RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

Solid Waste Management Unit 57 (RAAP-022)
RCRA Facility Investigation/
Corrective Measures Study Report

FINAL
SEPTEMBER 2009

PREPARED BY:

URS

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CONTRACT W9128F-04-D-0001
DELIVERY ORDER NO. DA03

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

September 21, 2009

Commander,
Radford Army Ammunition Plant
Attn: SJMRF-OP-EQ (Jim McKenna)
P.O. Box 2
Radford, VA 24141-0099

P.W. Holt
Environmental Manager
Alliant Techsystems, Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

Re: Radford Army Ammunition Plant, Va.
Review of Army's Final RCRA Facility Investigation/Corrective Measures Study (RFI/CMS) Report for Solid Waste Management Unit (SWMU) 57

Dear Mr. McKenna and Ms. Holt:

The U.S. Environmental Protection Agency (EPA) and Virginia Department of Environmental Quality (VDEQ) have reviewed the U.S. Army's (Army's) September 2009 Final RFI/CMS Report for SWMU 57, located at the Radford Army Ammunition Plant (RFAAP) in Radford, Virginia. Based upon our review, the report is approved, and in accordance with Part II. (E) (5) of RFAAP's Corrective Action Permit, it can now be considered final.

If you have any questions, please call me at 215-814-3413. Thanks.

Sincerely,

William Geiger
RCRA Project Manager
Office of Remediation (3LC20)

cc: James Cutler, VDEQ

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September 21, 2009

Mr. William Geiger
RCRA General Operations Branch, Mail Code: 3WC23
Waste and Chemicals Management Division
U. S. Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Mr. James L. Cutler, Jr.
Virginia Department of Environmental Quality
629 East Main Street
Richmond, VA 24143-0100

Subject: With Certification, Solid Waste Management Unit 57 (RAAP-022) RCRA Facility Investigation/Corrective Measures Study Report, Final September 2009
EPA ID# VA1 210020730

Dear Mr. Geiger and Mr. Cutler:

Enclosed is the certification for the subject document that was sent to you on September 17, 2009. Also enclosed is the 17 September 2009 transmittal email and with its attached response to comments.

This document was revised per the response to comments and we anticipate approval.

Please coordinate with and provide any questions or comments to myself at (540) 639-8658, Jerry Redder ATK staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 731-5782.

Sincerely,

P.W. Holt, Environmental Manager for
Alliant Techsystems Inc.

c: Karen Sismour
Virginia Department of Environmental Quality
P. O. Box 10009
Richmond, VA 23240-0009

E. A. Lohman
Virginia Department of Environmental Quality
Blue Ridge Regional Office
3019 Peters Creek Road
Roanoke, VA 24019

09-815-156
JMcKenna

bc: Administrative File
J. McKenna, ACO Staff
Rob Davie-ACO Staff
P.W. Holt
J. J. Redder
Env. File

Coordination: J. McKenna M. A. Miano

09-815-156
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Rich Mendoza
U.S. Army Environmental Command
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Rock Island, Illinois 61299

Tom Meyer
Corps of Engineers, Baltimore District
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Baltimore, MD 21201

09-815-156
JMcKenna

Concerning the following:

Radford Army Ammunition Plant
Solid Waste Management Unit 57 (RAAP-022)
RCRA Facility Investigation/Corrective Measures Study Report
Final September 2009

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

SIGNATURE:
PRINTED NAME: Antonio Munera
TITLE: LTC, CM
Commanding

SIGNATURE:
PRINTED NAME: Kent Holiday
TITLE: Vice President and General Manager
ATK Energetics Systems

09-815-156
JMcKenna

Greene, Anne

From: McKenna, Jim
Sent: Thursday, September 17, 2009 10:09 AM
To: Greene, Anne; ealohman@deq.virginia.gov; Druck, Dennis E Mr CIV USA MEDCOM CHPPM; diane.wisbeck@arcadis-us.com; durwood willis2; Geiger.William@epamail.epa.gov; Redder, Jerome; jim spencer; jlcutler@deq.virginia.gov; kjsismour@deq.virginia.gov; Llewellyn, Tim; Mendoza, Richard R Mr CIV USA IMCOM; Meyer, Tom NAB02; Parks, Jeffrey N; Timothy.Leahy@shawgrp.com; Tina_Devine@URSCorp.com
Cc: Lee_Mareck@URSCorp.com
Subject: SWMU 57 RFI/CMS Final Report FedEx Tracking Numbers (UNCLASSIFIED)
Attachments: Final RTC EPA SWMU 57 RFI-CMS Comments complete rev.pdf

Importance: High

Classification: UNCLASSIFIED
Caveats: FOUO

All:

Note the contractor will ship the subject document with a copy of this email to the POCs and tracking numbers below. Attached are our responses to regulatory comments received on the draft version of this report. The final report was revised in accordance with these responses.

Certification letter will follow from Radford AAP under separate cover.

Immediately below are the POCs with tracking numbers:

James McKenna 7979 3773 7938 2 Paper copies

Will Geiger 7969 5013 4911 1 Paper copy/1 CD

Jim Cutler 7979 3774 4756 1 Paper copy/1 CD

Tom Meyer 7969 5011 8709 1 Paper copy/1 CD

Richard Mendoza 7979 3775 4025 1 Paper copy/1 CD

Dennis Druck 7979 3772 0005 1 CD

Elizabeth Lohman 7979 3772 7970 1 CD

Susan Ryan 7979 3771 1559 1 CD

Thank you for your support of the Radford Army Ammunition Plant Installation Restoration Program, Jim McKenna 540 731 5782

Classification: UNCLASSIFIED
Caveats: FOUO

Final Response to Comments Minus RA Comments (Original Comment Responses April 21, 2009, Revised Responses via e-mail August 14, 2009)
Comments on the *Draft SWMU 57 RFI/CMS*, Radford Army Ammunition Plant (RAAP), Radford, Virginia, dated September 2008. Original Comments Received 12/5/2008. Additional Comments Received 6/15/2009.

Comments

1. We agree with the soil excavation option, and, as always, we want to ensure that confirmation sampling is employed to verify delineation assumptions if necessary.

Response: Noted. Confirmation sampling requirements are outlined for the selected alternative (Alternative #4) in Section 10.4.1.

2. Section 2-7. How does the fact that 57MW1 is dry affect site-specific ground water flow assumptions? No argument is made in the text with respect to the validity of assuming that downgradient transport has been characterized. Installation of a 3rd downgradient well, and possibly a redrill of upgradient well 57 MW51 are recommended.

Original Response (4/21/2009): Since release detection monitoring wells 57MW2 and 57MW3 are located adjacent to SWMU 57 (Figure 4-5), site-related groundwater COCs requiring corrective measures have not been identified at SWMU 57 for either well, and soil containing COCs (i.e., a potential source) is being removed from the site, the installation of an additional well is not recommended.

USEPA/VDEQ Additional Comment (6/15/2009): While we agree with the proposed remedy, we feel that more explanation is needed in the RTCs. The response to #2 should be strengthened with more discussion of hydrology and conceptual site model for ground water (likelihood that locations of MW2 and MW3 really are downgradient, etc.)

Revised Response (8/14/2009): Monitoring wells 57MW2 and 57MW3 are located immediately adjacent to SWMU 57, topographically downgradient of the site, and screened in the uppermost water bearing zone; therefore, releases from the unit would be detected by these wells. Based on the location of monitoring wells 57MW2 and 57MW3, site-related groundwater COCs requiring corrective measures have not been identified at SWMU 57 for either well, and soil containing COCs (i.e., a potential source) is being removed from the site, the installation of an additional well is not recommended.

3. Section 5-9. URS argues that since the maximum soil concentration of 24 ug/kg would result in a chloroform concentration of 3.9 ug/L in groundwater, then there are no significant remaining sources of chloroform. However, it could also be argued that the presence of 57 ug/L would indicate that there may be a significant source of chloroform that has yet to be detected. Also, are there site specific reasons why chloroform is present?

Original Response (4/21/2009): As discussed in Section 5.1.4 of the RFI/CMS Report, the physiochemical properties of chloroform result in this compound preferentially leaching from soil to groundwater (i.e., partitioning to the aqueous phase) rather than significantly adsorbing to soil. Over time this would account for the higher concentrations detected in groundwater relative to those expected in soil under equilibrium conditions. Thus, it is reasonable to conclude that the presence of chloroform in groundwater at concentrations of 57 µg/L may not be indicative of a significant source of residual chloroform remaining in soil at the site, especially given the high number of samples (64) collected to characterize source area conditions at this small site.

Specific potential sources of chloroform at the site are likely the following: 1) potential leakage from facility water lines (containing chlorinated water) running along the eastern edge of the site (near 57SB17 where chloroform was detected in soil) and water lines in the vicinity of Building 4931, and 2) potential leakage of wastewater conveyed from the terracotta pipe located between Building 4931 and the pond (near 57SB1 where chloroform was detected in soil).

USEPA/VDEQ Additional Comment (6/15/2009): In comment #3 the chloroform concentration of 57 ug/L in GW suggests a significant source of chloroform. The RTC considers a soil source unlikely. How would a leaking chlorinated water line be a reasonable source of chloroform? Would chloroform need to be present above MCLs in the water line (some dilution anticipated) or would it be expected to form later in the ground water environment?

Revised Response (8/21/2009): Specific potential sources of chloroform at the site are likely the following: 1) potential leakage from facility water lines (containing chlorinated water) running along the eastern edge of the site (near 57SB17 where chloroform was detected in soil) and water lines in the vicinity of Building 4931, and 2) potential leakage of wastewater conveyed from the terracotta pipe located between Building 4931 and the pond (near 57SB1 where chloroform was detected in soil).

A leaking water line would be a reasonable source of chloroform detected in groundwater due to the presence of chlorine and chloroform in the water lines at RFAAP. Information provided by RFAAP indicates that chlorine levels in the water system average approximately 1 part per million (Jerry Redder, ATK personnel communication). Typically, the main source of chloroform found in drinking water lines is the chlorination of naturally humic materials found in the raw-water supply. Chloroform concentrations may increase as the water moves through the system due to increased contact time between the chlorine and humic material (ATSDR 1997, p. 203). Representative drinking water sample data presented in the VDEQ approved Alternative Source Demonstration for HWMU 7 indicated detectable levels of chloroform up to 120 microgram per liter µg/L, which is approximately two times higher than detected in well 57MW2.

Similar to the formation of chloroform as a by product of chlorination, chlorine water released to the environment from a leaking water line would have the potential to form chloroform in the groundwater environment through reactions

with organic matter contained in soil/aquifer material. Testing of deeper soil at SWMU 57 representative of soil aquifer material confirm the presence of appreciable organic matter (3.6%), which would be available to react with the chlorine contained in leaking water to produce chloroform in the groundwater environment. Similar reactions of chlorine with organic matter have been observed in swimming pools containing appreciable organic material, where concentrations of chloroform as high as 163 µg/L have been documented (ATSDR 1997, p 204).

Given the above information and processes of chloroform formulation, prolonged leaching of water from a leaking water line could reasonably account for the level of chloroform detected in well 57MW7 through a combination of mixing of leaking water with the aquifer and subsequent reactions of chlorine contained in the water with the appreciable organic matter contained in the aquifer matrix.

Reference: Agency for Toxic Substances and Disease Registry (ATSDR), Toxicological Profile for Chloroform, September 1997, Chapter 5 p 203-204.

4. Long-Term Groundwater Monitoring (LTM) is included in Section 10.0 as part of Alternatives 2, 3, and 4. The summary presented on Pages 10-1 and 10-2 indicates that two wells are proposed for inclusion in the LTM program. As the RFI/CMS Report was prepared in response to a Corrective Action Permit, Resource Conservation and Recovery Act (RCRA) requirements for a regulated unit (i.e., Solid Waste Management Unit (SWMU) 57) will apply. The RCRA requirements for long-term groundwater monitoring of a regulated unit specify that a minimum of one upgradient well and three downgradient wells be monitored. The remedial alternative selected in the RFI/CMS Report allows for one round of groundwater monitoring of the unit, but the currently proposed monitoring scheme only includes two downgradient wells. In order to meet RCRA requirements, the RFI/CMS Report should include a proposal for the installation of a minimum of one additional upgradient well in place of 57MW1 (assuming this well continues to produce insufficient sample volume) and an additional downgradient monitoring point. Placement of these wells should be based on an evaluation of relevant site data (e.g., adjacent site and/or regional groundwater flow data), and factors influencing well placement should be discussed in the RFI/CMS Report. The RFI/CMS Report should also clarify how the final groundwater monitoring network and overall LTM program is sufficient to ensure that groundwater contaminants will not be overlooked if released from SWMU 57 over the long term.

Response: The selected alternative (Alternative #4) entails the excavation of approximately 2,358 tons of soil from the site, groundwater sampling prior to remedy implementation to verify RFI findings that COPC concentrations in groundwater are below applicable MCLs and risk-based criteria and confirm clean closure is achievable at the site. After completion of the remedy and verification that requirements for clean closure have been met, the existing monitoring wells will be abandoned (57MW1, 57MW2, and 57MW3); therefore, no long term monitoring is proposed.

Final Response to RA Comments (April 21, 2009)
Comments on the *Draft SWMU 57 RFI/CMS*, Radford Army Ammunition Plant (RAAP), Radford, Virginia, dated September 2008. Received 3/4/2009

General Comments

The claim that chloroform contamination in groundwater at the Radford site is widespread, and is not associated with any specific waste management unit is acknowledged; however, the presence of chloroform in groundwater must be evaluated on a case by case basis during assessment of individual units. The presence of chloroform cannot be dismissed unilaterally from site investigation results.

Response: Agreed. Chloroform in groundwater will be evaluated on a case by case basis during the assessment of individual units.

Specific Comments

1. Section 4.1.1 – Analytical Results – Please indicate whether rocket fuels (e.g., hydrazine, perchlorate, etc.) were included in the analytical work. This is asked based on the description given in Section 2.1 (Site Description) of the work previously performed (reconditioning of Nike and Honest John rocket motors) at an adjacent settling pond (SWMU-69) as well as SWMU-57.

   Response: Hydrazine is a component of liquid fueled rockets and RFAAP made only solid fuel rocket motors for various defense programs over the years. Bldg. 4931 was used to clean the solid rocket motor cases after test firing with the acid wastewater being directed to treatment, i.e. the SWMU 57 acid pond. The pond at SWMU 57 received the acid wastewater (chromic acid, hydraulic oil, Oakite-33, and zinc phosphate) used to clean rocket encasements. Perchlorate analysis (SW-846 Method 6850) was conducted for groundwater samples at SWMU 57, as outlined in Section 3.0 of the document, resulting in one detection of 0.16 ug/L at 57MW3 which is below the adjusted T-RBC (2.56 ug/L).

2. Section 4.1.2.3 – Lower area Surrounding Pond/Drainage Swale – On Page 4-8 the author states that pesticides and PCBs were not analyzed for in samples from the lower area surrounding the pond/drainage swale. It is unclear why they were not included in the analytical work, especially PCBs, since PCBs were found in samples from the pond.

   Response: The SSP report (Final May 2007) recommended a focused RFI investigation for metals and VOCs (pesticides/PCBs/SVOCs/explosives were not identified as a human health COPCs or COPECs), but the regulatory review of the RFI/CMS Work Plan Addendum for SWMU 57 resulted in the addition of a full suite of chemicals for samples from the pond area (the potential source area) to confirm the results of the SSP investigation. The RFI/CMS investigation did not identify pesticides/PCBs/SVOCs/explosives as chemicals of concern based on the risk assessments with the exception PCBs and SVOCs for amphibians within the pond area; thereby confirming the work plan sampling program.

3. Section 4.1.2.4 – Upper Area Surrounding Pond – It is unclear why pesticides, PCBs, SVOCs, and explosives were not collected from the upper area surrounding the pond.

Response: See response to Specific Comment #2.

4. Section 4.2.2 – Human Health Nature and Extent Assessment – See General comments on MCLs.

   Response: See response to general comment #1.

5. Section 4.0 – Nature and Extent Summary – It is unclear to me how contamination migrated down to a depth of 15 bgs when the pond had an asphalt liner/bottom. Please indicate whether the terra cotta pipe penetrated the asphalt liner or if the liner was not intact, thereby allowing certain COCs (e.g., chloroform, Aroclors 1254, 1260) to migrate downward into subsurface soils and groundwater.

   Response: The terracotta pipe enters the pond through the upper portion of the asphalt berm surrounds the pond and does not penetrate the asphalt liner. Given that asphalt is not considered an infinitely impermeable material when used as a liner (compared to synthetic liners, etc.); it is possible some slow vertical leakage of water occurred through the liner over time. Limited migration of organic constituents (i.e., PCBs) was observed below the asphalt liner as shown on Figures 4-2 and 4-3 at low concentrations. Chloroform detections in soil were limited to areas outside of the pond with the highest concentrations detected near existing plant water lines (57SB17) and the area of the terracotta pipe between the building and the pond.

6. Section 6.1.1.1 – Surface Soil and Total Soil – Please indicate if is typical to break soil sampling depths into a 0-1' and a broad 1-15' depth. Having only one subsurface depth can make determining an appropriate cleanup depth difficult.

   Response: As previously discussed during a conference call with Jeff Tuttle (2/19/2009), the sample were not collected from 0-1' and 1-15' but rather various intervals including surface, immediately below the pond asphalt liner, intermediate depth, and terminal depth. The depths of 0-1' and 1-15' reflect the division of samples into surface soil (0-1') and subsurface soil (1-15') for the risk assessment soil groupings. Total soil data grouping consists of surface and subsurface soil samples to address mixing of soil during construction or land development activities.

7. Section 7.1.1 – Ecological Site Characterization – Although SWMU-57 is not likely to provide sufficient habitat for many receptors, it does provide a food supply for those receptors (e.g., raccoons) that may feed on amphibians. Also, a single site reconnaissance is insufficient to adequately determine site usage by ecological receptors.

   Response: As previously discussed during a conference call with Jeff Tuttle (2/19/2009), during the site visit in July 2005, conducted with BTAG personnel, it was established that due to the proximity to the New River that SWMU 57 would likely not be an attractive habitat to ecological receptors with the exception of amphibians. It was agreed at that time to assess terrestrial receptors and amphibians at the site. Plants, invertebrates, terrestrial wildlife, and amphibians were assessed as presented in Section 7, which resulted in the

identification of a potential risk to plants, invertebrates and wildlife at the site due to metals and a a potential risk to amphibians at the site due to metals, pesticides, total PCBs, one SVOC, and high molecular weight PAHs. As presented in Section 7.2.3, elevated concentrations are primarily located within the pond area or its appurtenances.

8. Section 7.1.2.3 – Terrestrial – The first bullet on page 7-3 states that receptors that are "Highly likely to occur at the site in relatively high abundance" will be used for assessing mobility with the food web. It is unclear exactly what this means. Please clarify.

   Response: The first bullet of Section 7.1.2.3 will be revised as follows: "Highly likely to occur at the site."

9. Section 7.1.5 – Preliminary Exposure Estimate and Ecological Effects Evaluation – The author states an "HQ of less than one indicates no or negligible risk." EPA's Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting ERAs states that "An HQ less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects", not no or negligible risk. It is also important to take into account multiple COPCs acting through the same exposure mechanism.

   Response: The last paragraph of Section 7.1.5 will be revised as follows: "An HQ of less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects. The potential for risk increases as the HQ increases above one. However, this result should be considered in the context of other characteristic of the exposure area. In addition, it should be noted that the calculation of chemical specific HQs does not account for multiple chemicals acting through the same exposure mechanism. The results of the preliminary exposure assessment are presented in Appendix F.2."

10. Section 7.3.3 – Wildlife Profile Assumptions – Regarding area use factors (AF), it is important to recognize that while habitat may be of low or poor quality (suitability) it will still attract receptors (amphibians with SWMU-57) and species that prey on them if similar other alternative is not available. Therefore, a refined home range for a receptor that preys on amphibians (e.g., raccoon) may actually underestimate its risk.

    Response: See response to Specific Comment #7.

11. Table 9-1 – It is indicated that for Soil Excavation and Off-Site Disposal that stabilization may be required due to saturated conditions. It is unclear why dewatering was not included as a possible treatment prior to removal and disposal.

    Response: Dewatering, treatment, and disposal of any water present in the pond is included as a component of the soil excavation and offsite disposal technology in Section 10 (Development of Corrective Measures) for both Alternative 3 and 4, as presented in Sections 10.3.2 and 10.4.1, respectively.

12. Section 12 – Ranking of Corrective Measures Alternatives – I agree that that Alternative 4 (Excavation of Soil and Off-Site Disposal for Clean Closure and Unrestricted Land Use) should adequately reduce risks to human and ecological receptors that may be exposed to

site related COCs.

Response: Noted. No response required.

13. Table 4s – Values used in Intake Equations – I do not agree with a number of the intake parameters used in the HHRA modeling; however, since I was not involved with the project at its beginning, as well as the intake parameters I used in running the models resulted in exposure still within acceptable limits, they do not have to be changed. Future work may require additional discussion on intake parameters.

    Response: As previously discussed during a conference call with Jeff Tuttle (2/19/2009), the inhalation rate for the adult resident will be revised to 0.83 m^3/hour. Otherwise he was in agreement with the values.

14. Table 7s – Calculations – I was unable to replicate a number of the cancer risks and noncancer hazards, with some being off by ten-fold; however, the differences had minimal effect on the final outcome.

    Response: As previously discussed during a conference call with Jeff Tuttle (2/19/2009), there were technical difficulties with his spreadsheets and he was able to replicate the values when calculating them by hand.

15. Appendix F – ERA – It is unknown to me what previous agreements were made with EPA regarding the ecological risk assessment (ERA). Based on the information presented in this Appendix and in the document, it appears that the selected alternative (Alternative 4 – Excavation of Soil and Off-Site Disposal for Clean Closure and Unrestricted Land Use) should be protective of ecological receptors that may use SWMU-57. This is based in part on the excavation depth including the top 2-feet which is generally considered to be the most biologically active zone, as well as calculations provided in the ERA. Burrowing animals may still be at risk below this zone but the average excavation is anticipated to be below this level. If the selected alternative changes it may be necessary to revisit the ERA to ensure that a different alternative remains protective of ecological receptors at the site. Confirmatory sampling will be need to be conducted to confirm that soil levels of COCs are below levels that show unacceptable risk to ecological receptors. (Numerous COCs had NOAEL HQs exceeding 100 with others ranging from 10 – 100.)

    Response: Upon further discussion (conference call with Jeff Tuttle (2/19/2009)) of the site layout (i.e., the site is a distinct depressed area approximately 4 ft lower that the surrounding terrain) and since the excavation includes removal of the top 2 feet of soil for the site, no additional confirmation sampling beyond what has been stipulated in Section 10.4.1 (under Confirmation Soil Sampling) for Alternative #3 is proposed.

16. Table G-5 – It is unclear why a remedial goal was not calculated for vanadium; it is listed on Table E 1-10.2 RME as a COC for soil. Also, a point of clarification: the remedial goal will be the lower of the residential number for a child or an adult.

    Response: A remedial goal was not calculated for vanadium since vanadium was below

background for total soil.

Geiger.William@epamail.epa.gov
09/09/09 01:49 PM

To "McKenna, Jim J Mr CIV USA AMC" <jim.mckenna@us.army.mil>
cc jerome.redder@atk.com, jlcutler@deq.virginia.gov, "Mendoza, Richard R Mr CIV USA IMCOM" <richard.r.mendoza@us.army.mil>,
bcc
Subject SWMU 57 Response to USEPA Comments (UNCLASSIFIED)

History: This message has been forwarded.

Jim, EPA and VDEQ approve of these responses. Thanks

William A. Geiger
Office of Remediation (3LC20)
USEPA Region III
1650 Arch Street
Philadelphia, PA 19103
(215)814-3413

"McKenna, Jim J Mr CIV USA AMC " <jim.mckenna@us.army.mil>
08/14/09 05:14 PM

To <Geiger.William@epamail.epa.gov>, <jlcutler@deq.virginia.gov>
cc "Meyer, Tom NAB02" <Tom.Meyer@usace.army.mil>, "Mendoza, Richard R Mr CIV USA IMCOM" <richard.r.mendoza@us.army.mil>,
bcc
Subject RE: Response to USEPA Comments (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: FOUO

Will, Jim,

Resending as I forgot to include Tina on the distribution.

Please see the attached response to the USEPA comments (received via e-mail from Will Geiger on June 15, 2009) on our RTCs for SWMU 57 RFI/CMS. Upon USEPA approval of the revised responses, I will submit a final response to comments and the final report.

Thanks,
Jim

Classification: UNCLASSIFIED
Caveats: FOUO

Response to USEPA RTC to SWMU 57 RTCs jjm edit.doc

Geiger.William@epamail.epa.gov
06/15/09 01:35 PM

To "McKenna, Jim J Mr CIV USA AMC" <jim.mckenna@us.army.mil>
cc anne.greene@atk.com, "Druck, Dennis E Mr CIV USA MEDCOM CHPPM" <dennis.druck@us.army.mil>, "durwood willis2" <dhwillis@deq.virginia.gov>,
bcc
Subject Re: SWMU 57 RFI/CMS draft report, Response to Comments (UNCLASSIFIED)

While we agree with the proposed remedy, we feel that more explanation is needed in the RTCs. The response to #2 should be strengthened with more discussion of hydrology and conceptual site model for ground water (likelihood that locations of MW2 and MW3 really are downgradient, etc.)

In comment #3 the chloroform concentration of 57 ug/L in GW suggests a significant source of chloroform. The RTC considers a soil source unlikely. How would a leaking chlorinated water line be a reasonable source of chloroform? Would chloroform need to be present above MCLs in the water line (some dilution anticipated) or would it be expected to form later in the ground water environment?

William A. Geiger
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"McKenna, Jim J Mr CIV USA AMC " <jim.mckenna@us.army.mil>
04/21/09 01:06 PM

To <anne.greene@atk.com>, <ealohman@deq.virginia.gov>, "Druck, Dennis E Mr CIV USA MEDCOM CHPPM" <dennis.druck@us.army.mil>,
cc
bcc
Subject SWMU 57 RFI/CMS draft report, Response to Comments (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: FOUO

Will Geiger and Jim Cutler:

Attached are the subject responses. Please let us know as soon as you can if these responses are ok so we can revise and resubmit this report as final.

Thanks,
Jim
Classification: UNCLASSIFIED
Caveats: FOUO

SWMU 57 RFI-CMS RTC regulator Complete.pdf

Response to Comments Minus RA Comments (April 21, 2009)
Comments on the *Draft SWMU 57 RFI/CMS,* Radford Army Ammunition Plant (RAAP), Radford, Virginia, dated September 2008. Received 12/5/2008

Comments

1. We agree with the soil excavation option, and, as always, we want to ensure that confirmation sampling is employed to verify delineation assumptions if necessary.

> **Response:** Noted. Confirmation sampling requirements are outlined for the selected alternative (Alternative #4) in Section 10.4.1.

2. Section 2-7. How does the fact that 57MW1 is dry affect site-specific ground water flow assumptions? No argument is made in the text with respect to the validity of assuming that downgradient transport has been characterized. Installation of a 3rd downgradient well, and possibly a redrill of upgradient well 57 MW51 are recommended.

> **Response:** Since release detection monitoring wells 57MW2 and 57MW3 are located adjacent to SWMU 57 (Figure 4-5), site-related groundwater COCs requiring corrective measures have not been identified at SWMU 57 for either well, and soil containing COCs (i.e., a potential source) is being removed from the site, the installation of an additional well is not recommended.

3. Section 5-9. URS argues that since the maximum soil concentration of 24 ug/kg would result in a chloroform concentration of 3.9 ug/L in groundwater, then there are no significant remaining sources of chloroform. However, it could also be argued that the presence of 57 ug/L would indicate that there may be a significant source of chloroform that has yet to be detected. Also, are there site specific reasons why chloroform is present?

> **Response:** As discussed in Section 5.1.4 of the RFI/CMS Report, the physiochemical properties of chloroform result in this compound preferentially leaching from soil to groundwater (i.e., partitioning to the aqueous phase) rather than significantly adsorbing to soil. Over time this would account for the higher concentrations detected in groundwater relative to those expected in soil under equilibrium conditions. Thus, it is reasonable to conclude that the presence of chloroform in groundwater at concentrations of 57 µg/L may not be indicative of a significant source of residual chloroform remaining in soil at the site, especially given the high number of samples (64) collected to characterize source area conditions at this small site.
>
> Specific potential sources of chloroform at the site are likely the following: 1) potential leakage from facility water lines (containing chlorinated water) running along the eastern edge of the site (near 57SB17 where chloroform was detected in soil) and water lines in the vicinity of Building 4931, and 2) potential leakage of

wastewater conveyed from the terracotta pipe located between Building 4931 and the pond (near 57SB1 where chloroform was detected in soil).

4. Long-Term Groundwater Monitoring (LTM) is included in Section 10.0 as part of Alternatives 2, 3, and 4. The summary presented on Pages 10-1 and 10-2 indicates that two wells are proposed for inclusion in the LTM program. As the RFI/CMS Report was prepared in response to a Corrective Action Permit, Resource Conservation and Recovery Act (RCRA) requirements for a regulated unit (i.e., Solid Waste Management Unit (SWMU) 57) will apply. The RCRA requirements for long-term groundwater monitoring of a regulated unit specify that a minimum of one upgradient well and three downgradient wells be monitored. The remedial alternative selected in the RFI/CMS Report allows for one round of groundwater monitoring of the unit, but the currently proposed monitoring scheme only includes two downgradient wells. In order to meet RCRA requirements, the RFI/CMS Report should include a proposal for the installation of a minimum of one additional upgradient well in place of 57MW1 (assuming this well continues to produce insufficient sample volume) and an additional downgradient monitoring point. Placement of these wells should be based on an evaluation of relevant site data (e.g., adjacent site and/or regional groundwater flow data), and factors influencing well placement should be discussed in the RFI/CMS Report. The RFI/CMS Report should also clarify how the final groundwater monitoring network and overall LTM program is sufficient to ensure that groundwater contaminants will not be overlooked if released from SWMU 57 over the long term.

Response: The selected alternative (Alternative #4) entails the excavation of approximately 2,358 tons of soil from the site, groundwater sampling prior to remedy implementation to verify RFI findings that COPC concentrations in groundwater are below applicable MCLs and risk-based criteria and confirm clean closure is achievable at the site. After completion of the remedy and verification that requirements for clean closure have been met, the existing monitoring wells will be abandoned (57MW1, 57MW2, and 57MW3); therefore, no long term monitoring is proposed.

Response to RA Comments (April 21, 2009)
Comments on the *Draft SWMU 57 RFI/CMS*, Radford Army Ammunition Plant (RAAP), Radford, Virginia, dated September 2008. Received 3/4/2009

General Comments

The claim that chloroform contamination in groundwater at the Radford site is widespread, and is not associated with any specific waste management unit is acknowledged; however, the presence of chloroform in groundwater must be evaluated on a case by case basis during assessment of individual units. The presence of chloroform cannot be dismissed unilaterally from site investigation results.

Response: Agreed. Chloroform in groundwater will be evaluated on a case by case basis during the assessment of individual units.

Specific Comments

1. Section 4.1.1 – Analytical Results – Please indicate whether rocket fuels (e.g., hydrazine, perchlorate, etc.) were included in the analytical work. This is asked based on the description given in Section 2.1 (Site Description) of the work previously performed (reconditioning of Nike and Honest John rocket motors) at an adjacent settling pond (SWMU-69) as well as SWMU-57.

   Response: Hydrazine is a component of liquid fueled rockets and RFAAP made only solid fuel rocket motors for various defense programs over the years. Bldg. 4931 was used to clean the solid rocket motor cases after test firing with the acid wastewater being directed to treatment, i.e. the SWMU 57 acid pond. The pond at SWMU 57 received the acid wastewater (chromic acid, hydraulic oil, Oakite-33, and zinc phosphate) used to clean rocket encasements. Perchlorate analysis (SW-846 Method 6850) was conducted for groundwater samples at SWMU 57, as outlined in Section 3.0 of the document, resulting in one detection of 0.16 ug/L at 57MW3 which is below the adjusted T-RBC (2.56 ug/L).

2. Section 4.1.2.3 – Lower area Surrounding Pond/Drainage Swale – On Page 4-8 the author states that pesticides and PCBs were not analyzed for in samples from the lower area surrounding the pond/drainage swale. It is unclear why they were not included in the analytical work, especially PCBs, since PCBs were found in samples from the pond.

   Response: The SSP report (Final May 2007) recommended a focused RFI investigation for metals and VOCs (pesticides/PCBs/SVOCs/explosives were not identified as a human health COPCs or COPECs), but the regulatory review of the RFI/CMS Work Plan Addendum for SWMU 57 resulted in the addition of a full suite of chemicals for samples from the pond area (the potential source area) to confirm the results of the SSP investigation. The RFI/CMS investigation did not identify pesticides/PCBs/SVOCs/explosives as chemicals of concern based on the risk assessments with the exception PCBs and SVOCs for amphibians within the pond area; thereby confirming the work plan sampling program.

3. Section 4.1.2.4 – Upper Area Surrounding Pond – It is unclear why pesticides, PCBs, SVOCs, and explosives were not collected from the upper area surrounding the pond.

Response: See response to Specific Comment #2.

4. Section 4.2.2 – Human Health Nature and Extent Assessment – See General comments on MCLs.

   Response: See response to general comment #1.

5. Section 4.0 – Nature and Extent Summary – It is unclear to me how contamination migrated down to a depth of 15 bgs when the pond had an asphalt liner/bottom. Please indicate whether the terra cotta pipe penetrated the asphalt liner or if the liner was not intact, thereby allowing certain COCs (e.g., chloroform, Aroclors 1254, 1260) to migrate downward into subsurface soils and groundwater.

   Response: The terracotta pipe enters the pond through the upper portion of the asphalt berm surrounds the pond and does not penetrate the asphalt liner. Given that asphalt is not considered an infinitely impermeable material when used as a liner (compared to synthetic liners, etc.); it is possible some slow vertical leakage of water occurred through the liner over time. Limited migration of organic constituents (i.e., PCBs) was observed below the asphalt liner as shown on Figures 4-2 and 4-3 at low concentrations. Chloroform detections in soil were limited to areas outside of the pond with the highest concentrations detected near existing plant water lines (57SB17) and the area of the terracotta pipe between the building and the pond.

6. Section 6.1.1.1 – Surface Soil and Total Soil – Please indicate if is typical to break soil sampling depths into a 0-1' and a broad 1-15' depth. Having only one subsurface depth can make determining an appropriate cleanup depth difficult.

   Response: As previously discussed during a conference call with Jeff Tuttle (2/19/2009), the sample were not collected from 0-1' and 1-15' but rather various intervals including surface, immediately below the pond asphalt liner, intermediate depth, and terminal depth. The depths of 0-1' and 1-15' reflect the division of samples into surface soil (0-1') and subsurface soil (1-15') for the risk assessment soil groupings. Total soil data grouping consists of surface and subsurface soil samples to address mixing of soil during construction or land development activities.

7. Section 7.1.1 – Ecological Site Characterization – Although SWMU-57 is not likely to provide sufficient habitat for many receptors, it does provide a food supply for those receptors (e.g., raccoons) that may feed on amphibians. Also, a single site reconnaissance is insufficient to adequately determine site usage by ecological receptors.

   Response: As previously discussed during a conference call with Jeff Tuttle (2/19/2009), during the site visit in July 2005, conducted with BTAG personnel, it was established that due to the proximity to the New River that SWMU 57 would likely not be an attractive habitat to ecological receptors with the exception of amphibians. It was agreed at that time to assess terrestrial receptors and amphibians at the site. Plants, invertebrates, terrestrial

wildlife, and amphibians were assessed as presented in Section 7, which resulted in the identification of a potential risk to plants, invertebrates and wildlife at the site due to metals and a a potential risk to amphibians at the site due to metals, pesticides, total PCBs, one SVOC, and high molecular weight PAHs. As presented in Section 7.2.3, elevated concentrations are primarily located within the pond area or its appurtenances.

8. Section 7.1.2.3 – Terrestrial – The first bullet on page 7-3 states that receptors that are "Highly likely to occur at the site in relatively high abundance" will be used for assessing mobility with the food web. It is unclear exactly what this means. Please clarify.

   Response: The first bullet of Section 7.1.2.3 will be revised as follows: "Highly likely to occur at the site."

9. Section 7.1.5 – Preliminary Exposure Estimate and Ecological Effects Evaluation – The author states an "HQ of less than one indicates no or negligible risk." EPA's Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting ERAs states that "An HQ less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects", not no or negligible risk. It is also important to take into account multiple COPCs acting through the same exposure mechanism.

   Response: The last paragraph of Section 7.1.5 will be revised as follows: "An HQ of less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects. The potential for risk increases as the HQ increases above one. However, this result should be considered in the context of other characteristic of the exposure area. In addition, it should be noted that the calculation of chemical specific HQs does not account for multiple chemicals acting through the same exposure mechanism. The results of the preliminary exposure assessment are presented in Appendix F.2."

10. Section 7.3.3 – Wildlife Profile Assumptions – Regarding area use factors (AF), it is important to recognize that while habitat may be of low or poor quality (suitability) it will still attract receptors (amphibians with SWMU-57) and species that prey on them if similar other alternative is not available. Therefore, a refined home range for a receptor that preys on amphibians (e.g., raccoon) may actually underestimate its risk.

    Response: See response to Specific Comment #7.

11. Table 9-1 – It is indicated that for Soil Excavation and Off-Site Disposal that stabilization may be required due to saturated conditions. It is unclear why dewatering was not included as a possible treatment prior to removal and disposal.

    Response: Dewatering, treatment, and disposal of any water present in the pond is included as a component of the soil excavation and offsite disposal technology in Section 10 (Development of Corrective Measures) for both Alternative 3 and 4, as presented in Sections 10.3.2 and 10.4.1, respectively.

12. Section 12 – Ranking of Corrective Measures Alternatives – I agree that that Alternative 4

(Excavation of Soil and Off-Site Disposal for Clean Closure and Unrestricted Land Use) should adequately reduce risks to human and ecological receptors that may be exposed to site related COCs.

Response: Noted. No response required.

13. Table 4s – Values used in Intake Equations – I do not agree with a number of the intake parameters used in the HHRA modeling; however, since I was not involved with the project at its beginning, as well as the intake parameters I used in running the models resulted in exposure still within acceptable limits, they do not have to be changed. Future work may require additional discussion on intake parameters.

    Response: As previously discussed during a conference call with Jeff Tuttle (2/19/2009), the inhalation rate for the adult resident will be revised to 0.83 m^3/hour. Otherwise he was in agreement with the values.

14. Table 7s – Calculations – I was unable to replicate a number of the cancer risks and noncancer hazards, with some being off by ten-fold; however, the differences had minimal effect on the final outcome.

    Response: As previously discussed during a conference call with Jeff Tuttle (2/19/2009), there were technical difficulties with his spreadsheets and he was able to replicate the values when calculating them by hand.

15. Appendix F – ERA – It is unknown to me what previous agreements were made with EPA regarding the ecological risk assessment (ERA). Based on the information presented in this Appendix and in the document, it appears that the selected alternative (Alternative 4 – Excavation of Soil and Off-Site Disposal for Clean Closure and Unrestricted Land Use) should be protective of ecological receptors that may use SWMU-57. This is based in part on the excavation depth including the top 2-feet which is generally considered to be the most biologically active zone, as well as calculations provided in the ERA. Burrowing animals may still be at risk below this zone but the average excavation is anticipated to be below this level. If the selected alternative changes it may be necessary to revisit the ERA to ensure that a different alternative remains protective of ecological receptors at the site. Confirmatory sampling will be need to be conducted to confirm that soil levels of COCs are below levels that show unacceptable risk to ecological receptors. (Numerous COCs had NOAEL HQs exceeding 100 with others ranging from 10 – 100.)

    Response: Upon further discussion (conference call with Jeff Tuttle (2/19/2009)) of the site layout (i.e., the site is a distinct depressed area approximately 4 ft lower that the surrounding terrain) and since the excavation includes removal of the top 2 feet of soil for the site, no additional confirmation sampling beyond what has been stipulated in Section 10.4.1 (under Confirmation Soil Sampling) for Alternative #3 is proposed.

16. Table G-5 – It is unclear why a remedial goal was not calculated for vanadium; it is listed on Table E 1-10.2 RME as a COC for soil. Also, a point of clarification: the remedial goal will

be the lower of the residential number for a child or an adult.

Response: A remedial goal was not calculated for vanadium since vanadium was below background for total soil.

Geiger.William@epamail.epa.gov
03/04/09 02:52 PM

To "McKenna, Jim J Mr CIV USA AMC" <jim.mckenna@us.army.mil>
cc "jim spencer" <james_o_spencer@urscorp.com>, jerome.redder@atk.com, jlcutler@deq.virginia.gov, "Mendoza, Richard R Mr CIV USA IMCOM"
bcc
Subject SWMU 57 Risk Assessment Comments

Here are Betty Ann's edits of the SWMU 57 Risk Assessment Comments.

(See attached file: SWMU 57 Revised HH Eco comments.doc)

William A. Geiger
USEPA Region III
1650 Arch Street, 3LC20
Philadelphia, PA 19103
(215)814-3413
----- Forwarded by William Geiger/R3/USEPA/US on 03/04/2009 02:50 PM -----

William Geiger/R3/USEPA/US
02/12/2009 01:54 PM

To "McKenna, Jim J Mr CIV USA AMC" <jim.mckenna@us.army.mil>
cc "jim spencer" <james_o_spencer@urscorp.com>, jerome.redder@atk.com, jlcutler@deq.virginia.gov, "Mendoza, Richard R Mr CIV USA IMCOM" <richard.r.mendoza@us.army.mil>, Tina_Devine@URSCorp.com, "Meyer, Tom NAB02" <Tom.Meyer@nab02.usace.army.mil>, "Llewellyn, Tim" <Tim.Llewellyn@arcadis-us.com>, <Timothy.Leahy@shawgrp.com>
Subject SWMU 57 Risk Assessment Comments (Document link: William Geiger)

Below are EPA/VDEQ Risk Assessment Comments for the SWMU 57 RFI/CMS. Jeff Tuttle is a CERCLA Toxicologist who will hopefully be helping Ruth and Betty Ann out with some Radford Risk Assessment Reviews. If some of Jeff's comments don't follow with previously arranged Radford/EPA agreements, we can discuss at the meeting on Tuesday with Betty Ann. Thanks

(See attached file: Radford – Sept 08 Draft CMS Report RCRA HH Eco comments.doc)

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SWMU 57 Revised HH Eco comments.doc

Radford - Sept 08 Draft CMS Report RCRA HH Eco comments.doc

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

SUBJECT: Risk Assessment Comments on the September 2008 Draft Corrective Measures Study Report for SWMU 57: Radford Army Ammunition Plant

DATE: March 4, 2009

General Comments

The claim that chloroform contamination in groundwater at the Radford site is widespreaed, and is not associated with any specific waste management unit is acknowledged; however, the presence of chloroform in groundwater must be evaluated on a case by case basis during assessment of individual units. The presence of chloroform cannot be dismissed unilaterally from site investigation results.

Specific Comments

1. Section 4.1.1 – Analytical Results – Please indicate whether rocket fuels (e.g., hydrazine, perchlorate, etc.) were included in the analytical work. This is asked based on the description given in Section 2.1 (Site Description) of the work previously performed (reconditioning of Nike and Honest John rocket motors) at an adjacent settling pond (SWMU-69) as well as SWMU-57.

2. Section 4.1.2.3 – Lower area Surrounding Pond/Drainage Swale – On Page 4-8 the author states that pesticides and PCBs were not analyzed for in samples from the lower area surrounding the pond/drainage swale. It is unclear why they were not included in the analytical work, especially PCBs, since PCBs were found in samples from the pond.

3. Section 4.1.2.4 – Upper Area Surrounding Pond – It is unclear why pesticides, PCBs, SVOCs, and explosives were not collected from the upper area surrounding the pond.

4. Section 4.2.2 – Human Health Nature and Extent Assessment – See General comments on MCLs.

5. Section 4.0 – Nature and Extent Summary – It is unclear to me how contamination migrated down to a depth of 15 bgs when the pond had an asphalt liner/bottom. Please indicate whether the terra cotta pipe penetrated the asphalt liner or if the liner was not intact, thereby allowing certain COCs (e.g., chloroform, Aroclors 1254, 1260) to migrate downward into subsurface soils and groundwater.

6. Section 6.1.1.1 – Surface Soil and Total Soil – Please indicate if is typical to break soil sampling depths into a 0-1’ and a broad 1-15’ depth. Having only one subsurface depth can make determining an appropriate cleanup depth difficult.

7. Section 7.1.1 – Ecological Site Characterization – Although SWMU-57 is not likely to provide sufficient habitat for many receptors, it does provide a food supply for those receptors (e.g., raccoons) that may feed on amphibians. Also, a single site reconnaissance is insufficient to adequately determine site usage by ecological receptors.

8. Section 7.1.2.3 – Terrestrial – The first bullet on page 7-3 states that receptors that are "Highly likely to occur at the site in relatively high abundance" will be used for assessing mobility with the food web. It is unclear exactly what this means. Please clarify.

9. Section 7.1.5 – Preliminary Exposure Estimate and Ecological Effects Evaluation – The author states an "HQ of less than one indicates no or negligible risk." EPA's Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting ERAs states that "An HQ less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects", not no or negligible risk. It is also important to take into account multiple COPCs acting through the same exposure mechanism.

10. Section 7.3.3 – Wildlife Profile Assumptions – Regarding area use factors (AF), it is important to recognize that while habitat may be of low or poor quality (suitability) it will still attract receptors (amphibians with SWMU-57) and species that prey on them if similar other alternative is not available. Therefore, a refined home range for a receptor that preys on amphibians (e.g., raccoon) may actually underestimate its risk.

11. Table 9-1 – It is indicated that for Soil Excavation and Off-Site Disposal that stabilization may be required due to saturated conditions. It is unclear why dewatering was not included as a possible treatment prior to removal and disposal.

12. Section 12 – Ranking of Corrective Measures Alternatives – I agree that that Alternative 4 (Excavation of Soil and Off-Site Disposal for Clean Closure and Unrestricted Land Use) should adequately reduce risks to human and ecological receptors that may be exposed to site related COCs.

13. Table 4s – Values used in Intake Equations – I do not agree with a number of the intake parameters used in the HHRA modeling; however, since I was not involved with the project at its beginning, as well as the intake parameters I used in running the models resulted in exposure still within acceptable limits, they do not have to be changed. Future work may require additional discussion on intake parameters.

14. Table 7s – Calculations – I was unable to replicate a number of the cancer risks and noncancer hazards, with some being off by ten-fold; however, the differences had minimal effect on the final outcome.

15. Appendix F – ERA – It is unknown to me what previous agreements were made with EPA regarding the ecological risk assessment (ERA). Based on the information presented in this Appendix and in the document, it appears that the selected alternative (Alternative 4 – Excavation of Soil and Off-Site Disposal for Clean Closure and Unrestricted Land Use) should be protective of ecological receptors that may use SWMU-57. This is based in part on the excavation depth including the top 2-feet which

is generally considered to be the most biologically active zone, as well as calculations provided in the ERA. Burrowing animals may still be at risk below this zone but the average excavation is anticipated to be below this level. If the selected alternative changes it may be necessary to revisit the ERA to ensure that a different alternative remains protective of ecological receptors at the site. Confirmatory sampling will be need to be conducted to confirm that soil levels of COCs are below levels that show unacceptable risk to ecological receptors. (Numerous COCs had NOAEL HQs exceeding 100 with others ranging from 10 – 100.)

16. Table G-5 – It is unclear why a remedial goal was not calculated for vanadium; it is listed on Table E 1-10.2 RME as a COC for soil. Also, a point of clarification: the remedial goal will be the lower of the residential number for a child or an adult.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

SUBJECT: Comments on the September 2008 Draft Corrective Measures Study Report for SWMU 57: Radford Army Ammunition Plant

DATE: February 10, 2009

FROM: Jeffrey G. Tuttle, Toxicologist
Technical Support Branch (3HS41)

TO: Will Geiger (3WC23)
General Operations Branch

This memorandum is in response to your request to provide comments on the September 2008 Draft Corrective Measures Study Report for SWMU 57 for the Radford Army Ammunition Plant Site located in Radford, Virginia. The following comments are offered for your consideration.

General Comments

Chloroform was dismissed as COPC/COC based on the groundwater levels not exceeding the MCL for total trihalomethanes. I disagree with this approach for several reasons. First, the MCL for trihalomethanes is based on total trihalomethanes which are byproducts of drinking water disinfection and not as a result of a CERCLA release. Second, multiple trihalomethanes are factored into the MCL number and not a single compound of a known concentration(s). Third, MCLs are not entirely toxicity-based numbers; they also take into account the technical feasibility for removing a particular contaminant from water. Based on this it is recommended that a risk-based cleanup number for chloroform in groundwater be generated. Additionally, MCLs do not take into account impacts from multiple contaminants that act through the same mode or mechanism of action or affect the same target organs or systems.

Future work at Radford should utilize the Regional Screening Levels (RSLs). The RSLs can be found at:

http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm

The Region 3 RBC Tables can be used for the completion of this operable unit.

It is recommended that *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting ERAs* be used when conducting ERAs as this will lead to greater consistency among the sites at Radford and will help quicken review times.

Specific Comments

1. Section 4.0 Nature and Extent of Chemicals – The 95% UTL for several metals (Ba, Mn, and V - table on page 4-1) are higher than I would have expected for this part of the country. Please indicate how these background locations were chosen and if there are

any potential site (Facility as a whole) related influences on the locations.

2. Section 4.1.1 – Analytical Results – Please indicate whether rocket fuels (e.g., hydrazine, perchlorate, etc.) were included in the analytical work. This is asked based on the description given in Section 2.1 (Site Description) of the work previously performed (reconditioning of Nike and Honest John rocket motors) at an adjacent settling pond (SWMU-69) as well as SWMU-57.

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5. Section 4.2.2 – Human Health Nature and Extent Assessment – See General comments on MCLs.

6. Section 4.0 – Nature and Extent Summary – It is unclear to me how contamination migrated down to a depth of 15 bgs when the pond had an asphalt liner/bottom. Please indicate whether the terra cotta pipe penetrated the asphalt liner or if the liner was not intact, thereby allowing certain COCs (e.g., chloroform, Aroclors 1254, 1260) to migrate downward into subsurface soils and groundwater.

7. Section 6.1.1.1 – Surface Soil and Total Soil – Please indicate if is typical to break soil sampling depths into a 0-1' and a broad 1-15' depth. Having only one subsurface depth can make determining an appropriate cleanup depth difficult.

8. Section 6.1.2 – Identification of COPCs – I generally disagree with the concept of dropping COPCs from further consideration based on frequency of detection (FOD) when there is limited information on the spatial extent of the contamination. Dropping COPCs based on FOD at SWMU-57 may be less of an issue (in this instance) due to the limited size of the site, and the fact that soils will be removed from the entire area as well as adjacent areas; however, this decision should be made in consultation with EPA.

9. Section 7.1.1 – Ecological Site Characterization – Although SWMU-57 is not likely to provide sufficient habitat for many receptors, it does provide a food supply for those receptors (e.g., raccoons) that may feed on amphibians. Also, a single site reconnaissance is insufficient to adequately determine site usage by ecological receptors.

10. Section 7.1.2.3 – Terrestrial – The first bullet on page 7-3 states that receptors that are "Highly likely to occur at the site in relatively high abundance" will be used for assessing mobility with the food web. It is unclear exactly what this means. Please clarify.

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Risk Assessment Guidance for Superfund: Process for Designing and Conducting ERAs states that "An HQ less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects", not no or negligible risk. It is also important to take into account multiple COPCs acting through the same exposure mechanism.

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14. Section 12 – Ranking of Corrective Measures Alternatives – I agree that that Alternative 4 (Excavation of Soil and Off-Site Disposal for Clean Closure and Unrestricted Land Use) should adequately reduce risks to human and ecological receptors that may be exposed to site related COCs.

15. Table E.1-1 – Selection of Exposure Pathways – If future construction occurs on site vapor intrusion will need to be addressed based on the presence of elevated levels chloroform. Also, see General Comments.

16. Table 4s – Values used in Intake Equations – I do not agree with a number of the intake parameters used in the HHRA modeling; however, since I was not involved with the project at its beginning, as well as the intake parameters I used in running the models resulted in exposure still within acceptable limits, they do not have to be changed. Future work may require additional discussion on intake parameters.

17. Table 7s – Calculations – I was unable to replicate a number of the cancer risks and noncancer hazards, with some being off by ten-fold; however, the differences had minimal effect on the final outcome. Table 7.6 indicates that some sort of land use control may be needed to prevent inhalation exposure to chloroform in groundwater.

18. Appendix F – ERA – It is unknown to me what previous agreements were made with EPA regarding the ecological risk assessment (ERA). Based on the information presented in this Appendix and in the document, it appears that the selected alternative (Alternative 4 – Excavation of Soil and Off-Site Disposal for Clean Closure and Unrestricted Land Use) should be protective of ecological receptors that may use SWMU-57. This is based in part on the excavation depth including the top 2-feet which is generally considered to be the most biologically active zone, as well as calculations provided in the ERA. Burrowing animals may still be at risk below this zone but the average excavation is anticipated to be below this level. If the selected alternative changes it may be necessary to revisit the ERA to ensure that a different alternative remains protective of ecological receptors at the site. Confirmatory sampling will be need to be conducted to confirm that soil levels of COCs are below levels that show

unacceptable risk to ecological receptors. (Numerous COCs had NOAEL HQs exceeding 100 with others ranging from 10 – 100.)

19. Table G-5 – It is unclear why a remedial goal was not calculated for vanadium; it is listed on Table E 1-10.2 RME as a COC for soil. Also, a point of clarification: the remedial goal will be the lower of the residential number for a child or an adult.

Thank you for the opportunity to provide comments on this document. Please contact me at (215) 814-3236 if you have any questions.

Geiger.William@epamail.epa.gov
12/05/08 02:36 PM

To "McKenna, Jim J Mr CIV USA AMC" <jim.mckenna@us.army.mil>
cc anne.greene@atk.com, dennis.druck@us.army.mil, "durwood willis2" <dhwillis@deq.virginia.gov>, diane.wisbeck@arcadis-us.com,
bcc
Subject SWMU 57 RFI/CMS Comments

Jim, here are EPA/VDEQ comments on the draft SWMU 57 RFI/CMS, minus the Risk Assessments. Please call or email me with any questions.

(See attached file: Radford SWMU 57 Draft RFI-CMS Comments.doc)

William A. Geiger
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Radford SWMU 57 Draft RFI-CMS Comments.doc

Radford SWMU 57 Draft RFI/CMS

USEPA/VDEQ Comments

1. We agree with the soil excavation option, and, as always, we want to ensure that confirmation sampling is employed to verify delineation assumptions if necessary.

2. Section 2-7. How does the fact that 57MW1 is dry affect site-specific ground water flow assumptions? No argument is made in the text with respect to the validity of assuming that downgradient transport has been characterized. Installation of a 3rd downgradient well, and possibly a redrill of upgradient well 57 MW51 are recommended.

3. Section 5-9. URS argues that since the maximum soil concentration of 24 ug/kg would result in a chloroform concentration of 3.9 ug/L in groundwater, then there are no significant remaining sources of chloroform. However, it could also be argued that the presence of 57 ug/L would indicate that there may be a significant source of chloroform that has yet to be detected. Also, are there site specific reasons why chloroform is present?

4. Long-Term Groundwater Monitoring (LTM) is included in Section 10.0 as part of Alternatives 2, 3, and 4. The summary presented on Pages 10-1 and 10-2 indicates that two wells are proposed for inclusion in the LTM program. As the RFI/CMS Report was prepared in response to a Corrective Action Permit, Resource Conservation and Recovery Act (RCRA) requirements for a regulated unit (i.e., Solid Waste Management Unit (SWMU) 57) will apply. The RCRA requirements for long-term groundwater monitoring of a regulated unit specify that a minimum of one upgradient well and three downgradient wells be monitored. The remedial alternative selected in the RFI/CMS Report allows for one round of groundwater monitoring of the unit, but the currently proposed monitoring scheme only includes two downgradient wells. In order to meet RCRA requirements, the RFI/CMS Report should include a proposal for the installation of a minimum of one additional upgradient well in place of 57MW1 (assuming this well continues to produce insufficient sample volume) and an additional downgradient monitoring point. Placement of these wells should be based on an evaluation of relevant site data (e.g., adjacent site and/or regional groundwater flow data), and factors influencing well placement should be discussed in the RFI/CMS Report. The RFI/CMS Report should also clarify how the final groundwater monitoring network and overall LTM program is sufficient to ensure that groundwater contaminants will not be overlooked if released from SWMU 57 over the long term.

DEPARTMENT OF THE ARMY
US ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
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MCHB-TS-REH

16 OCT 2008

MEMORANDUM FOR Office of Environmental Quality, Radford Army Ammunition Plant (SJMRF-OP-EQ/Mr. Jim McKenna), P.O. Box 2, Radford, VA 24143-0002

SUBJECT: Document Titled: "Draft RCRA Facility Investigation/Corrective Measures Study Report, SWMU 57 (RAAP-022), Radford Army Ammunition Plant, Virginia, September 2008"

1. The U.S. Army Center for Health Promotion and Preventive Medicine reviewed, without comment, the subject document on behalf of the Office of The Surgeon General pursuant to Army Regulation 200-1 (Environmental Protection and Enhancement). We appreciate the opportunity to review this report and concur with the selected remedial alternative as being protective of human health and the environment.

2. The document was reviewed by Mr. Dennis Druck, Environmental Health Risk Assessment Program. He can be reached at DSN 584-2953, commercial (410) 436-2953 or electronic mail "dennis.druck@us.army.mil".

FOR THE COMMANDER:

Jeffrey S. Kirkpatrick

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September 23, 2008

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Mr. James L. Cutler, Jr.
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Subject:, Solid Waste Management Unit 57 (RAAP-022) RCRA Facility Investigation/Corrective Measures Study Report, Draft September 2008, With Certification
Radford Army Ammunition Plant,
EPA ID# VA1 210020730

Dear Mr. Geiger and Mr. Cutler:

Enclosed is the certification for the subject document that was sent to you on September 19, 2008. Also enclosed is a copy of the transmittal email message.

Please coordinate with and provide any questions or comments to myself at (540) 639-8658, Jerry Redder of my staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 731-5782.

Sincerely,

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Concerning the following:

Radford Army Ammunition Plant

Solid Waste Management Unit57 (RAAP-022)
RCRA Facility Investigation/Corrective Measures Study Report
Draft September 2008

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

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Subject: draft SWMU 57 RFI/CMS Tracking Numbers (UNCLASSIFIED)

Importance: High

Classification: UNCLASSIFIED
Caveats: NONE

All:

Note the contractor will ship the subject document with a copy of this email to the POCs and tracking numbers below.

Certification letter will follow from Radford AAP under separate cover.

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Thank you for your support of the Radford AAP Installation Restoration Program.

Jim McKenna
540 731 5782

Classification: UNCLASSIFIED
Caveats: NONE

EXECUTIVE SUMMARY

URS Group, Inc. (URS) conducted a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and Corrective Measures Study (CMS) at Radford Army Ammunition Plant (RFAAP) Solid Waste Management Unit (SWMU) 57, the Pond by Buildings 4931 and 4928 (the site), located in the Main Manufacturing Area (MMA) at the RFAAP, in Radford, Virginia. SWMU 57 is a 0.06-acre area (2,600 ft^2) consisting of an inactive, fabricated, asphalt-lined pond and associated piping.

The work was conducted to fulfill the requirements set forth in the 2000 RCRA Corrective Action permit as tasked by the United States Army Corps of Engineers, Baltimore District. URS performed the RFI/CMS in accordance with the Master Work Plan (MWP) developed for RFAAP, Work Plan Addendum (WPA) 021 (URS 2007e) to the MWP (URS 2003).

Nature and Extent Assessment

Metals were the primary chemicals of potential concern (COPCs) identified in soil at SWMU 57 with other detections above adjusted EPA Region III industrial risk-based concentrations (RBCs) limited to polychlorinated biphenyls (PCBs). Metals concentrations in soil were highest within the pond area above the pond's asphalt liner and in the surface samples collected from the drainage ditch area closest to the pond. Soil samples collected along and below the terracotta pipe leading from Building 4931 to the pond indicated significantly lower concentrations of metals than in the pond or drainage ditch.

Non-PCB organic compounds identified as COPCs were limited to the soil-to-groundwater pathway with low-level concentrations of methylene chloride and chloroform detected at concentrations above their default soil to groundwater screening values. COPCs identified in groundwater were limited antimony, arsenic, manganese, and chloroform, with dissolved metals and chloroform concentrations detected below their maximum contaminant levels (MCLs) or unadjusted T-RBC (manganese).

Fate and Transport Assessment

The fate and transport assessment potentially identified surface runoff as the mechanism for the occurrence of elevated metals in surface soil within the grass covered drainage swale extending from the pond area toward the northwest. Detected concentrations of metals in surface soil decreased with distance from the pond. Mass transport and runoff of metal and PCBs present within the pond to surrounding areas is prevented by the asphalt berm surrounding the pond.

Identified source areas where COPCs may potentially leach to subsurface soil include the pond area, soil at or below the depth of the terracotta pipe near the pond, and the grass covered drainage swale extending northwest of the pond. The presence of asphalt liner beneath the pond and has inhibited the vertical migration of COPCs such as metals and PCBs to underlying subsurface soil. Both inside and outside of the pond, a thick sequence of low permeability clay (+30 feet) at the site has inhibited vertical leaching of COPCs to deeper subsurface soil.

Appreciable leaching of metals from soil to groundwater at the site was not indicated by the dissolved metals data for site groundwater, where detected concentrations were below T-RBCs or MCLs. A potential low-level residual source of chloroform detected in groundwater was identified in the area of terracotta pipe where low levels of chloroform were detected in soil; however, the fate and transport assessment suggests that the remaining concentrations in soil would not represent a strong continuous source for future leaching of chloroform at levels that would potentially result in groundwater concentrations above the drinking water maximum contaminant level (MCL).

Human Health Risk Assessment (HHRA)

A HHRA was performed to evaluate the potential human health effects associated with previous activities at the site. Receptors evaluated included: current/future maintenance worker, hypothetical future construction worker, hypothetical future commercial worker, hypothetical future adult resident, hypothetical future child resident, and hypothetical lifetime resident. The HHRA included the calculated estimates of upper bound excess lifetime cancer risks for carcinogenic chemicals, and calculated estimates

of hazard quotients (HQs) and hazard indices (HI) for noncarcinogenic chemicals. HHRA methodology was consistent with guidance included in EPA's *Interim Final Risk Assessment Guidance for Superfund* (RAGS) and other current United States Environmental Protection Agency (USEPA)/USEPA Region III resources and guidance documents as noted in the report.

The current inactive industrial land use of the site is unlikely to change in the future in support of the Army's mission. The results of the risk assessment indicated that the calculated risk (2E-06) and hazard (8E-01) for the maintenance worker receptor associated with the current and most likely future land use at the site were at the lower end of USEPA's target risk range (1E-06 to 1E-04) and hazard range (1E+00 or less) for Superfund sites (USEPA 1989).

The risk assessment indicated that under an unlikely future hypothetical scenario, where the land use of the site would change from inactive to developed commercial/industrial property, the calculated hazard for future hypothetical construction worker would be above the target hazard of 1E+00, when considering target organs and background, primarily due to ingestion of antimony in soil and inhalation of aluminum and manganese. Calculated risks and hazards for future hypothetical commercial industrial worker were within USEPA's target risk and hazard ranges. Potential risks could be posed to human health and the environment under a hypothetical residential scenario where land use changed. The calculated risk for a lifetime resident under such a scenario (4E-04) is above USEPA's target range due primarily to chloroform in groundwater. The hazard for the adult resident when considering target organs and background is below the USEPA's target hazard range while the hazard for the child resident exceeds the USEPA target hazard range for several target organs primarily due to aluminum, antimony, cadmium, chromium, iron, and manganese in soil.

Screening Level Ecological Risk Assessment (SLERA)

A SLERA was performed to evaluate potential ecological risks associated with previous activities at the site. Direct contact and wildlife ingestion pathways were evaluated for soil. Terrestrial receptors that were evaluated included: plant communities, soil invertebrate/ microbial communities, American Robin, Red-tailed Hawk, Meadow Vole, Red Fox, and Short-tailed Shrew. A qualitative risk evaluation of amphibians was completed for the pond area. The SLERA assessed risk by comparing various exposure estimates for chemicals to available toxicity reference values (TRVs) for each receptor. The relative risk was expressed as a hazard quotient (HQ). An HQ of less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects. The potential for risk increases as the HQ increases above one. HQs were calculated for no effects range observable adverse effect levels (NOAELs) and lowest observable adverse effect levels (LOAELs). Preliminary and refined risk characterizations were conducted, with refined characterizations considering 95% upper confidence limits (UCLs) concentrations, background evaluations, and other more environmentally realistic assumptions than conservative preliminary estimates.

The SLERA results indicated that there was adequate information to conclude that the potential exists for an adverse ecological impact to terrestrial plants and soil invertebrates due to metals in soil, the American robin due to exposure to chromium in soil, and amphibians due to metals, pesticides, total PCBs, one semi-volatile organic compound, and high molecular weight polynuclear aromatic hydrocarbons in soil within the pond area. Elevated concentrations are primarily located within the pond area or its appurtenances. No other significant potential impacts to ecological receptors due to site-related activities were identified. Significant uncertainty is associated with the potential impacts to plants, invertebrates, the American robin, and amphibians. The Scientific Decision Management Point reached for the SLERA recommended that the need for remedial action to address these potential impacts be evaluated along with the uncertainty associated with the derivation of the HQs, the location of HHRA chemicals of concern (COCs), the fate and transport evaluation, and other relevant factors, which would influence any decision to implement action.

Corrective Measures Study (CMS)

The RFI risk assessment and fate and transport assessments identified a requirement to evaluate corrective measures for SWMU 57. The corrective measures objective (CMO) established for SWMU 57 was to mitigate the potential risks/hazards that have been identified for evaluated future hypothetical industrial receptors for exposure to soil (construction workers) at the site. Remedial goals were established for industrial soil, residential soil, and groundwater with consideration of risk, background levels in soil, and applicable and or relevant and appropriate requirements (ARARs), such as established drinking water maximum contaminant levels (MCLs). Maximum detected concentrations in groundwater were below remedial goals established for groundwater, and therefore, development of corrective measures specifically to address constituent concentrations in groundwater was not required.

Five potentially applicable corrective measure technologies for the site were identified and screened in the CMS with respect to their potential effectiveness and implementability in achieving the identified CMO. Four of the five technologies were retained for development of corrective measures alternatives based on the results of the technology screening. Four corrective measures alternatives were developed from these technologies in addition to a baseline no further action alternative including:

- Alternative One: No Further Action;
- Alternative Two: Institutional Controls, Engineering Controls, and Long-Term Monitoring
- Alternative Three: Soil Excavation and Offsite Disposal for Industrial Land Use, Institutional Controls, and Long-Term Monitoring; and
- Alternative Four: Excavation of Soil and Offsite Disposal for Clean Closure and Unrestricted Land Use.

The four alternatives were evaluated with respect to criteria specified in Attachment D of the RFAAP RCRA Permit (EPA 2000) and criteria for evaluating corrective measures alternatives in Section IV Part E of the RCRA Corrective Plan guidance document (EPA 1994a). Alternatives Three and Four were found to meet the established CMO, with Alternative Three allowing for future industrial use of the site without controls and Alternative Four exceeding the CMO by allowing for clean closure with unrestricted land use. Alternative Four was selected as the final alternative for SWMU 57 because: 1) it meets the established CMO, 2) it has the highest overall comparative ranking with approximately the same present value cost as the next highest ranked alternative (Alternative Three), which provides for future industrial land use without controls, and 3) it provides for clean closure and unrestricted land use without long-term monitoring (LTM) requirements.

Corrective Measure Alternative Four will consist of the following:

- Preparation of remedial implementation plans;
- Preparation of the site for excavation activities including removal of the perimeter fence surrounding the pond, dewatering the pond as necessary, and stabilizing material in the pond before excavation;
- Excavation of the pond area and associated surrounding soil with COC concentrations above residential RGs;
- Site restoration including backfilling, final grading, and restoration of vegetative cover;
- Abandonment of existing monitoring wells; and
- Preparation of closure documentation and reports.

Implementation of Alternative Four is expected to be completed in less than six months after site mobilization. This time frame is considered an estimate and the actual time to complete the corrective measures will be subject to site-specific conditions.

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SOLID WASTE MANAGEMENT UNIT 57
RCRA FACILITY INVESTIGATION/CORRECTIVE MEASURES STUDY REPORT
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- E.2 Iron "Margin of Exposure" Evaluation and Lead IEUBK Model Results

Appendix F Ecological Risk Assessment
- F.1 Screening Level Ecological Risk Assessment Process
- F.2 SWMU 57 SLERA
- F.3 Ecological Site Reconnaissance – July 2005

Appendix G Remedial Goal Calculations

Appendix H Analytical Data Evaluation
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- H.2 Laboratory Analytical Data (Form 1s)
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  - H.2.2 RCRA Facility investigation Sampling – 2007-2008

LIST OF ABBREVIATIONS AND ACRONYMS

°C .....Degrees Celsius
% .....Percent
AF .....Area Use Factor
AL .....Action Level
ALM.....Adult Lead Model
AST.....Aboveground Storage Tank
ATSDR .....Agency for Toxic Substance Disease Registry
BCY .....Bank Cubic Yard
bgs.....Below Ground Surface
BTAG.....Biological Technical Assistance Group
CDCP .....Center for Disease Control and Prevention
CDI.....Chronic Daily Intake
CF.....Cubic Feet
CFR.....Code of Federal Regulations
CH.....Fat Clay
CL .....Lean Clay
cm/sec .....Centimeters Per Second
CMO .....Corrective Measure Objective
CMS.....Corrective Measures Study
CNS.....Central Nervous System
COC .....Chemical of Concern
COPC.....Chemical of Potential Concern
COPEC.....Chemical of Potential Ecological Concern
CSF .....Cancer Slope Factor
CSM.....Conceptual Site Model
DAF .....Dilution Attenuation Factor
DQO.....Data Quality Objective
ECSM.....Ecological Conceptual Site Model
EPC .....Exposure Point Concentration
EPIC.....Environmental Photographic Interpretation Center
ERAGS .....Ecological Risk Assessment Guidance for Superfund
f_{oc}.....Fraction of Organic Carbon
ft.....Feet
GI .....Gastrointestinal
GIS .....Geographic Information System
GPS .....Global Positioning System
HHRA .....Human Health Risk Assessment
HI .....Hazard Index
HSA .....Horseshoe Area
HQ.....Hazard Quotient
I-RBC.....Industrial Risk-Based Concentration
IC .....Institutional Control
IDM.....Investigation-Derived Material
IEUBK .....Integrated Exposure Uptake Biokinetic
IRIS.....Integrated Risk Information System
K_d .....Distribution Coefficient
K_{oc} .....Organic Carbon Partition Coefficient

LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

L/kg.....Liter per Kilogram
LOAEL .....Lowest Observable Adverse Effect Level
LUC .....Land Use Control
LTM.....Long-term Monitoring
MCL.....Maximum Contaminant Level
MDC .....Maximum Detected Concentration
MMA .....Main Manufacturing Area
µg/dL.....Microgram per Deciliter
µg/L.....Micrograms per Liter
µm .....Micrometer
mg/kg .....Milligrams per Kilogram
MHSP.....Master Health and Safety Plan
ml/min.....Milliliter per Minute
MQAP.....Master Quality Assurance Plan
msl.....Mean Sea Level
MWP.....Master Work Plan
NFA .....No Further Action
NOAEL.....No Observable Adverse Effect Level
O&M.....Operation and Maintenance
ORP.....Oxidation-Reduction Potential
PAH .....Polynuclear Aromatic Hydrocarbon
PCB.....Polychlorinated Biphenyl
PEF.....Particulate Emission Factor
PETN .....Pentaerythritol tetranitrate
PPE.....Personal Protective Equipment
PSI.....Pounds per square inch
PVC.....Polyvinyl Chloride
QA.....Quality Assurance
QC.....Quality Control
R-RBC .....Residential Risk-Based Concentration
RAGS.....Risk Assessment Guidance for Superfund
RBC .....Risk-Based Concentration
RCRA.....Resource Conservation and Recovery Act
RDA .....Recommended Daily Allowance
RFA.....RCRA Facility Assessment
RfD.....Risk Reference Dose
RFAAP.....Radford Army Ammunition Plant
RFI .....RCRA Facility Investigation
RG.....Remedial Goal
SF .....Square Feet
SLERA.....Screening Level Ecological Risk Assessment
SMDP.....Scientific/Management Decision Point
SOP .....Standard Operating Procedure
SSL.....Soil Screening Level
SSP.....Soil Screening Process
SVOC.....Semi-volatile Organic Compound

LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

SWMU .....Solid Waste Management Unit
T&D .....Treatment and Disposal
T-RBC.....Tap Water Risk-Based Concentration
TAL.....Target Analyte List
TCE.....Tricloroethene
TCL.....Target Compound List
TCLP.....Toxicity Characteristic Leaching Procedure
TIC .....Tentatively Identified Compound
THM.....Trihalomethane
TOC .....Total Organic Carbon
TRV .....Toxicity Reference Value
TSV.....Toxicity Screening Value
UCL .....Upper Confidence Limit
URS.....URS Group, Inc.
USACE .....United States Army Corps of Engineers
USEPA.....United States Environmental Protection Agency
UTL.....Upper Tolerance Limit
VDEQ .....Virginia Department of Environmental Quality
VDGIF .....Virginia Department of Game and Inland Fisheries
VI .....Verification Investigation
VOC .....Volatile Organic Compound
WPA.....Work Plan Addendum

1.0 INTRODUCTION

This Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)/Corrective Measures Study (CMS) report presents the results and findings of the investigations conducted at the Radford Army Ammunition Plant (RFAAP) Solid Waste Management Unit (SWMU) 57, the Pond by Buildings 4931 and 4928 (the site), located in the Horseshoe Area (HAS) of the Main Manufacturing Area (MMA) at the RFAAP, in Radford, Virginia. SWMU 57 is a 0.06-acre area (2,600 ft^2) consisting of an inactive, fabricated, asphalt-lined pond and associated piping.

The work was conducted by URS Group, Inc. (URS) to fulfill the requirements set forth in the 2000 RCRA Corrective Action permit as tasked by the United States Army Corps of Engineers (USACE), Baltimore District. URS performed the RFI in accordance with the Master Work Plan (MWP) developed for RFAAP, Work Plan Addendum (WPA) 021 (URS 2007e) to the MWP (URS 2003). These documents, approved by the United States Environmental Protection Agency (USEPA) Region III and the Virginia Department of Environmental Quality (VDEQ), contain the Master Quality Assurance Plan (MQAP), the Master Health and Safety Plan (MHSP), and associated project-specific addenda.

This RFI investigation included: direct push soil borings, installation of monitoring wells, physical soil testing, chemical sampling of soil and groundwater, and aquifer characterization. The RFI was designed to:

- Fill data gaps from previous site investigations;
- Evaluate the nature and extent of chemicals present in soil at SWMU 57;
- Evaluate potential releases to groundwater at the site;
- Evaluate potential risks to human health and the environment using the physical and chemical data collected at the site; and
- Collect data to support completion of a CMS.

Section 2.0 of this report presents site background information including: site history, physical setting, and previous investigation results. The RFI field investigation program is described in Section 3.0. Sufficient data was collected for the RFI to complete a Nature and Extent of Chemicals Assessment (Section 4.0), Fate and Transport Evaluation (Section 5.0), Human Health Risk Assessment (HHRA) (Section 6.0), and a Screening Level Ecological Risk Assessment (SLERA) (Section 7.0).

The results of the risk assessments and fate and transport assessment indicated a requirement to complete a CMS for soil at SWMU 57. The purpose of the CMS is to develop and evaluate remedial alternatives and to recommend the remedy to be implemented. The CMS portion of this report includes the following sections: Establishment of Corrective Measures Objectives (Section 8.0), Identification and Screening of Corrective Measure Technologies (Section 9.0), Development of Corrective Measure Alternatives (Section 10.0), Evaluation of Corrective Measure Alternatives (Section 11.0), Ranking of Corrective Measure Alternatives (Section 12.0), and Substantiation/Justification of Final Remedy (Section 13.0).

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2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION

SWMU 57 is located in the western section of the HSA adjacent to the Rocket Area Office at RFAAP (Figure 2-1). Figure 2-2 shows the site layout, which includes a 0.06-acre area (2,600 ft^2) consisting of an inactive, fabricated, asphalt-lined pond and associated piping.

An asphalt-paved road is located to the east and several unrelated overhead pipes with associated appurtenances are present nearby. A four-foot high perimeter chain-link fence with a locked gate sits atop an asphalt-covered (one-inch thick) soil berm surrounding the pond (Figure 2-2). The pond is located in the vicinity of Buildings 4931 and 4928 with a terra-cotta pipe discharge pipe running from Building 4931 to the unit.

SWMU 57 – August 2002 – Looking Northwest

SWMU 68 (chromic acid treatment tanks) is 0.023-acre area located west of SWMU 57 as shown on Figure 2-3. Drainage from this area was engineered to flow into a former settling pond (SWMU 69). In 1958, RFAAP started reconditioning "Nike" and "Honest John" rocket motors utilizing a rinse of chromic acid with rust inhibitors (Hercules 1958). RFAAP operated a Virginia State Water Control Board-approved waste treatment plant (SWMU 68) in the Cast Propellant Area to treat chromic-acid wastewater prior to discharge to the New River (Hercules 1958, SWCB 1958). SWMU 68 consisted of two 4,000-gallon aboveground, open top tanks (ASTs) with associated pumps, piping, and appurtenances. Tanks in the nearby building were used prior to 1974 to treat spent chromic acid generated from the cleaning of rocket encasements (USEPA 1987). Treated wastewater was then discharged to a 12,000-gallon settling pond (SWMU 69) where chromium-hydroxide sludge precipitated (Hercules 1958). In July 1997, the site underwent closure including removal of the two treatment ASTs, appurtenances, and impacted soil (ICF Kaiser 1998). SWMU 68 was also investigated as part of the site screening process investigation conducted in 2003 by URS. SWMU 68 passed the site screening process (SSP) resulting in a recommendation of no further action (URS 2007a). The decision document recommending no further action at the site was approved by the USEPA in September 2007 and VDEQ in October 2007 (URS 2007b).

SWMU 69 (pond by chromic acid tanks) is 0.012-acre depressed, grassed area located west of the site as shown on Figure 2-3. This area was once a shallow settling pond that collected treated wastewater containing chromium-hydroxide sludge from SWMU 68, the Chromic Acid Treatment Tanks (Hercules 1958). The pond was bermed and approximately 1 to 2 feet deep. The supernatant from SWMU 69 discharged to a perennial stream that flows to the New River (Hercules 1958). In accordance with the recommendations included in the 1992 Verification Investigation (VI) Report for SWMU 69, interim measures were implemented and SWMU 69 underwent closure including removal of impacted soil (Dames & Moore 1992). The SWMU 69 Closure Report was prepared by Dames & Moore and submitted by RFAAP to the USEPA Region III and the VDEQ. Approximately 700 cubic yards of material were excavated during the closure and investigation activities and disposed of at RFAAP Fly Ash Landfill #2. After confirmatory sampling, the excavation(s) were backfilled with clean fill supplied and graded to reestablish the pre-existing drainage way. SWMU 69 was also investigated as part of the SSP investigation conducted in 2003 by URS. SWMU 69 passed the SSP resulting in a recommendation

of no further action (URS 2007a). The decision document recommending no further action at the site was approved by the USEPA in September 2007 and VDEQ in October 2007 (URS 2007c).

2.2 SITE HISTORY

SWMU 57 is an inactive fabricated unit historically used as an acid-settling pond. RFAAP as-built drawings from 1954 and 1967 identify the unit as the "Acid Settling Pool" with a diameter of approximately 50 ft and a capacity of 30,000 gallons. On the 1954 drawings, a six-inch diameter terra-cotta drainpipe is shown connecting the pond with a four-inch floor drain in the building south of the site (confirmed present during an August 2005 site reconnaissance). The floor drain is located near the chromic acid and Oakite-33 wash stations and reportedly discharged chromic acid, hydraulic oil, Oakite-33, and zinc phosphate to the pond. Oakite-33 is a mixture of phosphoric acid and butyl Cellosolve®, which replaced chromic acid after 1974 as a rust stripper to clean rocket encasements (Dames & Moore 1992). At the time of the RFI site visit (August 2005), the terra-cotta pipe was observed to be partially broken at one location near the pond. No liquids were visible in the pipe. A photographic log is provided in Appendix A.

2.3 PHYSIOGRAPHY

SWMU 57 consists of a 0.06-acre inactive, fabricated, asphalt-lined pond and associated piping. This site is located in the western section of the HSA on a small plateau above a hillside, which slopes downward to the northwest toward the New River (Figure 2-1). Land surface elevations in the vicinity of the SWMU range from approximately 1810 feet above mean sea level (ft msl) to approximately 1802 ft msl (Figure 2-4).

2.4 SURFACE WATER

Figure 2-4 shows surface-water drainage patterns in the site area. The surrounding berm produces interior drainage within the pond and prevents run-on and runoff of storm water. At the time of the field investigation, the pond contained several inches of standing water and heavy vegetation. Additionally, the pond was observed to contain several inches of standing water and aquatic vegetation during the SSP investigation in September-October 2003 and also during the RFI site reconnaissance in July of 2005.

A shallow, well-defined, drainage ditch has been excavated that surrounds the pond and diverts storm water around the pond and connects with a drainage swale to the northwest (Figure 2-4). The drainage swale leads to an intermittent stream located approximately 500 ft northwest of the site, which periodically flows northwestward approximately 1,500 ft to the New River, the nearest naturally-occurring perennial water body. Other manholes, catch basins, storm drains, or drainage ways have not been associated with the site.

2.5 SITE SOIL

SWMU 57 is underlain by Braddock loam soil. This soil has moderate permeability and is acidic-to-strongly acidic (IT 2001). Organic matter content of this soil is moderately low and permeability is moderate. Available water capacity of the Braddock soil is moderate and surface runoff is medium. The Braddock soil does not have a seasonally high water table within 60 inches of the surface. A typical profile of the Braddock soil consists of a seven-inch thick surface layer of dark yellowish brown loam underlain by a minimum 60-inch thick subsoil of yellowish-red clay and red clay. Depth to bedrock is greater than 60 inches (URS 2003). Soil borings completed at the site indicate that the primary soil type at the site is lean to fat clay (CL or CH), which extends to depths of 35 to 40 ft below ground surface (bgs).

Specific physical properties of site soil have been evaluated for the RFI by submitting three soil samples to URS' laboratory in Totowa, New Jersey for physical testing for various parameters. In addition, two soil samples were submitted for physical testing as part of the SSP investigation conducted in 2003. The

complete physical sample results are provided in Appendix C.1. Physical sample data are summarized in Table 2-1 and in the table below.

Summary of Physical Soil Test Data for RFI

Test Parameter	Range of Parameter Values
Sample Depths (ft bgs)	1.2-17
Unified Soil Classification Symbol	CL (lean clay) – 2 samples CH (fat clay) – 2 samples
Sieve Analysis - % fines (minus 200 Sieve)=	53.4 to 89.6%
Sieve Analysis - hydrometer percent minus 2 µm	46%
Organic Carbon	0.23 to 0.81%
pH – distilled water	5.2 to 6.4
pH – 0.01 M CaCl Solution	3.9 to 6.0
Soil particle density (pounds per cubic foot)	2.694 to 2.701
Soil bulk density (pounds per cubic foot)	85.8 to 106.4
Soil dry density (pounds per cubic foot)	72.7 to 73.3
Coefficient of permeability (centimeters per second)	1.8E-07
Water Content (%)	19.6 to 46.4%

Soil physical test results indicate that the primary soil type at the site is CL and CH. A complete report of the RFI and SSP physical test results is included in Appendix C.1

2.6 SITE GEOLOGY

Site geologic conditions were characterized for the RFI by completing 19 direct push soil borings, drilling 3 borings into bedrock for monitoring well installation, and physical testing of four soil samples. The maximum depth of investigation was 73 ft bgs with terminal drilling depths up to 25 ft into competent bedrock. Boring locations are shown on Figure 3-1 and boring data are summarized in Table 2-2. Soil boring logs and monitoring well construction diagrams are included in Appendix C.2 and monitoring well construction data are summarized in Table 2-3. Data from site borings were used to construct a geologic cross-section (Figure 2-5) depicting the interpreted subsurface conditions at the site. Cross-section A-A' is orientated west to east across SWMU 57 (Figure 2-5).

Approximately 35 to 40 ft of alluvial terrace deposits, consisting primarily of lean to fat, brown to reddish yellow clay (CH), underlies the site. A transitional zone of saprolite approximately 4 to 8 ft thick is present below the alluvial deposits and above competent carbonate bedrock. The saprolite is weathered in place from underlying bedrock. Bedrock at the site consists of Cambrian Elbrook Formation, which is described as dolomite and limestone with lesser shale and siltstone. Depth to competent bedrock at the two monitoring well locations proximate to the pond was 57 ft bgs at 57MW2 (1,748 ft msl) and 40 ft bgs at 57MW3 (1,764 ft msl). Competent bedrock observed from boring cuttings was generally described as light brownish gray limestone. An approximate 1.5 ft thick weathered/fracture zone was apparent from 49 to 50.5 ft in boring 57MW3. Other weathered or fractured zones of bedrock were not apparent during air hammer drilling within bedrock.

2.7 SITE HYDROGEOLOGY

Regional hydrogeology and general hydrogeology information for RFAAP is included in Section 3.8 of the MWP. Site-specific hydrogeologic conditions are discussed below.

Groundwater conditions at the site were characterized by the installation of three monitoring wells (57MW1 through 54MW3), obtaining water level measurements at well locations, and completion of slug tests to provide estimates of the hydraulic conductivity of the uppermost aquifer within the screened intervals of saprolite/competent bedrock (57MW2) and bedrock (57MW3).

In the area of the pond, groundwater was initially encountered at or near the approximate interface between the alluvial terrace deposits and saprolite, which corresponded to approximately 50 ft at 57MW2 and 35 ft at 57MW3. Groundwater also was encountered within a fracture zone in 57MW3 at a depth of 49.5 to 51 ft bgs.

At 57MW1, some water was observed to infiltrate into the hollow stem augers after their termination on competent bedrock at 61.5 ft bgs. After advancing the borehole with an air hammer to a depth of 73 ft, a water column of approximately 3.5 ft was measured in the open borehole after one hour and after well completion on the same day (January 18, 2008) an approximate 6 ft water column was measured. Subsequent measurements collected from 57MW1 on January 29, February 7, and May 1, 2008 indicated that the previously measured water column was absent with only approximately 0.37 ft of mud accumulated in the bottom of the well.

Table 2-3 summarizes RFI water level measurements from site monitoring wells obtained on February 7, 2008 prior to purging and sampling. Stabilized groundwater levels were at the approximate interface of alluvial terrace deposits and saprolite at 57MW2 (1756.34 ft msl) and at the interface of saprolite and competent bedrock at 57MW3 (1765.66). The precise groundwater flow direction and flow gradient could not be estimated in the site area due to lack of measurable water in 57MW1; however, based on topography and potentiometric surface data from 57MW2 and 57MW3, the presumed flow direction in the pond area is toward the north or northwest and the New River .

Rising and falling head slug tests were conducted at monitoring wells 57MW2 and 57MW3 to provide estimates of the hydraulic conductivity with the screened intervals, as described in Section 3.3.5. Slug test results are provided in Appendix C.3 and summarized below.

Summary of Slug Test Results

Well ID	Screened Interval	Falling Head Test (cm/sec)	Rising Head Test (cm/sec)	Appropriate Test for Well Construction	Selected Hydraulic Conductivity (cm/sec)
54MW2	Saprolite/Bedrock	2.56E-03	1.12E-03	Rising Head	1.12E-03
54MW3	Bedrock	1.05E-07	5.11E-06	Falling Head	1.05E-07

Note: cm/sec = centimeters per second.

2.8 PREVIOUS INVESTIGATIONS

2.8.1 Verification Investigation – 1992

In 1992, Dames & Moore collected one sediment/water sample pair (57SE1/57SW1) from material present within the inactive pond for analysis of target analyte list (TAL) metals, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs; Figure 2-6). The sediment sample was also analyzed for Total Organic Carbon (TOC), total organic halogens, and pH.

VOCs and SVOCs were not detected in the sediment sample or surface water sample (Tables 2-4 and 2-5). TAL metals concentrations in the sediment including aluminum, arsenic, chromium, iron, and vanadium were above their adjusted residential risk-based concentrations (R-RBCs; Table 2-4). The arsenic concentration in sediment was above its adjusted industrial risk-based concentration (I-RBC). The iron concentration in sediment was above its Biological Technical Assistance Group (BTAG) sediment screening level (EPA 2006c). Arsenic, chromium, iron, and manganese concentrations in the water sample were above their adjusted tap water risk-based concentrations (T-RBCs; Table 2-5). Aluminum, arsenic, barium, copper, iron, lead, manganese, and zinc concentrations in the water sample were above their respective BTAG freshwater screening levels (USEPA 2006b).

2.8.2 Installation Assessment (Aerial Photograph Interpretation) – 1992

The Environmental Photographic Interpretation Center (EPIC), under the direction of USEPA, performed an assessment of multiple SWMUs at RFAAP using selected aerial photographs from 1937 to 1986 (USEPA 1992). The photogeologic analysis was performed to locate waste management areas, identify the location of sinkholes that existed prior to the construction of the RFAAP, and map fracture traces.

Activity at SWMU 57 was first noted on a 1962 aerial photograph (Figure 2-7). The interpretation of the 1971 photograph indicated the presence of a "pond" containing liquid. This area remained unchanged through the 1986 photograph (Figure 2-8), although a drainage way extending from the "pond" to the New River was noted (USEPA 1992).

2.8.3 Site Screening Process Investigation - 2007

The SSP was designed using specific human health and ecological screening processes to assess: 1) whether releases of hazardous substances, pollutants, contaminants, hazardous wastes, or hazardous constituents have occurred to the environment at the sites evaluated, and 2) whether further investigation or action (i.e., risk assessment, RFI, interim action), or no further action (NFA) is appropriate at a site.

For the SSP investigation conducted September-October 2003, four borings were advanced in and around SWMU 57 to evaluate for the presence or absence of chemicals in soil potentially associated with previous use as a settling pond (Figure 2-9). Three soil samples were collected from borings 57SB1, 57SB2, and 57SB3, while two samples were collected from boring 57SB4 due to refusal at 1.5 ft bgs. The samples were analyzed for target compound list (TCL) VOCs, TCL SVOCs, polynuclear aromatic hydrocarbons (PAHs), explosives (including nitroglycerin and pentaerythritol tetranitrate [PETN], and TAL metals. Sample 57SB4A was also analyzed for TCL pesticides, TCL polychlorinated biphenyls (PCBs), and TCL herbicides.

Two samples were collected for physical testing including: percent moisture, grain size, pH, total organic content, specific gravity, and bulk density. Additional testing on selected samples was conducted for Atterberg limits and/or hydraulic conductivity. Analytical results for these samples are summarized in Appendix C.1.

The human health risk screening portion of the SSP consisted of the following components:

1. Identification of chemicals of potential concern (COPCs) via comparison of maximum detected concentrations (MDCs) to adjusted R-RBCs and I-RBCs;
2. Cumulative human health risk screening;
3. Chemical specific screening for lead and iron;
4. MDC comparison to soil to groundwater soil screening levels (SSLs) (dilution attenuation factor [DAF] 20); and
5. Metals MDC comparison to background point estimates.

The human health risk screening resulted in the identification of the following COPCs for the site requiring additional investigation: VOCs (SSL only) and metals.

The ecological risk screening portion of the SSP consisted of the following components:

Problem formulation including identification of chemicals of potential ecological concern (COPECs);

1. Exposure assessment;
2. Ecological effects assessment; and
3. Risk characterization.

The ecological risk screening portion of the SSP resulted in the identification of the following COPECs for the site requiring additional investigation: metals.

The SSP resulted in the recommendation of a focused RFI for soil and groundwater media at the site based on the site-specific SSL exceedance for chloroform, the lack of groundwater data for the site, and the results of the human health and ecological risk screenings (URS 2007a). The RFI was to focus on metals and VOCs in soil and groundwater.

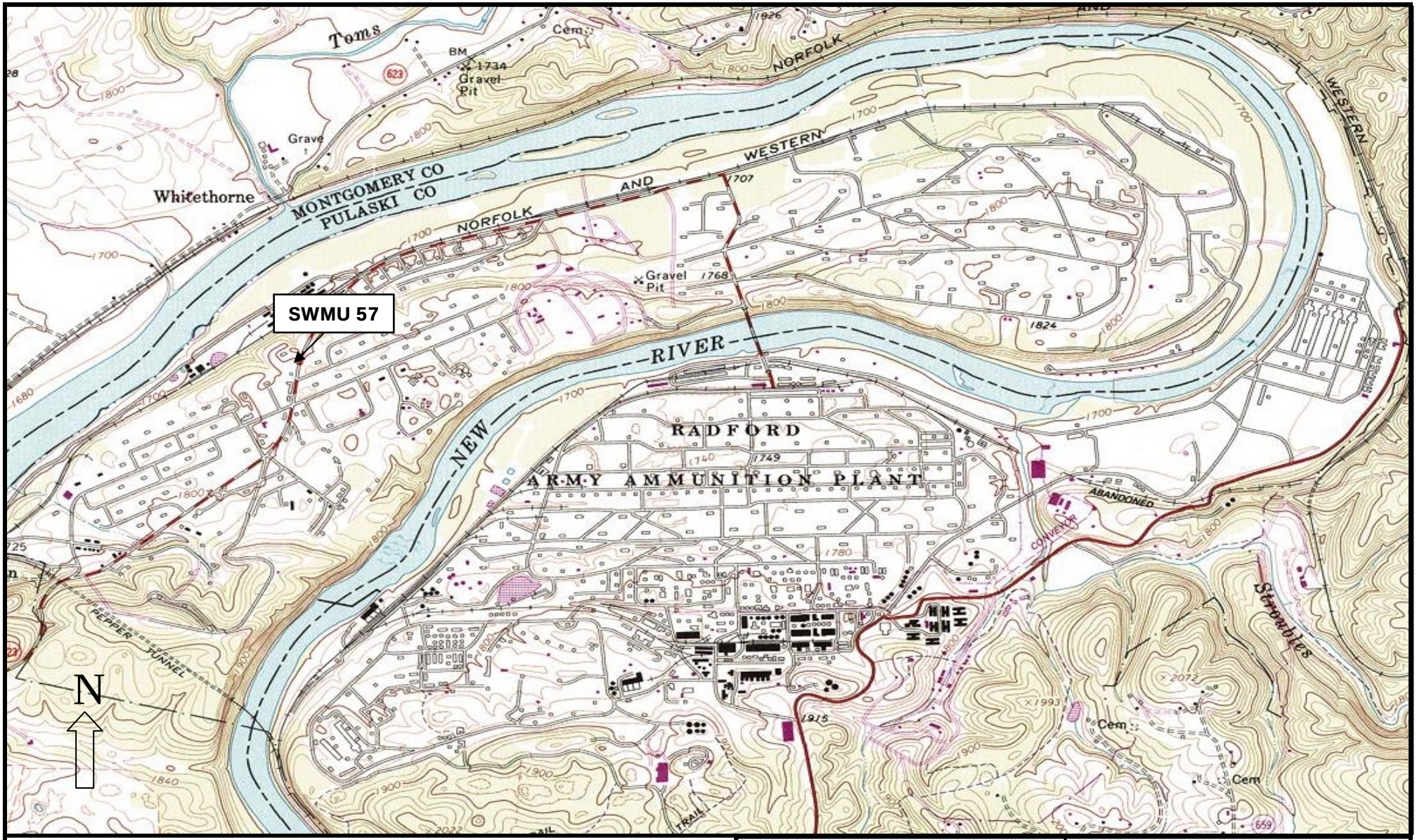
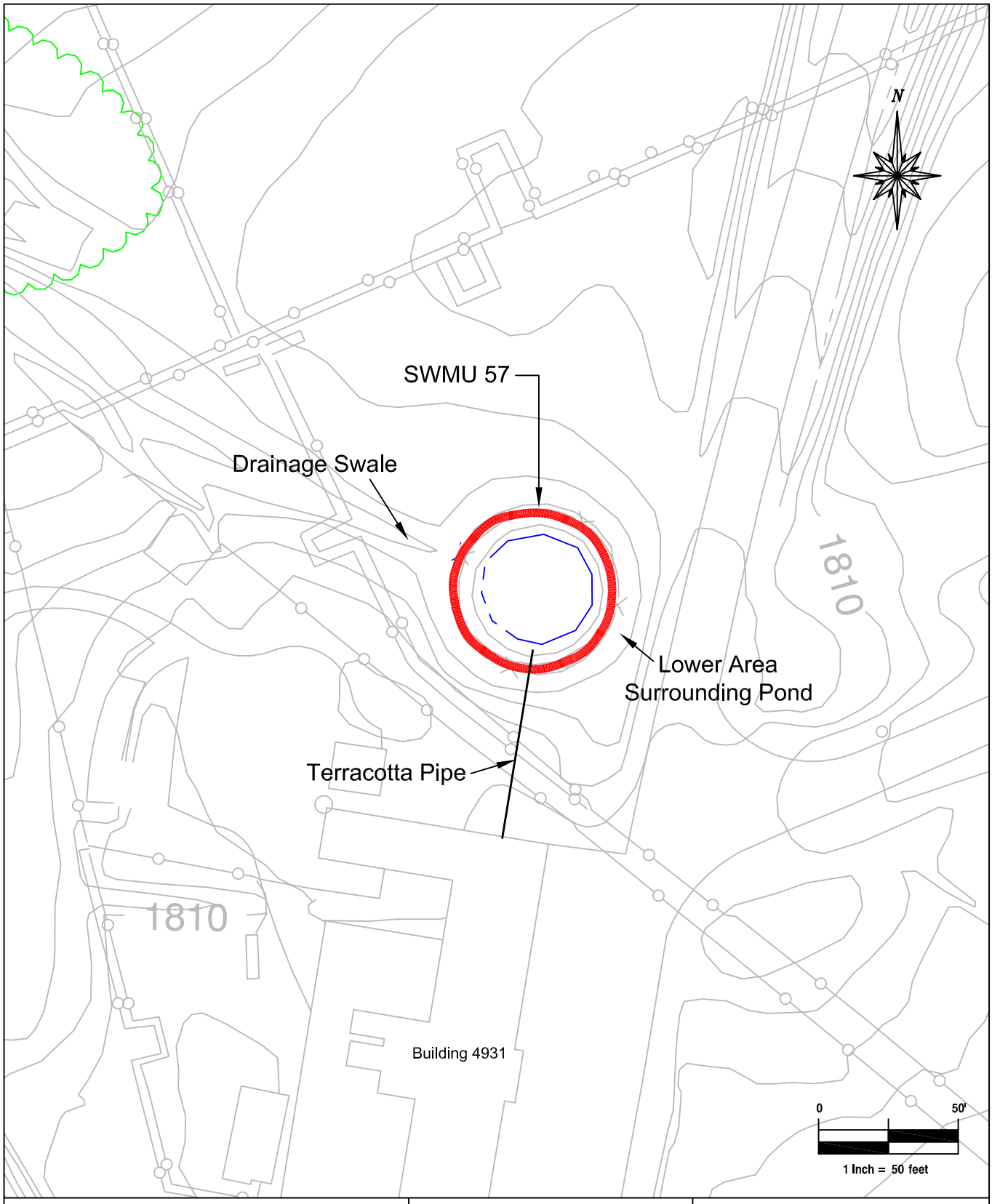


FIGURE 2-1 Site Location Map		SWMU 57 RFI/CMS Report Radford Army Ammunition Plant Radford, Virginia
Date: *April 2008*	**URS Project#:** *11656421*	
Prepared by: *DBC*	**Approved by:** *JOS*	URS **URS Group, Inc.** **5540 Falmouth Street,** **Suite 201** **Richmond, VA 23230**
Scale: *1" = 2000'*	**File Name:** *Fig.2-1 Site Loc*	



Legend

- Approximate SWMU Boundary
- Topographic Contour
- Vegetation
- Fence
- Aboveground Piping

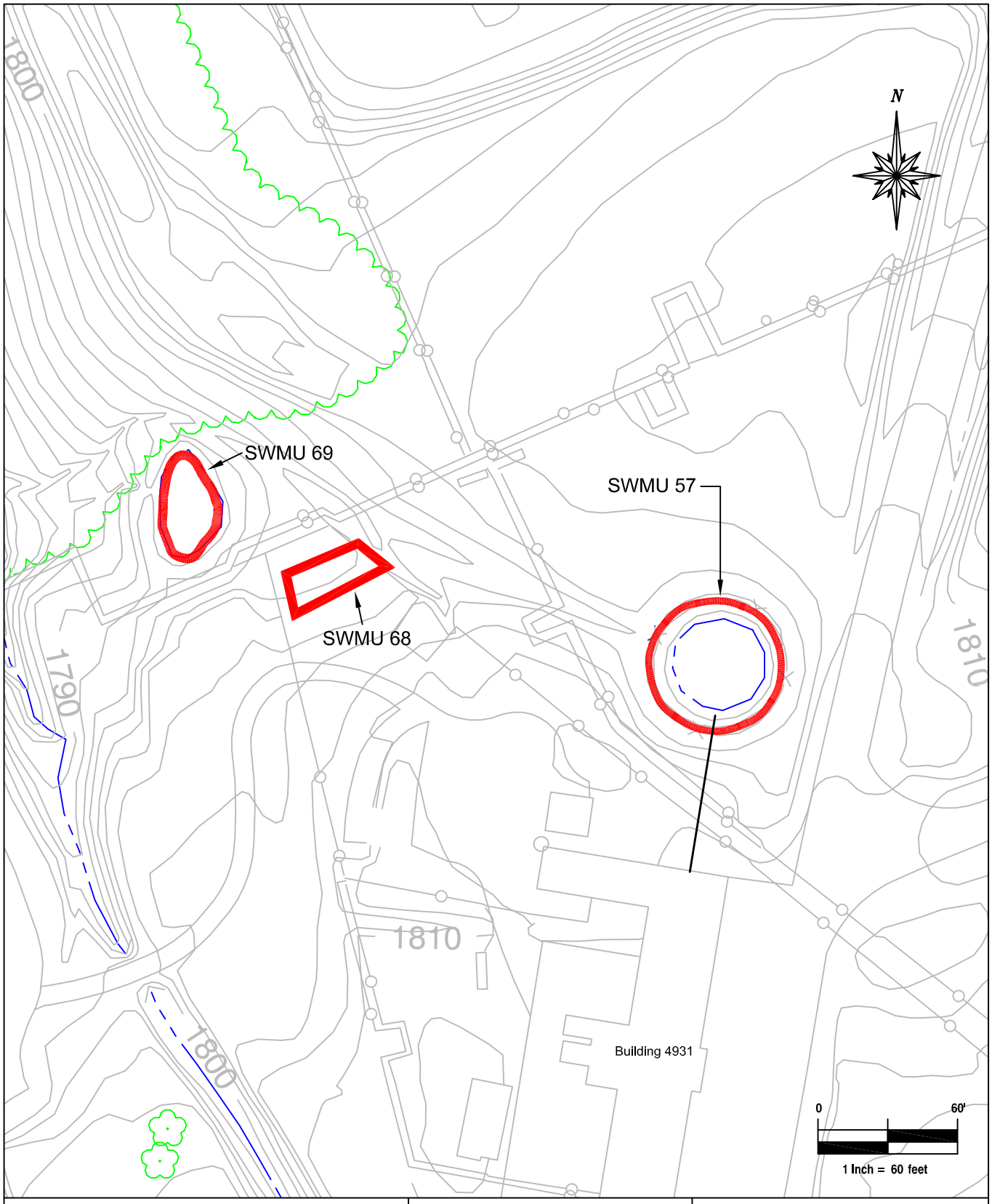
FIGURE 2-2
Site Layout

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.2-2 SiteLayout

SWMU 57

RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Legend

- Approximate SWMU Boundary
- Topographic Contour
- Vegetation
- Fence
- Aboveground Piping

FIGURE 2-3

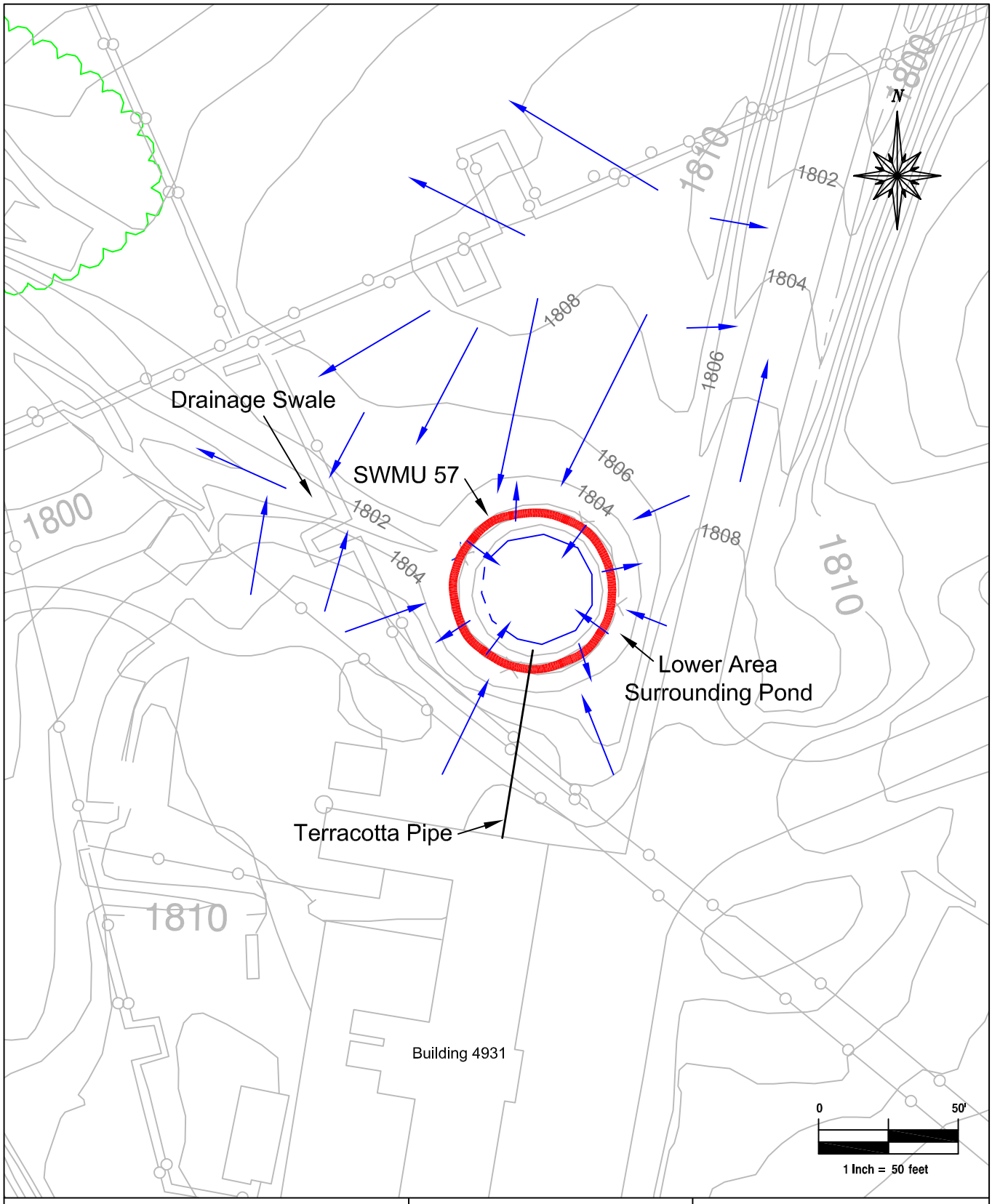
Site Vicinity Map

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 60 feet	File Name: Fig.2-3 SiteVicin

SWMU 57

RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Legend

- Approximate SWMU Boundary
- Topographic Contour
- Vegetation
- Fence
- Aboveground Piping
- Surface Water Flow Direction

FIGURE 2-4

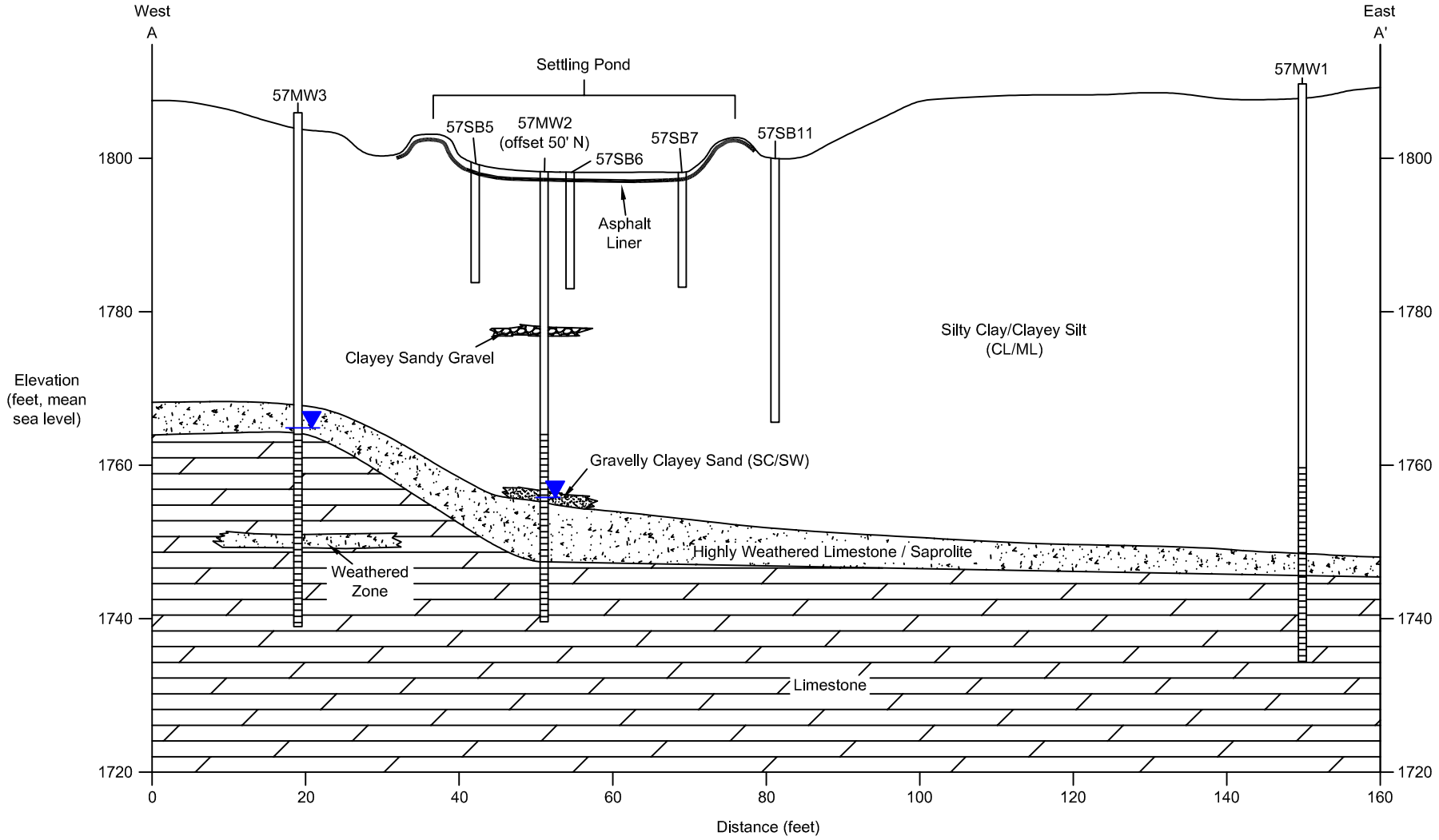
Surface Water Drainage Map

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.2-4 SW Drain.

SWMU 57

RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Notes:

Vertical Scale: 1" = 20'

Horizontal Scale: 1" = 20'

▼ Potentiometric Surface Elevation Measured in Well on February 7, 2008

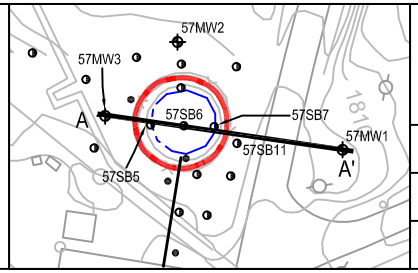


FIGURE 2-5
Geologic Cross-Section
A-A'

Date: May 2008	Job Number: 11656421
Prepared By: DBC	Reviewed By: JOS
Scale: As Shown	File Name: Fig.2-5 X-Sec A-A'

SWMU 57
RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23320

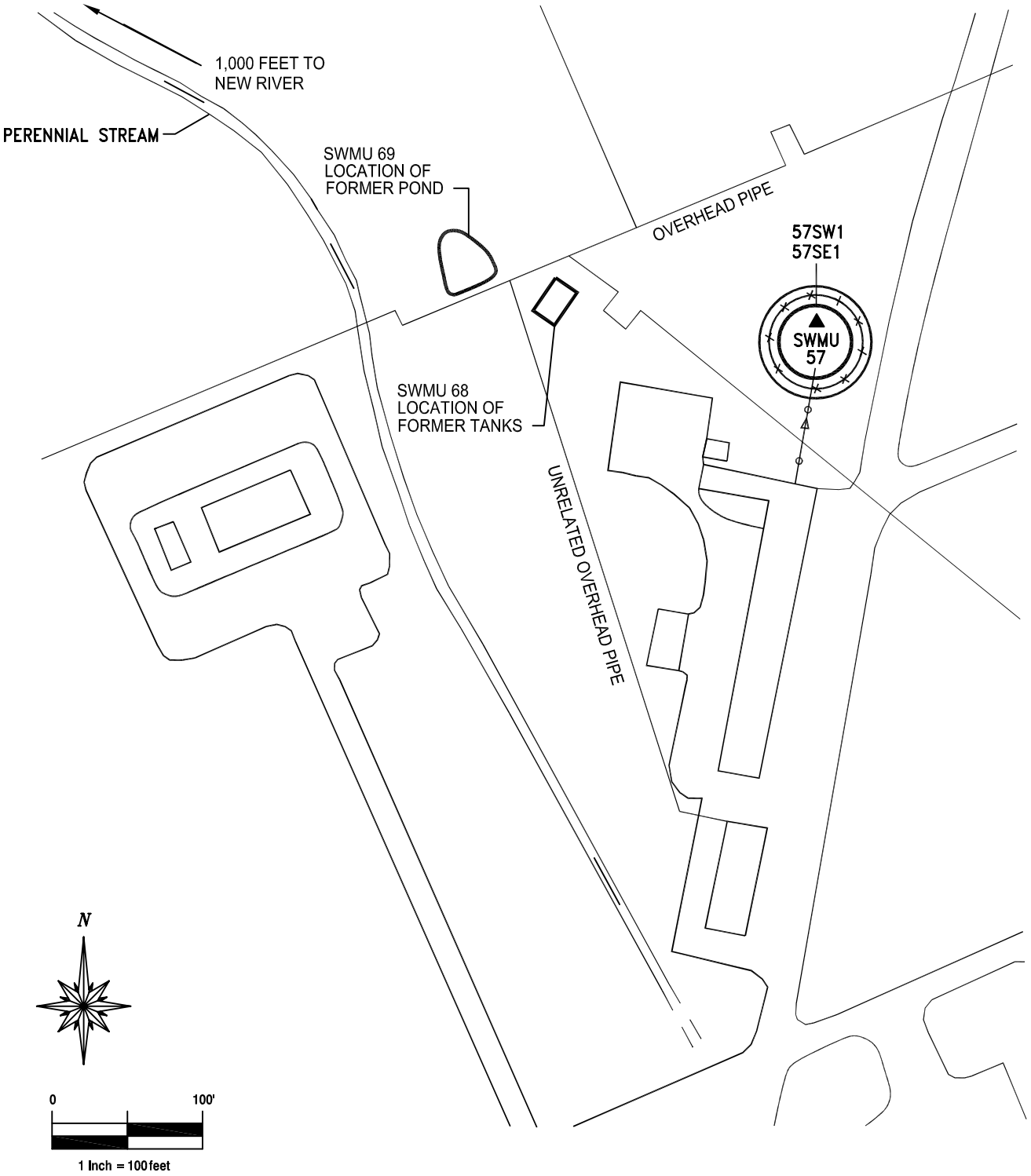


FIGURE 2-6

Verification Investigation
Sampling Locations

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 100 feet	File Name: Fig.2-6 VI Locs

SWMU 57

RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230

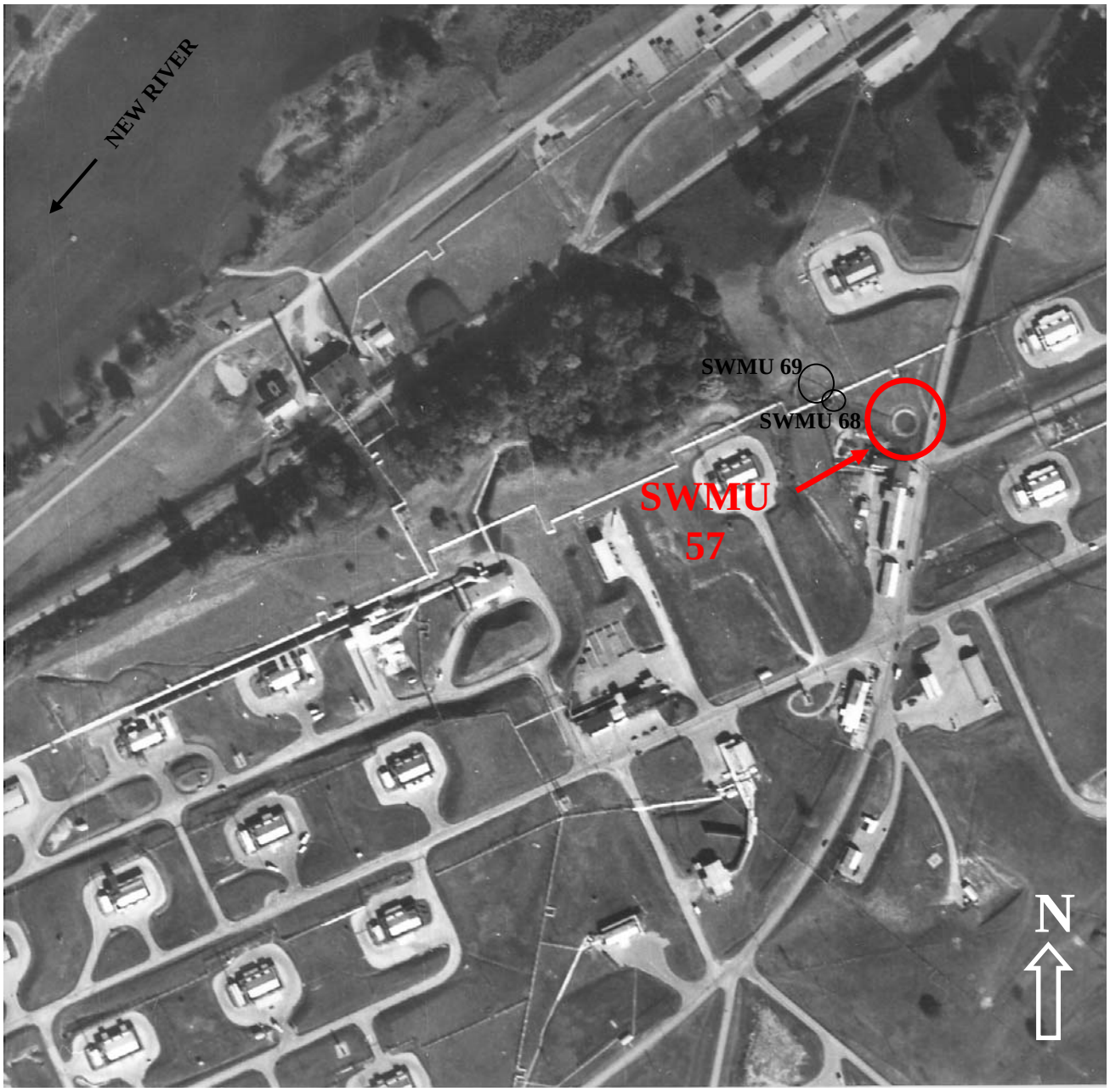


FIGURE 2-7
Aerial Photograph - 1962

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: Not to Scale	File Name: Fig.2-7 Aerial 1962

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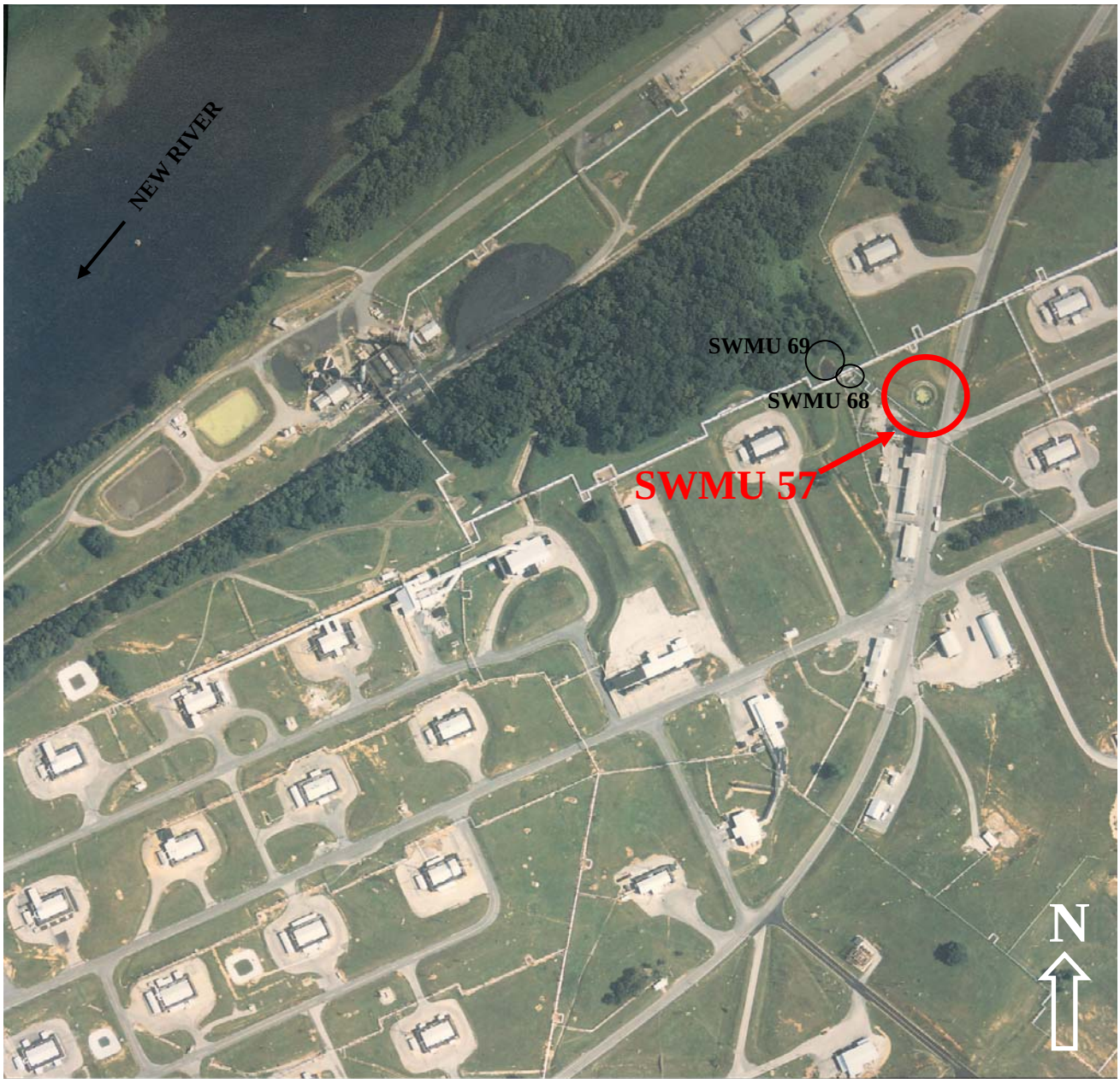

FIGURE 2-8
Aerial Photograph - 1986

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: Not to Scale	File Name: Fig.2-8 Aerial 1986

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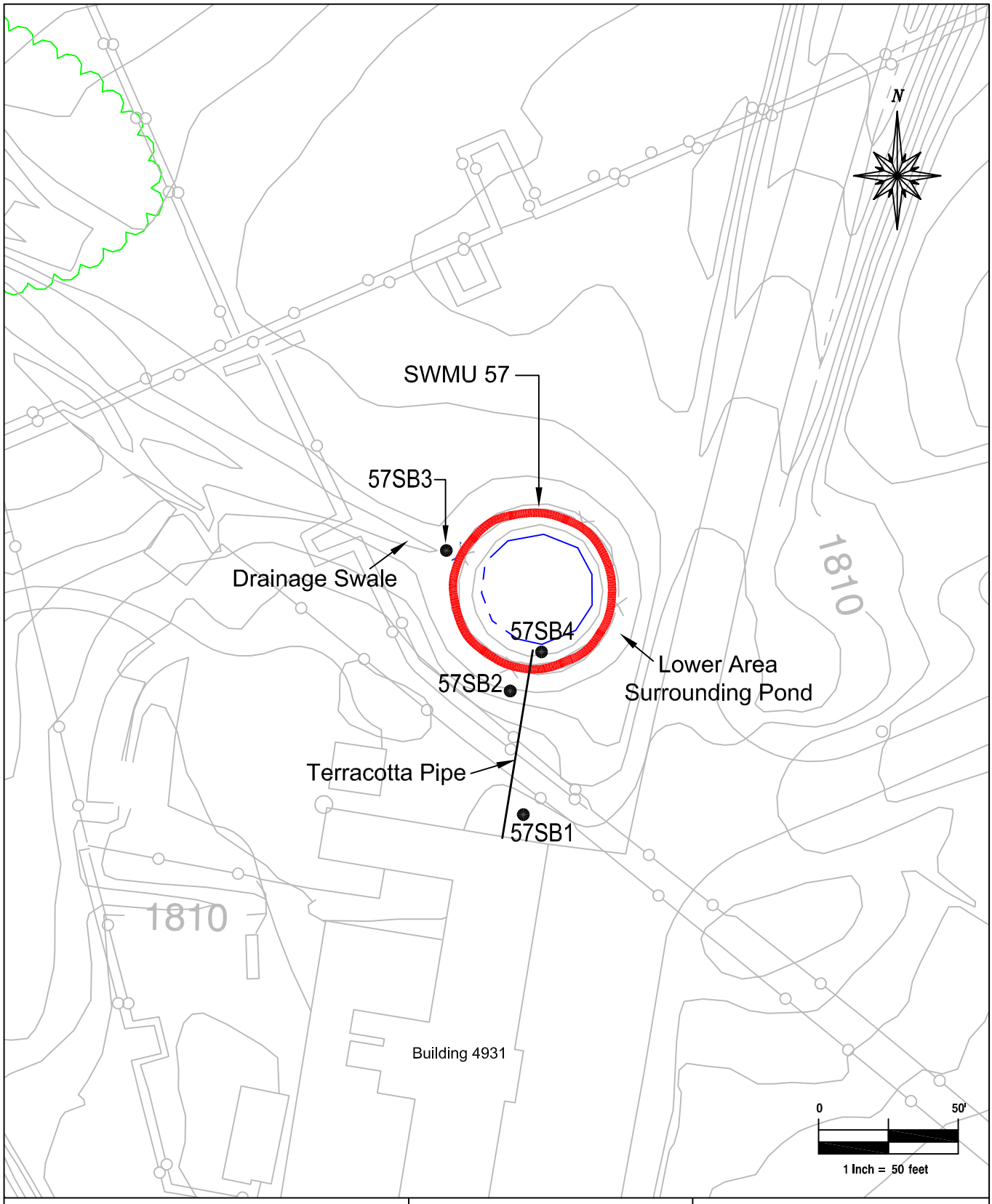

Legend

- Approximate SWMU Boundary
- Soil Boring Location
- Topographic Contour
- Vegetation
- Fence
- Aboveground Piping

FIGURE 2-9

SSP Sampling Location Map

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.2-9 SSP Locs

SWMU 57

RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

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Table 2-1
Physical Soil Testing Results
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Soil Sample			Physical Soil Testing Results												
Location	Depth Collected (ft bgs)	USCS Soil Type	Water Content (D2216-98)	Liquid Limit (D4318-00)	Plastic Limit (D4318-00)	Plastic Ind. (D4318-00)	Grain Size Minus No. 200 (D422-63 2002)	Hydrometer % Minus 2 μm (D422-63 2002)	pH Distilled Water (D4972-01)	pH 0.01 M CaCl Solution (D4972-01)	Organic Content (D2974-00)	Specific Gravity (D854-02)	Total Bulk Density (D2937-00e1)	Dry Bulk Density D2937-00e1)	Hydraulic Conductivity (D5084-00e1)
			%	--	--	--	%	%	SU	SU	%	--	pcf	pcf	cm/sec
SSP Investigation (2003)															
57SB2	7.5 - 8	CL-ML	28.4	nt	nt	nt	70.2	nt	5.6	3.9	2.6	2.701	94.1	73.3	nt
57SB3	16.5 - 17	CH	46.4	83	29	54	89.6	46	5.3	nt	3.6	2.694	106.4	72.7	1.8E-07
RFI (2008)															
57SB4	1.2-5	nt	nt	nt	nt	nt	nt	nt	nt	nt	0.81*	nt	nt	nt	nt
57SB5	2-4	nt	nt	nt	nt	nt	nt	nt	nt	nt	0.24*	nt	102.6	nt	nt
	2.2	nt	29.4	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	2.75	nt	30.9	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	3.0	CH	30.7	55	24	31	53.4	nt	nt	nt	nt	nt	nt	nt	nt
	3.3	nt	33.1	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	3.55	nt	nt	nt	nt	nt	nt	nt	5.2	4.2	nt	nt	nt	nt	nt
57SB12	1.2-2.5	nt	nt	nt	nt	nt	nt	nt	nt	nt	0.23*	nt	85.8	nt	nt
	1.2	nt	19.6	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	1.45	nt	nt	nt	nt	nt	nt	nt	6.4	6.0	nt	nt	nt	nt	nt
	1.75	nt	20.8	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
	2.0	CL	21.4	43	17	26	66.5	nt	nt	nt	nt	nt	nt	nt	nt

Notes:

ft bgs = Feet below ground surface
pcf = Pounds per cubic foot
cm/sec = centimeters per second
USCS = Unified Soil Classification System
(D2216) = ASTM Test Method

SU = Standard Units
-- = Unitless
CL = Clay low plasticity
ML = Silt low plasticity
CH = Clay high plasticity

g/cm^3 = Grams per cubic centimeter
nt = Not tested
* = total organic carbon

Table 2-2
Boring Data Summary Table
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	Depth Below Ground Surface			Elevation - Mean Sea Level					Coordinates	
Boring	Top of Competent Bedrock (bgs)	Borehole Termination (bgs)	DTW During Drilling (bgs)	Ground Surface (msl)	Top of Well Casing (msl)	Top of Compentent Bedrock (msl)	Borehole Termination (msl)	Groundwater Surface During Drilling (msl)	Northing	Easting
SWMU 57 SSP Borings										
57SB1	--	24	21.5	--	--	--	--	--	3600102.07	10881902.45
57SB2	--	36	35.5	--	--	--	--	--	3600131.78	10881926.13
57SB3	--	34.5	32.5	--			--	--	3600176.23	10881940.31
57SB4	--	1.5	--	--	--	--	--	--	3600137.97	10881947.50
SWMU 57 RFI Borings										
57SB1	--	12	--	--	--	--	--	--	3600102.07	10881902.45
57SB2	--	2	--	--	--	--	--	--	3600131.78	10881926.13
57SB4	--	15.5	--	--	--	--	--	--	3600137.97	10881947.50
57SB5	--	15	--	--	--	--	--	--	3600153.47	10881930.68
57SB6	--	15.5	--	--	--	--	--	--	3600152.93	10881951.20
57SB7	--	16	--	--	--	--	--	--	3600152.38	10881970.07
57SB8	--	15	--	--	--	--	--	--	3600176.42	10881949.56
57SB9	--	13.5	--	--	--	--	--	--	3600099.55	10881948.37
57SB10	--	36	--	--	--	--	--	--	3600122.88	10881959.33
57SB11	--	36	--	--	--	--	--	--	3600142.14	10881984.14
57SB12	--	36	--	--	--	--	--	--	3600191.06	10881949.72
57SB13	--	36	--	--	--	--	--	--	3600195.21	10881921.98
57SB14	--	36	--	--	--	--	--	--	3600139.21	10881895.79
57SB15	--	40	38	--	--	--	--	--	3600097.76	10881965.55
57SB16	--	51	--	--	--	--	--	--	3600121.94	10881980.20
57SB17	59	59	--	--	--	--	--	--	3600189.42	10881983.84
57SB18	--	35	28	--	--	--	--	--	3600181.58	10881890.69
57SB19	--	32	28	--	--	--	--	--	3600197.90	10881857.54
57MW1	61.5	73	53	1808.05	1810.54	1746.55	1735.05	1755.05	3600138.17	10882049.51
57MW2	57	65	48	1805.33	1808.21	1748.33	1740.33	1757.33	3600204.68	10881947.40
57MW3	40	65	49	1804.54	1807.49	1764.54	1739.54	1755.54	3600158.97	10881902.54

Notes:
bgs = Below ground surface
msl = Mean sea level
DTW = Depth to water

Table 2-3
Monitoring Well Construction and Groundwater Elevation Data
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Well Identification	Date Installed	Screened Zone	Boring Depth (ft bgs)	Depth to Competent Bedrock (ft bgs)	Screened Interval (ft bgs)	Elevation TOC (ft msl)	DTW (ft BTOC) 02/07/08	Groundwater Elevation (ft msl)
57MW1	1/17/2008	unconsolidated/bedrock	73	61.5	48.0-73.0	1810.54	--	--
57MW2	1/15/2008	unconsolidated/bedrock	65	57	40.0-65.0	1808.21	51.87	1756.34
57MW3	1/16/2008	unconsolidated/bedrock	65	40	40.0-65.0	1807.49	41.83	1765.66

Notes:
TOC = Top of Casing
BTOC = Below Top of Casing
DTW = Depth to Water
N/A = Not Applicable
ft = feet
msl = mean sea level
bgs = below ground surface
-- = Insufficient water

Table 2-4
Summary of Analytical Data for Detected Chemicals in Sediment Sample Collected at SWMU 57
Modified from Dames & Moore Verification Investigation Report
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	CAS #	PQLs mg/kg	Facility-Wide Background Point Estimate [A] mg/kg	Adjusted Soil Residential RBC mg/kg	Adjusted Soil Industrial RBC mg/kg	BTAG Sediment Screening Value mg/kg	57SE1 RVFS*92 10-Feb-92 0.5 CSE mg/kg
TAL Metals							
Aluminum	7429-90-5	14.1	40,041	7,821	102,200	--	30,000
Arsenic	7440-38-2	30	15.8	0.426	1.91	9.8	**4.66**
Barium	7440-39-3	1	209	1,564	20,440	--	65.5
Calcium	7440-70-2	100	--	--	--	--	30,800
Chromium(1)	7440-47-3	4	65.3	23.46	306.6	43.4	42.5
Cobalt	7440-48-4	3	72.3	--	--	50	4.71
Copper	7440-50-8	7	53.5	313	4,088	31.6	12.9
Iron	7439-89-6	1,000	50,962	5,475	71,540	20,000	24,400
Magnesium	7439-95-4	50	--	--	--	--	18,500
Manganese(2)	7439-96-5	0.275	2,543	156	2,044	460	126
Mercury(3)	7439-97-6	0.1	0.13	2.3	30.66	0.18	0.142
Nickel	7440-02-0	3	62.8	156	2,044	22.7	10.3
Potassium	7440-09-7	37.5	--	--	--	--	785
Sodium	7440-23-5	150	--	--	--	--	532B
Vanadium	7440-62-2	0.775	108	7.8	102	--	85
Zinc	7440-66-6	30.2	202	2,346	30,660	121	61.6

Notes:

BTAG = Biological Technical Assistance Group
Sediment - BTAG Sediment Screening Values, 2006
CAS = Chemical Abstract Service
CSE = Chemical Sediment
ft bgs = Feet below ground surface
mg/kg = Milligrams per kilogram
TAL = Target Analyte List
USEPA = United States Environmental Protection Agency
PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method
RBC = Risk-Based Concentration
USEPA Region III Risk-Based Concentration values from the October 2007, RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001)
(1) = Chromium VI RBC value was used
(2) = Manganese-nonfood RBC value was used
(3) = Mercuric chloride RBC value was used

= Concentration exceeds Adjusted Residential RBC

bold = Concentration exceeds Adjusted Industrial RBC

= Concentration exceeds BTAG Sediment Screening Level

underline = Concentration exceeds Facility-Wide Background Point Estimate

Table 2-5
Summary of Analytical Data for Detected Chemicals in Surface Water Sample Collected at SWMU 57
Modified from Dames & Moore Verification Investigation Report
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	CAS #	PQLs µg/L	Adjusted Tap Water RBC µg/L	MCL µg/L	BTAG Freshwater Screening Value µg/L	57SW1 RVFS*92 10-Feb-92 0.0 CSW µg/L
TAL Metals						
Aluminum	7429-90-5	141	3,650	--	87	871
Arsenic	7440-38-2	10	0.045	10	5	6.29
Barium	7440-39-3	20	730	2,000	4	23.1
Calcium	7440-70-2	500	--	--	116,000	16,700
Chromium[(1)]	7440-47-3	10	10.95	100	85	15.9
Copper	7440-50-8	60	146	1,300 [(AL)]	9	11.8
Iron	7439-89-6	38.1	2,555	--	300	2,750
Lead	7439-92-1	10	--	15 [(AL)]	2.5	14.4
Magnesium	7439-95-4	500	--	--	82,000	6,670
Manganese[(2)]	7439-96-5	2.75	73	--	120	380
Potassium	7440-09-7	375	--	--	53,000	8,850
Sodium	7440-23-5	500	--	--	680,000	14,000
Zinc	7440-66-6	50	1,095	--	120	155

Notes:

BTAG = Biological Technical Assistance Group
Water - BTAG Freshwater Screening Values, 2006
CAS = Chemical Abstract Service
CSW = Chemical Surface Water
ft bgs = Feet below ground surface
µg/L = Microgram Per Liter
TAL = Target Analyte List
USEPA = United States Environmental Protection Agency
MCL = Maximum Contaminant Level
PQL = Practical quanitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method
RBC = Risk-Based Concentration
USEPA Region III Risk-Based Concentration values from the October 2007, RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
[(AL)] = Action Level
[(1)] = Chromium VI RBC value used
[(2)] = Manganese-nonfood RBC value used

= Concentration exceeds Adjusted Tap Water RBC

= Concentration exceeds BTAG Freshwater Screening Level

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3.0 FIELD INVESTIGATION PROGRAM

The field investigation program for the RFI conducted at SWMU 57 included a soil investigation and a groundwater investigation as outlined in the following sections.

3.1 SAMPLING AND ANALYSIS

The RFI sampling and analysis program is summarized in Table 3-1; this table identifies the boring locations, chemical and physical sample locations and depths, and analytical methods and parameters. Figure 3-1 shows the soil sample locations and groundwater monitoring wells sampled for the RFI.

3.1.1 Soil Borings and Soil Sampling

Direct push borings (19 locations) from the SSP and RFI investigations were used to characterize soil conditions at SWMU 57. Soil boring locations are shown on Figure 3-1 and summarized in Table 3-1. SSP and RFI soil investigations and associated samples for SWMU 57 are summarized in the following table.

Soil Sampling and Analysis for SWMU 57

Date/Event	Soil Sample Locations	Analytical Parameters	Comments
October 2003 (SSP)	***Within Pond Area:*** 57SB4	TAL Metals, TCL VOCs, TCL SVOCs, TCL PAHs, TCL PCBs (selected samples), TCL Pesticides and Herbicides (selected samples), and Explosives	Assess the nature and extent of contamination within the source area. Unable to obtain samples below the asphalt liner.
	Terracotta Pipe: 57SB1 and 57SB2	TAL Metals, TCL VOCs, TCL PAHs, TCL SVOCs, and Explosives	Assess the nature and extent of COPCs in soil and to evaluate potential impacts to soil from the terracotta drainage pipe.
	Drainage Swale 57SB3	TAL Metals, TCL VOCs, TCL PAHs, TCL SVOCs, and Explosives	Assess the nature and extent of COPCs in soil and to evaluate potential migration of COPCs from the site to the drainage swale.
	Physical/Geotechnical Properties 57SB2 and 57SB3	pH, TOC, grain size, hydraulic conductivity, bulk density, Atterberg Limits, moisture content	Geotechnical and physical property analysis.
January 2008 (RFI)	***Within pond area:*** 57SB4 through 57SB8	TAL Metals, TCL VOCs, TCL SVOCs, TCL PCBs, TCL Pesticides, and Explosives	Assess the nature and extent of contamination within the source area, to provide sufficient data for risk assessment, and to evaluate whether COPCs have migrated vertically to soil below the asphalt liner. Additional samples collected at SSP boring 57SB4.

Date/Event	Soil Sample Locations	Analytical Parameters	Comments
January 2008 (RFI) (continued)	***Terracotta Pipe:*** 57SB1, 57SB2, 57SB9	TCL VOCs and TAL metals	Assess the nature and extent of COPCs in soil and to evaluate potential impacts to soil from the terracotta drainage pipe. Additional samples collected at SSP borings 57SB1 and 57SB2.
	Lower Area Surrounding Pond/Drainage Swale 57SB10, 57SB11, 57SB12, 57SB18, 57SB19	TCL VOCs and TAL metals	Assess the nature and extent of COPCs in soil and to evaluate potential migration of COPCs from the site to the lower area surrounding pond and drainage swale.
	Upper Area Surrounding Pond 57SB13 through 57SB17	TCL VOCs and TAL metals	Assess the nature and extent of COPCs in soil and to evaluate potential migration of COPCs from the site to the upper area surrounding pond.
	Physical/Geotechnical Properties 57SB4, 57SB5, and 57SB12	pH, TOC, grain size, Atterberg Limits, moisture content, cation exchange capacity	Geotechnical and physical property analysis.

For the RFI, five soil borings (57SB4 through 57SB8) were completed within the pond area to the depth of refusal (groundwater was not encountered in the borings within the pond area). Four soil samples were collected from each boring from the following intervals: (1) surface - "A" sample, (2) immediately below the pond asphalt liner - "AB" sample, (3) intermediate depth - "B" sample, and (4) terminal depth at refusal to further advancement of the sampler - "C" sample. A surface sample was not collected at boring 57SB4 due to previous sampling during SSP. Soil samples collected from borings within the pond area were analyzed for TAL Metals, TCL VOCs, TCL SVOCs, TCL PCBs, TCL pesticides, and explosives. Additionally, a sample from 57SB5 was collected for physical testing of pH, TOC, grain size, Atterberg Limits, moisture content, and cation exchange capacity. A sample from 57SB4 was also collected for physical testing of TOC and cation exchange capacity.

For the RFI, three soil borings (57SB1, 57SB2, and 57SB9) were completed outside the fenced area of the pond adjacent to the terracotta pipe. The approximately 65 ft long terracotta drainage pipe is below grade except for the northern end of the pipe where it enters into the pond (Figure 3-1). An approximate four foot section of the pipe is above grade and the pipe is broken at a single point where two pipe sections are attached (see the photographic log in Appendix A). SSP boring 57SB2 was completed at the location where the pipe is broken. Three soil samples were collected at this location as part of the SSP to evaluate potential releases from the pipe including a surface soil sample from 0 to 1 ft bgs (0.5 to 1 ft for volatiles), and intermediate depth sample from 8 to 10 ft bgs, and a terminal depth sample collected from 33 to 35 ft bgs. As part of the RFI, an additional sample was collected at location 57SB2 from 1 to 2 ft below the bottom of the drainpipe section where it is broken to further assess for potential releases in this area. One additional soil sample was also collected from previous SSP boring 57SB1 at a depth of approximately 1 to 2 ft below the bottom of the drainpipe (Figure 3-1, Table 3-1). As part of the RFI, a third soil boring (57SB9) was completed along the drainpipe at the midpoint between SSP borings 57SB1 and 57SB2 (Figure 3-1). Two soil samples were collected from this boring for chemical analysis including: (1) a

surface sample – "A" sample and (2) a sample from 1 to 2 ft below the drainpipe – "AB" sample (Table 3-1). RFI soil samples from borings 57SB1, 57SB2, and 57SB9 were analyzed for TCL VOCs and TAL metals.

For the RFI, five soil borings were completed in the lower area surrounding pond/drainage swale. Three soil borings (57SB10, 57SB11, and 57SB12) were completed north, east, and south of the fenced perimeter/berm within the low area surrounding the pond to supplement existing data from previous SSP boring 57SB3 (Figure 3-1). Three soil samples were collected from each boring for chemical analysis including the following intervals: (1) surface – "A" sample, (2) intermediate – "B" sample, and (3) terminal depth immediately above encountered groundwater or refusal – "C" sample (Table 3-1). These soil samples were analyzed for TCL VOCs and TAL metals. Additionally, a sample from 57SB12 was collected for physical testing of pH, TOC, grain size, Atterberg Limits, moisture content, and cation exchange capacity. Two additional soil borings (57SB18 and 57SB19) were completed in the 80 ft segment of swale northwest of SSP boring 57SB3 (no additional samples were collected from SSP boring 57SB3 for the RFI). Three soil samples were collected from each boring for chemical analysis including: (1) a surface sample – "A" sample, (2) an intermediate sample – "B" sample, and (3) a termination depth sample – "C" sample (Table 3-1). These soil samples were analyzed for TCL VOCs and TAL metals.

For the RFI, five soil borings (57SB13, 57SB14, 57SB15, 57SB16, and 57SB17) were completed farther outside the pond at a distance of 20 to 25 ft from the perimeter fence (Figure 3-1). Three soil samples were collected from each boring for chemical analysis including the following intervals: (1) surface – "A" sample, (2) intermediate – "B" sample, and (3) terminal depth immediately above encountered groundwater – "C" sample (Table 3-1). These soil samples were analyzed for TCL VOCs and TAL metals.

3.1.2 Monitoring Well Installation and Groundwater Sampling

In January 2008, monitoring wells 57MW1, 57MW2, and 57MW3 were installed at the site at locations east, north and west of the of the pond area, respectively, to evaluate potential releases to groundwater. 57MW1 was installed as a background well at a location anticipated to be upgradient from the site area. 57MW2 and 57MW3 were installed adjacent to the pond area at locations downgradient of the pond and source areas. Monitoring well construction data are summarized in Table 2-3.

Groundwater sampling was completed for the RFI in February 2008. Groundwater samples were collected from newly installed monitoring wells 57MW2 and 57MW3 but could not be collected from 57MW1 due to the lack of sufficient water in the well for sample collection. The groundwater sampling and analysis program is summarized in Table 3-1 and in the table below. Figure 3-1 shows the monitoring well locations.

Monitoring Well Sampling and Analysis

Sampling Date	Monitoring Wells Sampled	Analytical Parameters
February 2008 (RFI)	57MW2 (D) 57MW3 (D)	TAL metals (filtered and total), TCL VOCs, TCL SVOCs, TCL Pesticides, TCL PCBs, Explosives, and Perchlorate Field water quality parameters: pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity.

Note: (D) = Downgradient.

3.2 QUALITY ASSURANCE

Quality Assurance (QA) planning defined the overall system of activities for assuring the reliability of data produced. The system integrated the quality planning, assessment, and corrective actions of various groups in the organization to provide the independent QA program necessary to establish and maintain an effective system for collection and analysis of environmental samples and related activities. The program encompasses the generation of complete data with its subsequent review, validation, and documentation.

The accuracy and integrity of RFI data were ensured through the implementation of internal quality control (QC) measures consistent with MWP Addendum 021 (URS 2007e). QA and QC procedures, including field QC, laboratory QC, data management, and data validation, were integrated into the investigation program to meet data quality objectives (DQOs) established and approved for the RFI. The data were evaluated for each of the DQO indicators and the results of this evaluation are presented in Appendix H.1. DQOs for the RFI were met.

3.3 INVESTIGATION METHODOLOGY

3.3.1 Soil Sampling for Chemical Analysis

Surface and subsurface soil samples were collected for chemical analysis following the procedures outlined in standard operating procedure (SOP) 30.1 included in Appendix B and as described in Section 5.2 of the MWP (URS 2003). Soil sampling forms are presented in Appendix C.4.

The soil core interval was examined and classified by the site geologist and recorded in the field logbook and on the boring log consistent with SOPs 10.1 and 10.3, respectively (Appendix B). Soil was then extracted from the appropriate interval; sample containers were filled, labeled, and placed into coolers with ice and maintained at 4 degrees Celsius (°C).

Soil samples were collected from the borings using an All-terrain vehicle (ATV)-mounted direct push/rotary rig. This rig was equipped with 1.25-inch diameter push rods, 4-ft long, 2-inch diameter, stainless steel closed solid barrel sampler (Macro-Core®) with a disposable liner and stainless steel cutting shoes. A percussion hammer was used to advance the sampling assembly. Following withdrawal of the Macro-Core® and removal of the liner, a cutting device was used to open the liner before inspection and processing of the sample cores.

Once the termination depth of the boring was reached and sample collection was completed, the borehole was backfilled with hydrated bentonite chips. Excess soil cuttings were temporarily accumulated in 55-gallon drums at the Installation-approved area for disposal as discussed in Section 3.3.7. Soil boring logs are included in Appendix C.2.

3.3.2 Monitoring Well Installation and Development

Monitoring wells 57MW1, 57MW2, and 57MW3 were installed following the procedures outlined in SOP 20.1 (Appendix B) and as described in Section 5.2 of the MWP (URS 2003). These monitoring wells were installed using a track mounted drill rig using 4.25-inch inner diameter hollow stem augers for overburden drilling and a 4-inch diameter air rotary drill bit for drilling into competent bedrock. Boring logs were completed as described in SOP 10.3 (Appendix B) and drilling activities were documented in the field logbook as described in SOP 10.1 (Appendix B). Downhole drill rig tools and equipment were decontaminated before use at each location following SOP 80.1 (Appendix B).

Monitoring wells were constructed with 2-inch diameter, Schedule 40 polyvinyl chloride (PVC) 0.01-inch factory slotted screen and riser pipe with threaded joints. Twenty-five foot long screens were used for each well, with the screened positioned to intercept the overburden/bedrock interface where the first significant water was encountered during drilling. Boring logs and construction diagrams for the monitoring wells are included in Appendix C.2. Monitoring well construction data are summarized in Table 2-3.

Prior to sampling, each of the monitoring wells was developed consistent with SOP 20.2 (Appendix B) and as described in Section 5.2 of the MWP (URS 2003). Development was completed after well completion and stabilization using a surge block, disposable bailer, and stainless steel, adjustable flow rate submersible pump with new disposable tubing. Development was continued at each monitoring well until a minimum of three equivalent well volumes were purged, water quality indicator parameters had stabilized, development water was clear to the unaided eye, and any remaining sediment had been removed from the well. Decontamination and purge water were temporarily accumulated in 55-gallon drums at the Installation-approved area for disposal as discussed in Section 3.3.7. Well development records are included in Appendix C.4.

3.3.3 Groundwater Sampling

Groundwater samples were collected for chemical analysis in accordance with SOP 30.2 (Appendix B) and as described in Section 5.2.10 of the MWP (URS 2003). Groundwater sampling information was recorded in the field logbooks as described in SOPs 10.1 and 10.2 (Appendix B). Groundwater sampling field data sheets are included in Appendix C.4.

Low flow purging and sampling techniques were used to collect the groundwater samples from monitoring wells 57MW2 and 57MW3. Purging in these monitoring wells was at a rate of 500 milliliters per minute (ml/min) or less to minimize excessive drawdown. Sampling followed the procedures outlined in Section 3.3 of SOP 30.2 (Appendix B). Equipment used to purge and sample wells was thoroughly decontaminated before and after use following SOP 80.1 (Appendix B). All equipment used for monitoring water quality parameters was calibrated before use according to the manufacturer's instructions and SOP 40.1 (Appendix B). Prior to the sampling round, the depth to water was measured at each well to the nearest 0.01 ft using an electronic water level indicator in accordance with SOP 40.2. Calibration and measurement data were recorded in the field logbook and on groundwater sampling forms, which are presented in Appendix C.4.

A stainless steel, adjustable flow rate submersible pump, and new disposable tubing were used to collect the groundwater samples. The pump tubing was connected to an in-line flow-through cell and the multi-parameter meter probe was connected to the flow cell to monitor water quality parameters during purging. Pumping was started and the pump rate was adjusted to cause minimal drawdown (less than 0.2 ft if possible). A Horiba Model U-22 multi-parameter water quality meter was used to monitor pH, specific conductance, temperature, ORP, dissolved oxygen, and turbidity during purging. Purging was continued until parameter stabilization was achieved. Once purging was complete, the pumping rate was reduced to its lowest steady rate and the in-line flow cell was disconnected from the tubing to allow for sampling from the tubing directly into sample containers provided the laboratory.

Groundwater samples were collected and containerized in the order of volatilization sensitivity of the parameters. Filtered and unfiltered samples were collected for metals analysis. Metals samples were filtered with an in-line high capacity 0.45-micron disposable filter. The appropriate sample containers were filled, labeled, and placed into coolers with ice and maintained at 4 °C.

3.3.4 Water Quality Measurements

Field water quality measurements were collected consistent with SOP 40.1 (Appendix B) using a Horiba Model U-22 multi-parameter water quality meter. Prior to its use each day, the meter was calibrated according to the manufacturer's instructions.

3.3.5 Aquifer Tests

Rising head and falling head slug tests were conducted at monitoring wells 57MW2 and 57MW3 in accordance with SOP 40.3 (Appendix B) and Section 5.9 of the MWP (URS 2003). A 3-inch diameter and 4-ft long solid PVC slug was used for the slug tests to induce instantaneous changes in water levels. Water level changes were recorded using a downhole pressure transducer with an internal data logger

(Solinst Levelogger, 3001 - Level/Temperature F15 mini). Slug-test data analysis was performed using AQTESOLV for Windows Pro Version 3.0. Appendix C.3 includes the slug test output and analysis.

3.3.6 Site Surveying

Draper Aden Associates completed a survey of new monitoring wells 57MW1, 57MW2 and 57MW3. At the conclusion of the field investigations, the locations and elevations of borings were also obtained using a Trimble Pathfinder Pro XRS® global positioning system (GPS).

Surveying was conducted using the U.S. State [Virginia (South Zone)] Plane Coordinate System (measured in U.S. survey ft) using the North American Datum 1983. Vertical elevations at the site were surveyed to the nearest 0.01 ft using the National Vertical Datum of 1988. Sample location coordinates and survey data are included in Table 2.2.

3.3.7 Investigation-Derived Material (IDM) Management

IDM management activities were conducted consistent with the procedures outlined in WPA 021 (URS 2007e) and documented in the field logbook, and conducted as described below.

3.3.7.1 Accumulation

IDM accumulated during field sampling activities, monitoring well installation, and groundwater sampling activities included the following materials and containers:

- Soil cuttings – fifteen 55-gallon drums;
- Personal protective equipment (PPE), probe liners, and plastic sheeting – two 55-gallon drums;
- Decontamination and purge water – six 55-gallon drums; and

IDM accumulation and labeling was conducted as outlined in MWP SOP 70.1 (Appendix B). Drums were transferred to the Installation's approved container accumulation area at SWMU 17 while this IDM was on hold pending analysis for characterization and disposal.

3.3.7.2 Material Characterization

IDM characterization samples were collected for each set of containerized soil cuttings and decontamination/purge water generated during the investigation. IDM was characterized to evaluate whether it was a RCRA characteristic hazardous waste as described in Part 40 of the Code of Federal Regulations (CFR) Part 261, Subpart C (as referenced in the Virginia Hazardous Waste Management Regulations).

The analytical results for the IDM characterization samples indicated the soil cuttings, water, and PPE were non-hazardous material. IDM sample results are presented in Appendix C.5.

3.3.7.3 Transportation and Disposal

Before disposal, waste analytical results were provided to the Installation, IDM management subcontractor, and the disposal facilities for review and approval. Manifests were reviewed and signed by Installation personnel prior to loading and transport of the IDM. The Installation maintains a record of the manifests and related information including analytical testing results and waste profiles.

First Piedmont transported the nonhazardous soil drums and the nonhazardous material to the First Piedmont Landfill in Chatham, Virginia.

3.3.7.4 Decontamination Water

Following the waste characterization sample analysis, the Installation and RFAAP Process Water Treatment Plant engineers were provided a copy of the water IDM sample results and groundwater sample results. After receiving Plant approval, decontamination water and purge water were discharged into the collection system of the Process Water Treatment Plant.

3.4 WORK PLAN FIELD CHANGES

In some cases, deviations to the Work Plan were necessary to adjust for field conditions as they occurred during field sampling.

3.4.1 Soil Investigations

Specific deviations to the Work Plan for soil investigations included the following:

- Soil borings 57SB14 and 57SB19 were relocated from their original proposed locations due to the proximity to overhead steam lines; and
- A terminal depth sample ("C" sample) was not collected from 57SB9 due to refusal at 13.5 feet bgs.

3.4.2 Groundwater Investigations

Background monitoring well 57MW1 was not sampled due to lack of a sufficient water column. An initial water column of approximately six feet was measured after well installation on January 18, 2008; however, subsequent measurements obtained from this well in January, February, and May 2008 indicated an absence of water and approximately 0.37 ft of mud in the well bottom. Therefore, a groundwater sample could not be collected from this monitoring well as proposed in the RFI.

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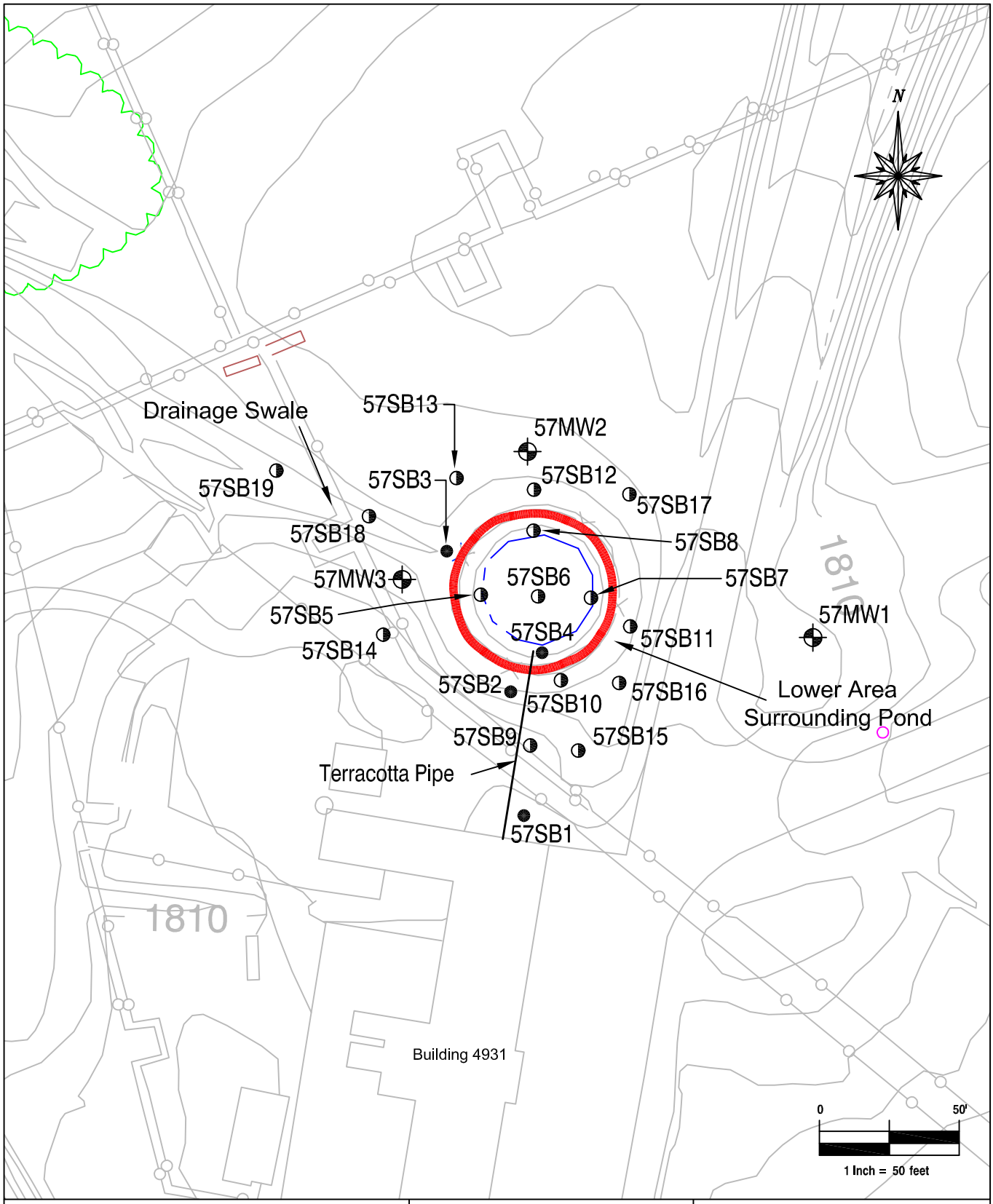

Legend

- Approximate SWMU Boundary
- Topographic Contour
- SSP Soil Sample Location
- RFI Sample Location
- Monitoring Well Location
- Vegetation
- Fence
- Aboveground Piping

FIGURE 3-1

RFI Sample Locations Map

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.3-1 RFI Locs

SWMU 57

RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230

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4.0 NATURE AND EXTENT OF CHEMICALS

The following sections discuss the results of chemical sampling of soil and groundwater at the site and assess the nature and extent of detected chemicals in site media. Chemical results are evaluated with respect to the following: USEPA Region III R-RBCs and I-RBCs for soil, and T-RBCs (USEPA 2007), which are adjusted downward for non-carcinogenic chemicals to a hazard quotient (HQ) of 0.1 to account for potential additive toxicity effects of multiple chemicals; USEPA Region III soil transfer-to-groundwater screening levels (SSLs, DAF20 default values); the most current USEPA Region III ecological soil screening levels (as presented in Section 7.0); USEPA maximum contaminant levels (MCLs) for groundwater; and facility-wide background concentrations for metals in soil as provided below (IT 2001).

Facility-Wide Background Point Estimates for Soil

Chemical	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	95% Upper Tolerance Limit (UTL) of the Mean (mg/kg)
Aluminum	3,620	47,900	40,041
Arsenic	1.2	35.9	15.8
Barium	23.4	174	209
Beryllium	0.61	5.4	1.02
Cadmium	0.62	2.5	0.69
Chromium	6.3	75.8	65.3
Cobalt	5.9	130	72.3
Copper	1.6	38.7	53.5
Iron	7,250	67,700	50,962
Lead	2.1	256	26.8
Manganese	16.7	2,040	2,543
Mercury	0.038	1.2	0.13
Nickel	4.6	94.2	62.8
Thallium	1.3	5	2.11
Vanadium	12.2	114	108
Zinc	4.7	598	202

Note: mg/kg = milligram per kilogram

With the exception of metals in soil, chemicals detected in one or more samples in a given medium at concentrations above their adjusted RBCs, SSL DAF20s, or ecological screening level are identified in the nature and extent assessment as COPCs. Metals in soil detected at concentrations above their background point estimates and an adjusted RBC, SSL DAF20, or ecological screening levels are retained as COPCs in the nature and extent assessment. The facility-wide background concentrations are used in the nature and extent assessment to evaluate the significance of background exceedances in soil and to assist in bounding the lateral and vertical extent of metals concentrations potentially attributable to historical site activities. Additional chemical specific screening information is provided on Table 4-1.

4.1 NATURE AND EXTENT – SOIL

4.1.1 Analytical Results

Twenty surface soil samples and 44 subsurface soil samples for a total of 64 samples were collected for chemical analysis from SWMU 57 (Figure 3-1 and Table 3-1). Table 4-1 presents analytical results for chemicals detected in soil samples collected at SWMU 57 and screens these data with respect to adjusted RBCs, SSLs, and background concentrations. Risk screening results are summarized for each site area in Table 4-2 (Soil within Pond Area), Table 4-3 (Soil in Terracotta Pipe Area), Table 4-4 (Soil in Lower Area Surrounding Pond/Drainage Swale), Table 4-5 (Soil in Upper Area Surrounding Pond), and Table 4-6 (Total Soil). These tables show the constituents detected, minimum and maximum concentrations detected, number of detections, number of samples, and number of samples exceeding human health screening criteria or SSL DAF20 screening levels and background concentrations (inorganics only). COPECs listed below were identified for the site as part of the screening level ecological risk assessment presented in Section 7.2.3 and above background point estimates (inorganics only). The screenings resulted in the identification of the following COPCs (note that chemicals which exceeded both its adjusted R-RBC and I-RBC are italicized) and COPECs:

TAL Metals (Methods 6010B, 6020A, 7471A) – 23 TAL metals were detected in soil samples with the following screening level and background point estimate (if available) exceedances:

RBC – *antimony, cadmium*, *chromium*, *iron*, lead, *manganese*, *vanadium*, zinc;
SSL – antimony, cadmium, chromium, manganese, vanadium; and
Eco – aluminum, antimony, cadmium, calcium, chromium, iron, lead, mercury, zinc.

TCL Pesticides (Method 8081A) – 4 pesticides were detected in soil samples with the following screening level exceedances:

RBC – none;
SSL – dieldrin; and
Eco – none.

TCL PCBs (Method 8082) – 2 PCBs were detected in soil samples with the following screening level exceedance:

RBC – *Aroclor 1254*, *Aroclor 1260*;
SSL – Aroclor 1254; and
Eco – none.

TCL VOCs (Method 8260B) – 14 VOCs were detected in soil samples with the following screening level exceedances:

RBC – none;
SSL – bromodichloromethane, chloroform, methylene chloride, trichloroethene; and
Eco – none.

TCL SVOCs and PAHs (Method 8270C) – 11 SVOCs and 16 PAHs were detected in soil samples with the following screening level exceedances:

RBC – benzo(a)pyrene;
SSL – none; and
Eco – none.

Explosives (Method 8330) and Nitroglycerin (Method 8332) – Explosives and nitroglycerin were not detected in soil samples; therefore, there were no screening level exceedances.

4.1.2 Human Health Nature and Extent Assessment

A summary of the chemical that exceeded human health risk screening values and background point estimates (inorganics only) is presented in the table below.

Summary of Human Health COPCs for Soil

Chemical	Total # of Det/# of Samples	# of R-RBC/I-RBC Exceed.	Sample Exceedances			
			Within Pond Area	Terracotta Pipe	Lower Area Surrounding Pond/ Drainage Swale	Upper Area Surrounding Pond
Antimony	62/64	14/4	57SB4A, 57SB4A2, 57SB5A, **57SB6A**, 57SB6B, **57SB7A**, 57SB7AB, 57SB8A, 57SB8B	57SB2A, 57SB2AB	**57SB3A DUP AVG**, **57SB18A**, 57SB19A	NA
Cadmium	39/64	9/1	57SB5A, 57SB6A, **57SB7A**	57SB2A, 57SB2AB, 57SB1C	57SB3A DUP AVG, 57SB18A, 57SB19A	NA
Chromium	64/64	8/3	**57SB6A**, **57SB7A**	57SB2A, 57SB2AB, 57SB1C	**57SB3A DUP AVG**, 57SB18A, 57SB19A	NA
Iron	64/64	13/3	**57SB4A**, 57SB4A2, **57SB4B**, 57SB6AB, 57SB7AB, 57SB7B, 57SB8A, 57SB8AB, 57SB8B, **57SB8C**	NA	57SB3B	57SB15B, 57SB16C
Lead	64/64	1/0	57SB7A	NA	NA	NA
Manganese	64/64	8/8	**57SB4A**, **57SB6AB**, **57SB7AB**, **57SB8A**, **57SB8AB**, **57SB8B**, **57SB8C**	NA	**57SB10B**	NA
Vanadium	64/64	4/4	**57SB6A**, **57SB7A**	**57SB2AB**	**57SB18A**	NA
Zinc	64/64	1/0	57SB7A	NA	NA	NA
Aroclor 1254	11/20	7/1	57SB5A, 57SB5AB DUP AVG, **57SB6A**, 57SB6B, 57SB7A, 57SB8A, 57SB8AB	NA	NA	NA
Aroclor 1260	6/20	2/1	**57SB6A**, 57SB6B	NA	NA	NA
Benzo(a)pyrene	7/30	2/0	57SB6A	57SB2A	NA	NA

Notes: NA=Not Applicable, DUP AVG = Duplicate Average, **Bold**=Sample Exceeds adjusted R-RBC and I-RBC

The nature and extent of COPCs identified in the above table, as well as SSL DAF20 exceedances (above background concentrations for inorganics), identified in Section 4.1.1 and presented on Table 4-2 (Soil Within Pond Area), Table 4-3 (Soil in Terracotta Pipe Area), Table 4-4 (Soil in Lower Area Surrounding Pond/Drainage Swale), Table 4-5 (Soil in Upper Area Surrounding Pond), and Table 4-6 (Total Soil), is discussed further in the following sections for the soil within the pond area, soil adjacent to the terracotta pipe, soil in the lower area surrounding pond/drainage swale, and soil in the upper area surrounding pond.

4.1.2.1 Within Pond Area

Metals

Antimony: antimony was detected at concentrations above its adjusted R-RBC in each of the 6 soil samples collected in the pond area above the asphalt liner. Two of these samples (57SB6A and 57SB7A) also had antimony concentrations above the adjusted I-RBC. Four of these samples (57SB5A, 57SB6A 57SB7A, and 57SB8A) also had antimony concentrations above the SSL DAF20. Below the asphalt liner, antimony concentrations were less than the adjusted R-RBC except for one sample collected immediately below the asphalt liner at boring 57SB7 (57SB7AB) and in two intermediate depth samples (57SB6B and 57SB8B) collected at maximum depths of 9 ft bgs or less. Underlying "C" sample results at boring locations 57SB6 and 57SB8 indicated that the vertical extent of appreciable leaching of antimony and associated detected R-RBC exceedances and SSL DAF20 was less than 13 ft bgs in the

pond area (Figures 4-1 and 4-3). Groundwater sample results indicate antimony at concentrations above its adjusted T-RBC but below its unadjusted T-RBC and MCL.

Cadmium: cadmium was detected at concentrations above its adjusted R-RBC and background point estimate in 3 of 6 soil samples (57SB5A, 57SB6A, and 57SB7A) collected in the pond area above the asphalt liner. The cadmium concentration in sample 57SB7A also exceeded its adjusted I-RBC. The cadmium concentrations in samples (57SB6A and 57SB7A) also exceeded its SSL DAF20. Detected cadmium concentrations from immediately below the asphalt liner to the boring termination depths were below adjusted RBCs and SSL DAF20 indicating limited leaching from the pond at depths below 2 ft bgs (Figures 4-1 and 4-3). The lack of significant leaching of cadmium from the pond was also confirmed by groundwater sample results, which had dissolved cadmium concentrations below the adjusted T-RBC.

Chromium: chromium was detected at concentrations above its adjusted R-RBC, I-RBC, DAF20 SSL, and background point estimate in 2 of 6 soil samples (57SB6A and 57SB7A) collected in the pond area above the asphalt liner. Detected chromium concentrations from immediately below the asphalt liner to the boring termination depths were below the R-RBC and SSL DAF20 indicating limited leaching from the pond at depths below 2 ft bgs (Figures 4-1 and 4-3). The lack of significant leaching of chromium from the pond was also confirmed by groundwater sample results, which had dissolved chromium concentrations below the adjusted T-RBC.

Iron: iron was detected at concentrations above its adjusted R-RBC and background point estimate in 3 of 6 soil samples (57SB4A, 57SB4A2, and 57SB8A) collected in the pond area above the asphalt liner. The iron concentration in sample 57SB4A also exceeded its adjusted I-RBC. Below the asphalt liner, detected iron concentrations were above the adjusted R-RBC and background point estimate in 4 of 5 boring locations with the vertical extent ranging from less than 6 ft bgs at 57SB6B to the terminal depth of 15 ft bgs at 57SB8C. Iron concentrations were also above the adjusted I-RBC and background point estimate in sample 57SB8C indicating the vertical extent of concentrations above the I-RBC extends below a depth of 15 ft bgs at boring 57SB8 (Figure 4-1). An SSL DAF20 is not available for iron, but the groundwater sample results did not indicate the leaching of iron from soil to groundwater at concentrations above its adjusted T-RBC.

Lead: lead was detected at concentrations above its residential action level (AL) and background point estimate in 1 of 6 soil samples (57SB7A) collected in the pond area above the asphalt liner. Detected concentrations in these samples were below the industrial AL. Detected lead concentrations from immediately below the asphalt liner to the boring termination depths were below the residential AL and background point estimate indicating limited leaching from the pond at depths below 2 ft bgs (Figure 4-1). The lack of significant leaching of lead from the pond was also confirmed by groundwater sample results, which had lead concentrations below its adjusted T-RBC. An SSL DAF20 is not available for lead, but the groundwater sample results did not indicate the leaching of lead from soil to groundwater at concentrations above its adjusted T-RBC.

Manganese: manganese was detected at concentrations above its adjusted R-RBC, I-RBC, SSL DAF20, and background point estimate in 2 of 6 soil samples (57SB4A and 57SB8A) collected in the pond area above the asphalt liner. Below the asphalt liner, detected manganese concentrations were also above these screening criteria at three locations immediately below the liner (57SB6AB, 57SB7AB, 57SB8AB), in one intermediate depth sample from 8 ft bgs (57SB8B) and one terminal depth sample from 15 ft bgs (57SB8C), which indicated that the vertical extent of concentrations above the adjusted I-RBC and DAF20 SSL extends below a depth of 15 ft bgs at boring 57SB8 (Figures 4-1 and 4-3). Groundwater sample results indicated some potential leaching of manganese to groundwater with concentrations above the adjusted T-RBC but below the unadjusted T-RBC.

Vanadium: vanadium was detected at concentrations above its adjusted R-RBC, I-RBC, and background point estimate in 2 of 6 soil samples (57SB6A and 57SB7A) collected in the pond area above the asphalt liner. One of these samples (57SB7A) also had a vanadium concentration above the SSL DAF20.

Detected vanadium concentrations from immediately below the asphalt liner to the boring termination depths were below adjusted RBCs and SSL DAF20 indicating limited leaching from the pond at depths below 2 ft bgs (Figures 4-1 and 4-3). The lack of appreciable leaching of vanadium from the pond was also confirmed by groundwater sample results, which had dissolved vanadium concentrations below the adjusted T-RBC.

Zinc: zinc was detected at concentrations above its adjusted R-RBC and background point estimate in 1 of 6 soil samples (57SB7A) collected in the pond area above the asphalt liner. The detected concentration was below its adjusted I-RBC and SSL DAF20. Detected zinc concentrations immediately below the asphalt liner to the boring termination depths were below adjusted RBCs and SSL DAF20 indicating limited leaching from the pond at depths below 2 ft bgs (Figure 4-1). The lack of appreciable leaching of zinc from the pond was also confirmed by groundwater sample results, which had zinc concentrations below the adjusted T-RBC.

Pesticides

Pesticides were detected in samples collected within the pond area at concentrations below their adjusted RBCs. Dieldrin was detected in three soil samples at concentrations above its SSL DAF20 including one sample collected above the asphalt liner (57SB8A), one sample collected immediately below the asphalt liner (57SB8AB), and one intermediate depth sample collected at 9 ft bgs (57SB6B) (Figure 4-3). Additional discussion and assessment of the soil-to-groundwater migration pathway for dieldrin is presented in Section 5.1.4. Groundwater sample results did not indicate leaching of dieldrin or other pesticides from soil to groundwater at concentrations above adjusted T-RBCs.

PCBs

Aroclor 1254 was detected at concentrations above its adjusted R-RBC in 4 of 6 soil samples (57SB5A, 57SB6A, 57SB7A, and 57SB8A) collected in the pond area above the asphalt liner. Aroclor 1260 was also detected in sample 57SB6A at a concentration above its adjusted R-RBC. The concentrations of both of these PCBs were also above the adjusted I-RBC in sample 57SB6A. Lower PCB concentrations were detected below the asphalt liner with R-RBC exceedances for Aroclor 1254 limited to 2 of 5 samples (57SB5AB DUP AVG and 57SB8AB) collected immediately below the liner and one intermediate depth sample (57SB6B) collected from a depth of 8 ft bgs. This intermediate depth sample also had the only detected concentration of Aroclor 1260 above the adjusted R-RBC from samples collected below the asphalt liner. The vertical extent of detected concentrations of PCBs above adjusted R-RBCs is less than 13 ft bgs at location 57SB6B given that these compounds were not detected in terminal sample 57SB6C (Figure 4-2).

PCB detections above their SSL DAF20 were limited to one sample (57SB6A) for Aroclor 1254 within the pond area above the asphalt liner (Figure 4-3). Additional discussion and assessment of the soil-to-groundwater migration pathway is presented in Section 5.1.4. Groundwater sample results did not indicate leaching of PCBs from soil to groundwater at detectable levels.

VOCs

VOCs were detected in samples collected within the pond area above the asphalt liner at concentrations below their adjusted RBCs and DAF20 SSLs. Appreciable leaching of VOCs below the pond's asphalt liner was not apparent, with one VOC detection reported above its SSL DAF20 in a soil sample (57SB5AB DUP AVG) collected immediately below the pond's asphalt liner (Figure 4-3). Trichloroethene (TCE) was detected in this sample at a low-level concentration of 7.1µg/kg but this detection was not confirmed in the associated duplicate sample. Underlying samples collected from boring 57SB5 at depths of 6 ft bgs or greater did not have detectable TCE levels and groundwater sample results did not indicate leaching of TCE from soil to groundwater at detectable levels. Based on these data and the low frequency of detection of TCE (1 detection from 21 samples in the pond area and 2

detections from 64 samples in total soil at the site), TCE is not considered further in the nature and extent assessment or fate and transport assessment for the pond area.

SVOCs

SVOC compounds were detected in samples collected within the pond area at concentrations below their adjusted RBCs and DAF20 SSLs, with the exception of one soil sample (57SB6A) collected above the pond's asphalt liner with a benzo(a)pyrene concentration above its adjusted R-RBC, but below its SSL DAF20 and adjusted I-RBC (Figure 4-2). The lack of appreciable leaching of SVOCs to soil below the pond's liner was also confirmed by the groundwater sample results, which did not indicate detections of SVOCs above their adjusted T-RBCs.

Explosives

Explosives including nitroglycerin and PETN were not detected in samples collected within the pond area.

4.1.2.2 Terracotta Pipe

Metals

Antimony: antimony was detected in one surface soil sample (57SB2A) and one shallow sample collected immediately below the terracotta pipe (57SB2AB) at concentrations above its adjusted R-RBC and SSL DAF20 but below its adjusted I-RBC. Antimony results from the intermediate and terminal depth samples from boring 57SB2 indicated that vertical extent of concentrations above the adjusted R-RBC and SSL DAF20 at this location is less than 8 ft bgs (Figures 4-1 and 4-3). Groundwater sample results from the site indicated an antimony concentration above its adjusted T-RBC in 1 of 2 samples (57MW2) but below the unadjusted T-RBC and MCL.

Cadmium and Chromium: cadmium and chromium were detected in three soil samples at concentrations above their adjusted R-RBCs but below their adjusted I-RBCs including: the terminal depth sample from boring 57SB1 (20 ft bgs) and the samples collected from the surface and below the terracotta pipe at boring location 57SB2 near the pond (Figure 4-1). The vertical extent of detected cadmium and chromium concentrations above adjusted R-RBCs at 57SB2 is less than 8 ft bgs and greater than 20 ft bgs at 57SB1. Detected cadmium concentrations were below its SSL DAF20 and appreciable leaching of cadmium from soil to groundwater was not indicated by the groundwater sample results, which were below the adjusted T-RBC. Exceedances of the SSL DAF20 and background point estimate for chromium were limited to the surface and shallow samples at 57SB2, with underlying intermediate and terminal samples having lower concentrations than these criteria, and a terminal sample at 57SB1. Appreciable leaching of chromium from soil to groundwater was not indicated by the groundwater sample results for dissolved chromium, which were below its adjusted T-RBC.

Vanadium: vanadium was detected in one sample collected immediately below the terracotta pipe (57SB2AB) at concentrations above its adjusted R-RBC, I-RBC, and background point estimate. Soil samples collected above and below sample 57SB2AB had vanadium concentrations above the adjusted R-RBC but below the background point estimate indicating a limited vertical extent of concentrations (less than 8 ft bgs) above the background point estimate and the I-RBC at boring 57SB2 (Figure 4-1). Vanadium concentrations in soil samples were below the SSL DAF20. Appreciable leaching of vanadium from soil to groundwater was not indicated by the groundwater sample results for dissolved vanadium, which were below the adjusted T-RBCs.

Pesticides

Pesticides were not analyzed for in samples collected from the area of the terracotta pipe.

PCBs

PCBs were not analyzed for in samples collected from the area of the terracotta pipe.

VOCs

VOCs were detected in soil samples collected from the area of the terracotta pipe at concentrations below their adjusted RBCs. Limited low-level VOC detections above DAF20 SSLs were reported in the intermediate and terminal samples from boring 57SB1C for chloroform and in the terminal sample from boring 57SB2 for bromodichloromethane and chloroform. Groundwater samples collected from the site did not indicate apparent leaching of bromodichloromethane from soil to groundwater at detectable levels. Based on these data, the single detection in soil (1 of 64 soil samples collected), and low concentration detected (1.2 µg/kg), bromodichloromethane is not assessed further in the nature and extent assessment or fate and transport assessment.

Potential leaching of chloroform from soil to groundwater was indicated by detections of chloroform in groundwater at concentrations above the adjusted T-RBC but below the MCL for chloroform (total trihalomethanes [THMs]). Additional discussion and assessment of the soil-to-groundwater migration pathway for VOCs is presented in Section 5.1.4.

SVOCs

SVOCs were detected in samples collected from the area of the terracotta pipe at concentrations below their adjusted RBCs and DAF20 SSLs, except for one surface soil sample (57SB2A) collected near where the pipe enters the pond. This sample had a benzo(a)pyrene concentration above its adjusted R-RBC, but below its SSL DAF20 and adjusted I-RBC (Figure 4-2). The lack of appreciable leaching of SVOCs in soil was also confirmed by the groundwater sample results, which did not indicate detections of SVOCs above their adjusted T-RBCs.

Explosives

Explosives including nitroglycerin and PETN were not detected in samples collected from the area of the terracotta pipe.

4.1.2.3 Lower Area Surrounding Pond/Drainage Swale

Metals

Antimony: antimony was detected in the three surface soil samples collected in the drainage swale at concentrations above its adjusted R-RBC and SSL DAF20. Detected concentrations of antimony for two of these samples (57SB3A DUP AVG and 57SB18A) were also above the adjusted I-RBC. Subsurface soil samples collected from the drainage ditch had antimony concentrations below the adjusted R-RBC and SSL DAF20 indicating that the vertical extent of concentrations above these criteria was less than 14 ft bgs at boring 57SB3 closest to the pond and less than 10 ft at the other two boring locations (Figures 4-1 and 4-3). Groundwater sample results from the site indicated antimony concentration above its adjusted T-RBC in 1 of 2 samples (57MW2) but below the unadjusted T-RBC and MCL.

Cadmium and Chromium: Cadmium and chromium were detected in the three surface soil samples collected in the drainage swale at concentrations above their adjusted R-RBCs and background point estimates. Detected cadmium concentrations were below its adjusted I-RBC. The surface soil sample collected adjacent to the pond (57SB3A) had a chromium concentration above its adjusted I-RBC and SSL DAF20 (Figures 4-1 and 4-3). Subsurface samples collected from the drainage swale had chromium concentrations below the background point estimate, SSL DAF20, and adjusted I-RBC, with cadmium concentrations also below its adjusted R-RBC. Closest to the pond at 57SB3, the vertical extent of chromium and cadmium concentrations above background and the adjusted R-RBC, respectively, was less than 14 ft bgs. In the remaining drainage ditch samples, the vertical of chromium and cadmium concentrations above background and the adjusted R-RBC was less than 10 ft bgs (Figure 4-1). Appreciable leaching of chromium and cadmium from soil to groundwater was not indicated by the groundwater samples, which had dissolved concentrations of these chemicals below their adjusted T-RBCs.

Iron: iron was detected in one subsurface sample collected in the drainage swale (57SB3B) at a concentration above its adjusted R-RBC and background point estimate but below the adjusted I-RBC. The surface soil and terminal depth samples at this location were below the background point estimate and I-RBC indicating that the vertical extent of iron concentrations above the R-RBC and background point estimate at boring 57SB3B was less than 29 ft bgs (Figure 4-1). Appreciable leaching of iron from soil to groundwater was not indicated by the groundwater sample results, which had iron concentrations below the adjusted T-RBC.

Manganese: manganese was detected in one subsurface sample collected in the lower area surrounding the pond (57SB10B) at concentrations above its adjusted R-RBC, I-RBC, SSL DAF20, and background point estimate. The surface soil and terminal depth samples at this location were below the background point estimate, SSL DAF20, and I-RBC indicating that the vertical extent of manganese concentrations above these criteria at boring 57SB10 is less than 34 ft bgs (Figure 4-1). Groundwater sample results indicated some potential leaching of manganese to groundwater with concentrations above the adjusted T-RBC but below the unadjusted T-RBC.

Vanadium: vanadium was detected in one sample collected in the drainage swale (57SB18A) at concentrations above its adjusted R-RBC, I-RBC, and background point estimate. The intermediate and terminal depth samples at this location were below the I-RBC and background point estimate indicating that the vertical extent of vanadium concentrations above these criteria at boring 57SB18 was less than 10 ft bgs (Figure 4-1). Detected vanadium concentrations were below the SSL DAF20. Appreciable leaching of vanadium from soil to groundwater was not indicated by the groundwater sample results, which had dissolved vanadium concentrations below the adjusted T-RBC.

Pesticides

Pesticides were not analyzed for in samples collected from the lower area surrounding the pond/drainage swale.

PCBs

PCBs were not analyzed for in samples collected from the lower area surrounding the pond/drainage swale.

VOCs

VOCs were detected in samples collected from the lower area surrounding the pond/drainage swale at concentrations below their adjusted RBCs. Limited low-level VOC detections above SSL DAF20s were reported in the surface sample from boring 57SB3 for TCE, in the surface sample from boring 57SB18 for methylene chloride, and in the terminal samples from borings 57SB3 and 57SB12 for chloroform (Figure 4-3). TCE is not considered further in the nature extent assessment or fate and transport assessment due to the lack of detections above the adjusted R-RBC, single confirmed low-level detection in soil samples (1 of 64), and lack of detections in groundwater samples.

Groundwater samples collected from the site did not indicate apparent leaching of methylene chloride from soil to groundwater at detectable levels. Potential leaching of chloroform from soil to groundwater was indicated by detections of chloroform in groundwater at concentrations above the adjusted T-RBC but below the MCL for total THMs, which includes chloroform. Additional discussion and assessment of the soil-to-groundwater migration pathway for VOCs is presented in Section 5.1.4.

SVOCs

SVOCs were detected in samples collected from the lower area surrounding the pond/drainage swale at concentrations below their adjusted RBCs and DAF20 SSLs.

Explosives

Explosives including nitroglycerin and PETN were not detected in samples collected from the lower area surrounding the pond/drainage swale.

4.1.2.4 Upper Area Surrounding Pond

Metals

Isolated iron detections at concentrations above the background point estimate and above the adjusted R-RBC were reported in one intermediate depth sample (57SB15B) and one terminal depth sample (57SB16C) collected from the upper area surrounding pond (Figure 4-1). Detected concentrations were below the adjusted I-RBC. Other soil samples collected from this area had iron concentrations below the background point estimate. Appreciable leaching of iron from soil to groundwater was not indicated by the groundwater sample results, which had iron concentrations below the adjusted T-RBC.

Pesticides

Pesticides were not analyzed for in samples collected from the upper area surrounding pond.

PCBs

PCBs were not analyzed for in samples collected from the upper area surrounding pond.

VOCs

VOCs were detected in samples collected from the upper area surrounding pond at concentrations below their adjusted RBCs. Limited low-level VOC detections above DAF20 SSLs were reported in the terminal samples from 57SB14 for methylene chloride and in the terminal samples from boring 57SB17 for chloroform (Figure 4-3). Groundwater samples collected from the site did not indicate apparent leaching of methylene chloride from soil to groundwater at detectable levels. Potential leaching of chloroform from soil to groundwater was indicated by detections of chloroform in groundwater at concentrations above the adjusted T-RBC but below the MCL for total THMs, which includes chloroform. Additional discussion and assessment of the soil-to-groundwater migration pathway for VOCs is presented in Section 5.1.4.

SVOCs

SVOCs were not analyzed for in samples collected from the upper area surrounding pond.

Explosives

Explosives including nitroglycerin and PETN were not analyzed for in samples collected from the upper area surrounding pond.

4.1.3 Summary of Soil-to-Groundwater Screening Results

As previously discussed in Section 4.1.1 and presented on Table 4-6, concentrations for each detected chemical at the site were screened against the SSL DAF20 and background point estimates (for metals) resulting in the identification of the COPCs listed in the following table. Based on the low frequency of detection (<5% detections) and the low levels of detections, trichloroethene and bromodichloromethane were excluded from further nature and extent assessment. Site specific SSLs were not calculated for the site due to the fraction of organic carbon in soil at the site (0.00235) being approximately equivalent to the value used for default SSL calculation (0.002).

SSL COPCs

Chemical	Total # of Det/# of Samples	# of SSL DAF20 Exceedances	Sample Exceedances			
			Within Pond Area	Terracotta Pipe Area	Lower Area Surrounding Pond/ Drainage Swale	Upper Area Surrounding Pond
Antimony	62/64	10	57SB5A, 57SB6A, 57SB6B, 57SB7A, 57SB8A, 57SB8B	57SB2AB	57SB3A DUP AVG, 57SB18A, 57SB19A	NA
Cadmium	39/64	3	57SB6A, 57SB7A	NA	57SB3A DUP AVG	NA
Chromium	64/64	8	57SB6A, 57SB7A	57SB2A, 57SB2AB, 57SB1C	57SB3A DUP AVG, 57SB18A, 57SB19A	NA
Manganese	64/64	8	57SB4A, 57SB6AB, 57SB7AB, 57SB8A, 57SB8AB, 57SB8B, 57SB8C	NA	57SB10B	NA
Vanadium	64/64	1	57SB7A	NA	NA	NA
Dieldrin	5/20	3	57SB6B, 57SB8A, 57SB8AB	NA	NA	NA
Aroclor 1254	11/20	1	57SB6A	NA	NA	NA
Chloroform	10/64	7	NA	57SB1AB, 57SB1B, 57SB1C, 57SB2C	57SB3C, 57SB12C	57SB17C
Methylene Chloride	16/64	2	NA	NA	57SB18A	57SB14C

Further assessment of the soil-to-groundwater migration pathway for the above chemicals is presented in Section 5.1.4.

4.1.4 Ecological Nature and Extent Assessment

The nature and extent of COPECs identified at the site are based on the risk management portion of the SLERA presented in Section 7.2.3. As presented in Section 7.2.3, after consideration of spatial distribution of data at the site, the results of the SLERA, background concentrations, and nature of the material in place at the site, the scientific management decision point (SMDP) is the following:

There is adequate information to conclude that the potential exists for an adverse ecological impact to terrestrial plants and soil invertebrates due to metals in soil, the American robin due to exposure to chromium in soil, and amphibians due to metals, pesticides, total PCBs, one SVOC, and high molecular weight PAHs in soil within the pond area. Elevated concentrations are primarily located within the area of the pond or its appurtenances. No other significant potential impacts to ecological receptors due to site-related activities were identified. Significant uncertainty is associated with the potential impacts to plants, invertebrates, the American robin, and amphibians. It is recommended that the need for remedial action to address these potential impacts be evaluated along with the uncertainty associated with the derivation of the HQs, the location of HHRA chemicals of concern (COCs), the fate and transport evaluation, and other relevant factors, which would influence any decision to implement action.

4.2 NATURE AND EXTENT – GROUNDWATER

4.2.1 Monitoring Well Analytical Results

Monitoring well sample results from wells 57MW2 and 57MW3, collected in January 2008, are summarized in Table 4-7. Table 4-8 summarizes the screening results for groundwater data including: constituents detected, minimum and maximum concentrations detected, number of detections, number of samples, and number of samples exceeding human health screening criteria. Figure 4-5 shows the monitoring well locations and sample results for COPCs identified from the risk screening. The screening resulted in the identification of the following COPCs:

TAL Metals (Methods 6010B, 6020A, 7470A) – Eighteen TAL metals were detected in groundwater at concentrations below their adjusted T-RBCs with the exception of antimony (total and dissolved), arsenic (total and dissolved), chromium (total only), and manganese (total and dissolved). Metals concentrations detected in groundwater were below their MCLs.

TCL VOCs (Method 8260B) – Four VOCs were detected in groundwater at concentrations below their adjusted T-RBCs and MCLs with the exception of chloroform which exceeded its T-RBC but was below the MCL for total THMs.

TCL SVOCs (Method 8270C) – Eight SVOCs were detected in groundwater at concentrations below their adjusted T-RBCs.

TCL Pesticides (Method 8081A) – One pesticide, endosulfan II, was detected in groundwater at a concentration below its adjusted T-RBC.

TCL PCBs (Method 8082) – PCBs were not detected in groundwater.

Explosives (Method 8330) and Nitroglycerin (Method 8332) – Explosives and nitroglycerin were not detected in groundwater.

Perchlorate (Method 6850) – Perchlorate was detected in groundwater at a concentration below its adjusted T-RBC.

4.2.2 Human Health Nature and Extent Assessment

The groundwater risk screening identified antimony, arsenic, chromium, manganese, and chloroform as COPCs for groundwater. The nature and extent of these COPCs in groundwater is discussed below and presented on Figure 4-5:

Antimony

Dissolved antimony was detected at concentrations above its adjusted T-RBC of 1.46 microgram per liter (µg/L) in the sample and duplicate sample collected from well 57MW2 (5.5 µg/L and 5.1 µg/L). Detected concentrations were below the unadjusted T-RBC of 14.6 µg/L and MCL of 6 µg/L.

Arsenic

Dissolved arsenic was detected at concentrations above its T-RBC of 0.0446 µg/L in the sample and duplicate sample collected from well 57MW2 (2.3 µg/L and 2 µg/L), as well as, the sample collected from 57MW3 (0.94 µg/L). Detected concentrations were below the MCL of 10 µg/L.

Chromium

The groundwater risk screening identified total chromium as a COPC for groundwater. However, dissolved concentrations of chromium are below the adjusted T-RBC for groundwater, and therefore, chromium was not considered a COPC for groundwater for the nature and extent assessment given that the dissolved concentration result is more representative of the actual dissolved levels in groundwater.

Manganese

Dissolved manganese was detected at concentrations above its adjusted T-RBC of 73 µg/L in the sample and duplicate sample collected from well 57MW2 (190 µg/L and 160 µg/L). Detected concentrations were below the unadjusted T-RBC of 730 µg/L.

Chloroform

Chloroform was detected at concentrations above its T-RBC of 0.155 µg/L in the sample and duplicate sample collected from well 57MW2 (0.4 µg/L and 0.38 µg/L), as well as, the sample from 57MW3 (57 µg/L). Detected concentrations were below the MCL of 80 µg/L for chloroform (total THMs).

4.3 NATURE AND EXTENT SUMMARY

The primary site-related COPCs in soil at SWMU 57 are metals with limited PCBs within the pond area. These conclusions are supported by the results of the human health and ecological risks assessments presented in Sections 6.0 and 7.0, respectively. Metals concentrations in soil were highest within the pond area above the asphalt liner and in the surface samples collected from the drainage ditch area closest to the pond, where concentrations of antimony, cadmium, chromium, and vanadium in one or more samples were above their background point estimates and adjusted I-RBCs (Figure 4-1). Iron and manganese concentrations were also above their background point estimates and adjusted I-RBCs in selected samples from the pond and below the pond's asphalt liner. PCB concentrations above their adjusted I-RBCs were limited to one sample collected within the pond area above the asphalt liner (Figure 4-2).

Soil samples collected along and below the terracotta pipe indicated significantly lower concentrations of metals than in the pond or drainage ditch, with only vanadium exceeding its background point estimate and adjusted I-RBC in one sample collected immediately below the pipe near the pond.

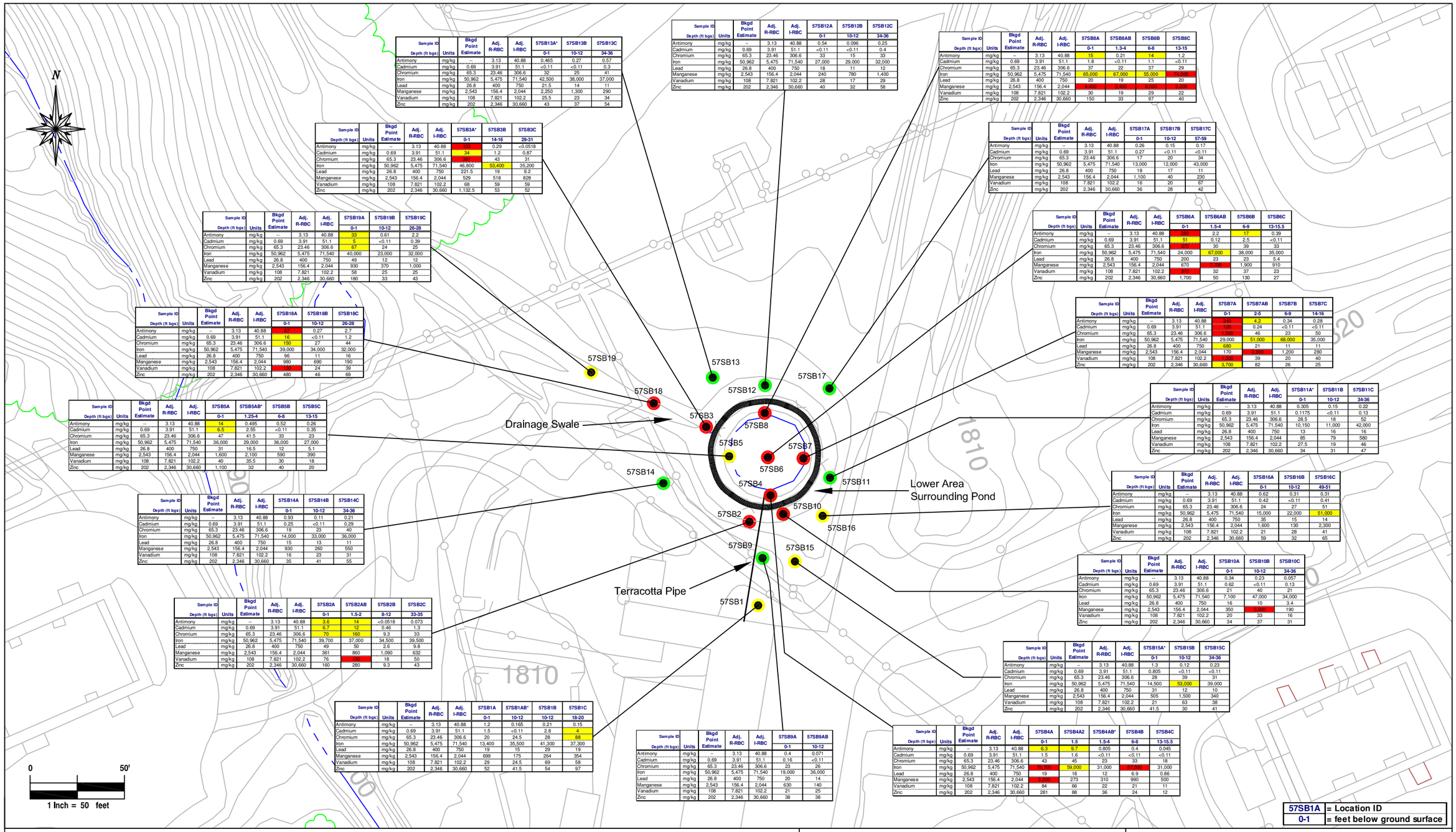
The combination of the pond's asphalt liner and 30+ feet of low permeability clay below and around the pond has generally limited the vertical migration of metals and PCBs present at higher concentrations in surface or near surface soil to depths less 15 ft bgs.

Non-PCB organic compounds identified as COPCs were limited to the soil-to-groundwater pathway with low-level concentrations of methylene chloride and chloroform (VOCs) detected at concentrations above their default SSL DAF20 values. COPCs identified in groundwater were limited antimony, arsenic, manganese, and chloroform, with dissolved metals and chloroform concentrations detected below their unadjusted T-RBCs or MCLs (Figure 4-5). COPCs identified in the nature and extent assessment are summarized in the following table.

Summary of Nature and Extent Assessment

Chemical	HH COPC*	SSL COPC*	Groundwater COPC*	Ecological COPEC*
Aluminum**				X
Antimony	X	X	X	X
Arsenic			X	
Cadmium	X	X		X
Chromium	X	X		X
Iron	X			X
Lead	X			X
Manganese	X	X	X	
Mercury				X
Vanadium	X	X		
Zinc	X			X
Dieldrin		X		
Aroclor 1254	X	X		
Aroclor 1260	X			
Benzo(a)pyrene	X			
Chloroform		X	X	
Methylene Chloride		X		

Note: * Chemicals with available screening values; ** No exceedances of background point estimate for aluminum but was identified as COPEC in SLERA (Section 7.2.3)



Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB13A*	57SB13B	57SB13C
					0-1	10-12	34-36
Antimony	mg/kg	--	3.13	40.88	0.465	0.27	0.57
Cadmium	mg/kg	0.69	3.91	51.1	<0.11	<0.11	0.3
Chromium	mg/kg	65.3	23.46	306.6	32	25	41
Iron	mg/kg	50,962	5,475	71,540	42,500	38,000	37,000
Lead	mg/kg	26.8	400	750	21.5	14	11
Manganese	mg/kg	2,543	156.4	2,044	2,250	1,300	290
Vanadium	mg/kg	108	7.821	102.2	25.5	23	34
Zinc	mg/kg	202	2,346	30,660	43	37	54

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB12A	57SB12B	57SB12C
					0-1	10-12	34-36
Antimony	mg/kg	--	3.13	40.88	0.54	0.096	0.25
Cadmium	mg/kg	0.69	3.91	51.1	<0.11	<0.11	0.4
Chromium	mg/kg	65.3	23.46	306.6	33	15	33
Iron	mg/kg	50,962	5,475	71,540	27,000	29,000	32,000
Lead	mg/kg	26.8	400	750	18	11	12
Manganese	mg/kg	2,543	156.4	2,044	240	780	1,400
Vanadium	mg/kg	108	7.821	102.2	28	17	29
Zinc	mg/kg	202	2,346	30,660	40	32	58

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB8A	57SB8AB	57SB8B	57SB8C
					0-1	1.3-4	6-8	13-15
Antimony	mg/kg	--	3.13	40.88	15	0.21	14	1.2
Cadmium	mg/kg	0.69	3.91	51.1	1.8	<0.11	1.1	<0.11
Chromium	mg/kg	65.3	23.46	306.6	37	22	37	29
Iron	mg/kg	50,962	5,475	71,540	65,000	67,000	55,000	39,000
Lead	mg/kg	26.8	400	750	20	19	25	20
Manganese	mg/kg	2,543	156.4	2,044	4,400	3,400	5,000	3,200
Vanadium	mg/kg	108	7.821	102.2	30	19	29	22
Zinc	mg/kg	202	2,346	30,660	150	33	97	40

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB3A*	57SB3B	57SB3C
					0-1	14-16	29-31
Antimony	mg/kg	--	3.13	40.88	103	0.29	<0.0518
Cadmium	mg/kg	0.69	3.91	51.1	34	1.2	0.87
Chromium	mg/kg	65.3	23.46	306.6	381	43	31
Iron	mg/kg	50,962	5,475	71,540	46,800	53,400	35,200
Lead	mg/kg	26.8	400	750	221.5	19	9.2
Manganese	mg/kg	2,543	156.4	2,044	529	518	828
Vanadium	mg/kg	108	7.821	102.2	68	59	59
Zinc	mg/kg	202	2,346	30,660	1,132.5	53	52

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB17A	57SB17B	57SB17C
					0-1	10-12	57-59
Antimony	mg/kg	--	3.13	40.88	0.26	0.15	0.17
Cadmium	mg/kg	0.69	3.91	51.1	0.27	<0.11	<0.11
Chromium	mg/kg	65.3	23.46	306.6	17	20	34
Iron	mg/kg	50,962	5,475	71,540	13,000	12,000	43,000
Lead	mg/kg	26.8	400	750	18	17	11
Manganese	mg/kg	2,543	156.4	2,044	1,100	40	230
Vanadium	mg/kg	108	7.821	102.2	16	20	67
Zinc	mg/kg	202	2,346	30,660	36	28	42

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB19A	57SB19B	57SB19C
					0-1	10-12	26-28
Antimony	mg/kg	--	3.13	40.88	33	0.61	2.2
Cadmium	mg/kg	0.69	3.91	51.1	5	<0.11	0.39
Chromium	mg/kg	65.3	23.46	306.6	67	24	25
Iron	mg/kg	50,962	5,475	71,540	40,000	23,000	32,000
Lead	mg/kg	26.8	400	750	49	12	12
Manganese	mg/kg	2,543	156.4	2,044	930	370	1,000
Vanadium	mg/kg	108	7.821	102.2	58	25	25
Zinc	mg/kg	202	2,346	30,660	180	33	43

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB6A	57SB6AB	57SB6B	57SB6C
					0-1	1.5-4	6-9	13-15.5
Antimony	mg/kg	--	3.13	40.88	280	2.2	17	0.39
Cadmium	mg/kg	0.69	3.91	51.1	51	0.12	2.5	<0.11
Chromium	mg/kg	65.3	23.46	306.6	370	30	39	33
Iron	mg/kg	50,962	5,475	71,540	24,000	67,000	38,000	35,000
Lead	mg/kg	26.8	400	750	200	23	23	5.4
Manganese	mg/kg	2,543	156.4	2,044	670	1,200	1,900	910
Vanadium	mg/kg	108	7.821	102.2	370	32	37	23
Zinc	mg/kg	202	2,346	30,660	1,700	50	130	27

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB18A	57SB18B	57SB18C
					0-1	10-12	26-28
Antimony	mg/kg	--	3.13	40.88	87	0.27	2.7
Cadmium	mg/kg	0.69	3.91	51.1	16	<0.11	1.2
Chromium	mg/kg	65.3	23.46	306.6	150	27	44
Iron	mg/kg	50,962	5,475	71,540	39,000	34,000	32,000
Lead	mg/kg	26.8	400	750	96	11	16
Manganese	mg/kg	2,543	156.4	2,044	980	690	190
Vanadium	mg/kg	108	7.821	102.2	1,100	24	39
Zinc	mg/kg	202	2,346	30,660	480	46	69

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB7A	57SB7AB	57SB7B	57SB7C
					0-1	2-5	6-9	14-16
Antimony	mg/kg	--	3.13	40.88	340	4.2	0.34	0.28
Cadmium	mg/kg	0.69	3.91	51.1	120	0.24	<0.11	<0.11
Chromium	mg/kg	65.3	23.46	306.6	1,500	46	23	50
Iron	mg/kg	50,962	5,475	71,540	29,000	51,000	68,000	35,000
Lead	mg/kg	26.8	400	750	680	21	11	11
Manganese	mg/kg	2,543	156.4	2,044	170	2,400	1,200	280
Vanadium	mg/kg	108	7.821	102.2	1,200	39	20	40
Zinc	mg/kg	202	2,346	30,660	3,700	82	26	25

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB11A*	57SB11B	57SB11C
					0-1	10-12	34-36
Antimony	mg/kg	--	3.13	40.88	0.305	0.15	0.22
Cadmium	mg/kg	0.69	3.91	51.1	0.1175	<0.11	0.13
Chromium	mg/kg	65.3	23.46	306.6	28.5	18	52
Iron	mg/kg	50,962	5,475	71,540	10,150	11,000	42,000
Lead	mg/kg	26.8	400	750	13	16	16
Manganese	mg/kg	2,543	156.4	2,044	85	79	580
Vanadium	mg/kg	108	7.821	102.2	20	33	16
Zinc	mg/kg	202	2,346	30,660	37	37	31

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB5A	57SB5AB*	57SB5B	57SB5C
					0-1	1.25-4	6-8	13-15
Antimony	mg/kg	--	3.13	40.88	14	0.495	0.52	0.26
Cadmium	mg/kg	0.69	3.91	51.1	6.5	2.55	<0.11	0.35
Chromium	mg/kg	65.3	23.46	306.6	47	41.5	33	23
Iron	mg/kg	50,962	5,475	71,540	36,000	29,000	36,000	27,000
Lead	mg/kg	26.8	400	750	31	16.5	12	5.1
Manganese	mg/kg	2,543	156.4	2,044	1,600	2,100	590	390
Vanadium	mg/kg	108	7.821	102.2	40	35.5	30	18
Zinc	mg/kg	202	2,346	30,660	1,100	32	40	20

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB14A	57SB14B	57SB14C
					0-1	10-12	34-36
Antimony	mg/kg	--	3.13	40.88	0.93	0.11	0.21
Cadmium	mg/kg	0.69	3.91	51.1	0.25	<0.11	0.29
Chromium	mg/kg	65.3	23.46	306.6	19	23	40
Iron	mg/kg	50,962	5,475	71,540	14,000	33,000	36,000
Lead	mg/kg	26.8	400	750	15	13	11
Manganese	mg/kg	2,543	156.4	2,044	930	260	550
Vanadium	mg/kg	108	7.821	102.2	16	23	31
Zinc	mg/kg	202	2,346	30,660	35	41	55

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB16A	57SB16B	57SB16C
					0-1	10-12	49-51
Antimony	mg/kg	--	3.13	40.88	0.62	0.31	0.31
Cadmium	mg/kg	0.69	3.91	51.1	0.42	<0.11	0.41
Chromium	mg/kg	65.3	23.46	306.6	24	27	51
Iron	mg/kg	50,962	5,475	71,540	15,000	22,000	51,000
Lead	mg/kg	26.8	400	750	35	15	14
Manganese	mg/kg	2,543	156.4	2,044	1,600	130	2,300
Vanadium	mg/kg	108	7.821	102.2	21	28	41
Zinc	mg/kg	202	2,346	30,660	59	32	65

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB2A	57SB2AB	57SB2B	57SB2C
					0-1	1.5-2	8-12	33-35
Antimony	mg/kg	--	3.13	40.88	3.6	14	<0.0518	0.073
Cadmium	mg/kg	0.69	3.91	51.1	6.7	12	0.46	1.3
Chromium	mg/kg	65.3	23.46	306.6	70	160	9.3	33
Iron	mg/kg	50,962	5,475	71,540	39,700	37,000	34,500	39,500
Lead	mg/kg	26.8	400	750	49	50	2.6	9.8
Manganese	mg/kg	2,543	156.4	2,044	361	860	1,090	632
Vanadium	mg/kg	108	7.821	102.2	76	130	18	50
Zinc	mg/kg	202	2,346	30,660	160	280	9.3	43

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB10A	57SB10B	57SB10C
					0-1	10-12	34-36
Antimony	mg/kg	--	3.13	40.88	0.34	0.23	0.057
Cadmium	mg/kg	0.69	3.91	51.1	0.62	<0.11	0.13
Chromium	mg/kg	65.3	23.46	306.6	21	40	21
Iron	mg/kg	50,962	5,475	71,540	7,100	47,000	34,000
Lead	mg/kg	26.8	400	750	16	10	3.4
Manganese	mg/kg	2,543	156.4	2,044	350	1,900	190
Vanadium	mg/kg	108	7.821	102.2	20	33	16
Zinc	mg/kg	202	2,346	30,660	34	37	31

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB1A	57SB1AB*	57SB1B	57SB1C
					0-1	10-12	10-12	18-20
Antimony	mg/kg	--	3.13	40.88	1.2	0.165	0.21	0.15
Cadmium	mg/kg	0.69	3.91	51.1	1.5	<0.11	2.8	4
Chromium	mg/kg	65.3	23.46	306.6	20	24.5	28	88
Iron	mg/kg	50,962	5,475	71,540	13,400	35,500	41,300	37,300
Lead	mg/kg	26.8	400	750	19	15	29	19
Manganese	mg/kg	2,543	156.4	2,044	699	175	264	354
Vanadium	mg/kg	108	7.821	102.2	29	24.5	69	58
Zinc	mg/kg	202	2,346	30,660	52	41.5	54	97

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB9A	57SB9AB
					0-1	10-12
Antimony	mg/kg	--	3.13	40.88	0.4	0.071
Cadmium	mg/kg	0.69	3.91	51.1	0.16	<0.11
Chromium	mg/kg	65.3	23.46	306.6	23	26
Iron	mg/kg	50,962	5,475	71,540	19,000	36,000
Lead	mg/kg	26.8	400	750	20	14
Manganese	mg/kg	2,543	156.4	2,044	630	140
Vanadium	mg/kg	108	7.821	102.2	21	25
Zinc	mg/kg	202	2,346	30,660	38	38

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB15A*	57SB15B	57SB15C
					0-1	10-12	34-36
Antimony	mg/kg	--	3.13	40.88	1.3	0.12	0.23
Cadmium	mg/kg	0.69	3.91	51.1	0.805	<0.11	<0.11
Chromium	mg/kg	65.3	23.46	306.6	28	39	31
Iron	mg/kg	50,962	5,475	71,540	14,500	53,000	39,000
Lead	mg/kg	26.8	400	750	31	12	10
Manganese	mg/kg	2,543	156.4	2,044	505	1,500	340
Vanadium	mg/kg	108	7.821	102.2	21	63	38
Zinc	mg/kg	202	2,346	30,660	41.5	30	41

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB4A	57SB4A2	57SB4AB*	57SB4B	57SB4C
					0-1	1.5	1.5-4	6-8	13-15.5
Antimony	mg/kg	--	3.13	40.88	6.3	9.7	0.805	0.4	0.045
Cadmium	mg/kg	0.69	3.91	51.1	1.5	1.6	<0.11	<0.11	<0.11
Chromium	mg/kg	65.3	23.46	306.6	43	45	23	33	18
Iron	mg/kg	50,962	5,475	71,540	76,000	59,000	31,000	61,000	31,000
Lead	mg/kg	26.8	400	750	19	18	12	6.9	0.86
Manganese	mg/kg	2,543	156.4	2,044	3,200	273	310	990	500
Vanadium	mg/kg	108	7.821	102.2	84	66	22	21	11
Zinc	mg/kg	202	2,346	30,660	281	88	36	24	12

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB10A	57SB10B	57SB10C
					0-1	10-12	34-36
Antimony	mg/kg	--	3.13	40.88	0.34	0.23	0.057
Cadmium	mg/kg	0.69	3.91	51.1	0.62	<0.11	0.13
Chromium	mg/kg	65.3	23.46	306.6	21	40	21
Iron	mg/kg	50,962	5,475	71,540	7,100	47,000	34,000
Lead	mg/kg	26.8	400	750	16	10	3.4
Manganese	mg/kg	2,543	156.4	2,044	350	1,900	190
Vanadium	mg/kg	108	7.821	102.2	20	33	16
Zinc	mg/kg	202	2,346	30,660	34	37	31

57SB1A = Location ID
0-1 = feet below ground surface

Legend

- Approximate SWMU Boundary
- Soil Boring Location
- Exceeds Adjusted Residential Risk-Based Concentration (R-RBC) and Facility-wide Background Point Estimate
- Exceeds Adjusted R-RBC, Adjusted Industrial RBC (I-RBC), and Facility-wide Background Point Estimate
- Parameters do not exceed Adjusted RBCs
- Parameters exceed Adjusted Residential RBC and Facility-wide Background Point Estimate
- Parameters exceed Adjusted R-RBC, Adjusted I-RBC, and Facility-wide Background Point Estimate
- mg/kg — Concentrations in milligrams per kilogram
- * — Duplicate Average

FIGURE 4-1
Extent of Metals in Soil - Human Health

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.4-1 Metals

SWMU 57
RFI / CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230

Sample ID Sample Depth (ft bgs)	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB3A*	57SB3B	57SB3C
				0-1	14-16	29-31
Aroclor 1254	--	156	1,430.8	NT	NT	NT
Aroclor 1260	--	319.4	1,430.8	NT	NT	NT
Benzo(a)pyrene	--	22	392	16	<9.14	<7.42

Sample ID Sample Depth (ft bgs)	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB8A	57SB8AB	57SB8B	57SB8C
				0-1	1.3-4	6-8	13-15
Aroclor 1254	--	156	1,430.8	290	230	79	31
Aroclor 1260	--	319.4	1,430.8	140	<21	60	<22
Benzo(a)pyrene	--	22	392	<1.4	2.6	<1.4	1.8

Sample ID Sample Depth (ft bgs)	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB6A	57SB6AB	57SB6B	57SB6C
				0-1	1.7-4	6-9	13.15.5
Aroclor 1254	--	156	1,430.8	2,000	<5.7	550	<6
Aroclor 1260	--	319.4	1,430.8	2,000	<21	390	<22
Benzo(a)pyrene	--	22	392	31	<1.3	<1.5	<1.4

Sample ID Sample Depth (ft bgs)	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB5A	57SB5AB*	57SB5B	57SB5C
				0-1	1.25-4	6-8	13-15
Aroclor 1254	--	156	1,430.8	200	190	21	<5.7
Aroclor 1260	--	319.4	1,430.8	73	<21	<22	<21
Benzo(a)pyrene	--	22	392	<1.4	<1.4	<1.4	<1.3

Sample ID Sample Depth (ft bgs)	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB7A	57SB7AB	57SB7B	57SB7C
				0-1	2-5	6-9	14-16
Aroclor 1254	--	156	1,430.8	420	<6.1	<5.5	<6.4
Aroclor 1260	--	319.4	1,430.8	210	<22	<20	<23
Benzo(a)pyrene	--	22	392	8.9	<1.4	<1.3	<1.5

Sample ID Sample Depth (ft bgs)	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB2A	57SB2AB	57SB2B	57SB2C
				0-1	1.5-2	8-12	33-35
Aroclor 1254	--	156	1,430.8	NT	NT	NT	NT
Aroclor 1260	--	319.4	1,430.8	NT	NT	NT	NT
Benzo(a)pyrene	--	22	392	30	NT	<7.42	<7.42

Sample ID Sample Depth (ft bgs)	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB4A	57SB4A2	57SB4AB*	57SB4B	57SB4C
				0-1	1.5	1.5-4	6-8	13-15.5
Aroclor 1254	--	156	1,430.8	12	NT	<5.8	<5.6	<5.6
Aroclor 1260	--	319.4	1,430.8	<9.8	NT	<21	<20	<20
Benzo(a)pyrene	--	22	392	<7.99	<7.99	<8.8	<1.3	<1.3

Sample ID Sample Depth (ft bgs)	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	57SB1A	57SB1AB*	57SB1B	57SB1C
				0-1	10-12	10-12	18-20
Aroclor 1254	--	156	1,430.8	NT	NT	NT	NT
Aroclor 1260	--	319.4	1,430.8	NT	NT	NT	NT
Benzo(a)pyrene	--	22	392	12	NT	<7.42	<8.57

Drainage Swale

Lower Area Surrounding Pond

Terracotta Pipe

57SB19 57SB13 57SB12 57SB17 57SB18 57SB15 57SB15 57SB5 57SB7 57SB6 57SB14 57SB4 57SB11 57SB2 57SB16 57SB10 57SB9 57SB15 57SB1

1790 1810 1820

0 50'

1 Inch = 50 feet

57SB1A = Location ID

0-1 = feet below ground surface

Legend

- Approximate SWMU Boundary
- Soil Boring Location (Not Tested for Organic Chemical Classes)
- Exceeds Adjusted Residential Risk-Based Concentration (R-RBC)
- Exceeds Adjusted R-RBC, Adjusted Industrial RBC (I-RBC)
- NT — Not Tested
- Parameters do not exceed Adjusted RBCs
- Parameters exceed Adjusted Residential RBC
- Parameters exceed Adjusted R-RBC and Adjusted I-RBC
- ug/kg — Concentrations in micrograms per kilogram
- * — Duplicate Average

FIGURE 4-2

Extent of Organics in Soil - Human Health

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.4-1 Organics

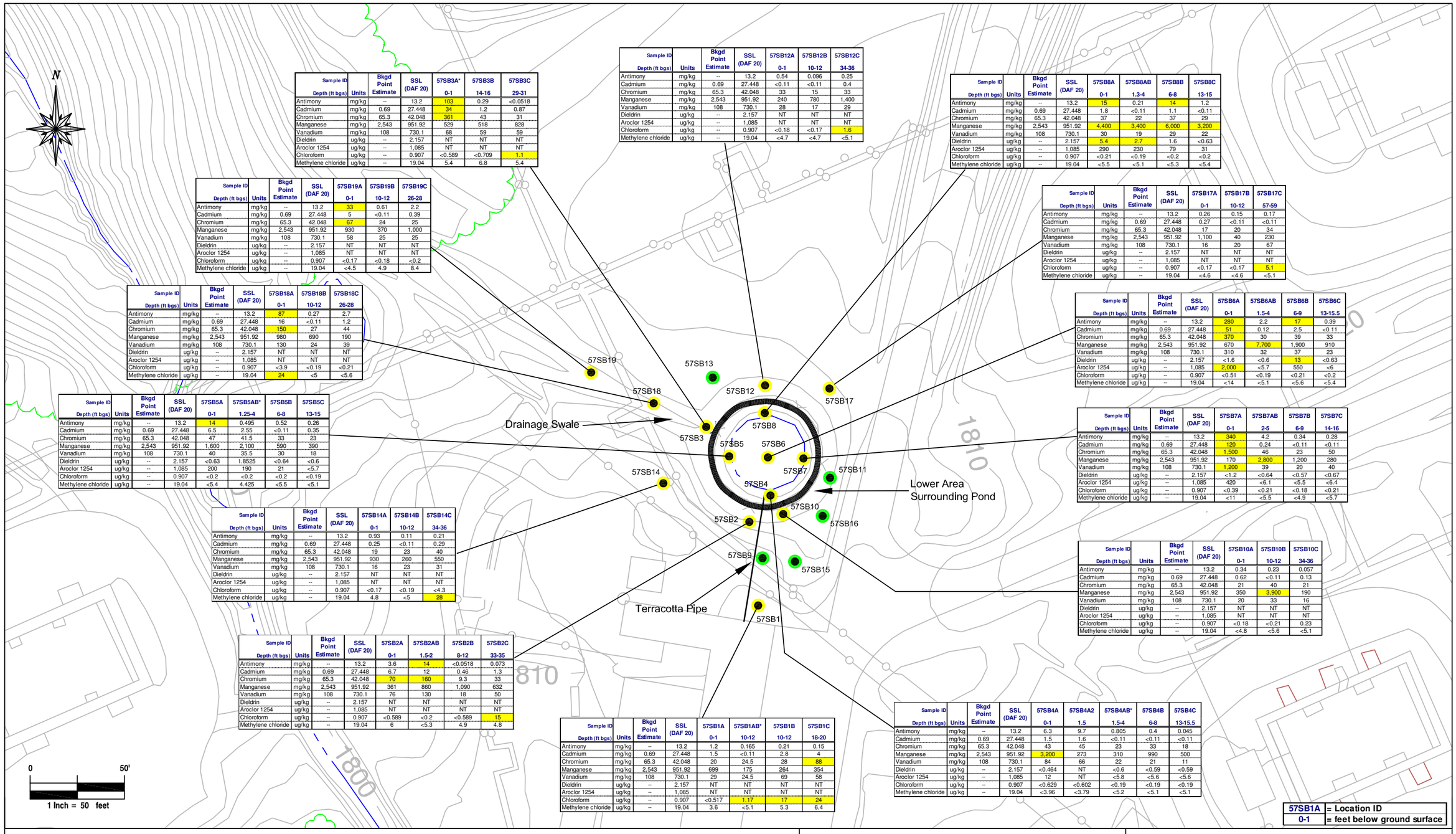
SWMU 57

RFI / CMS Report

Radford Army Ammunition Plant

Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB3A* 0-1	57SB3B 14-16	57SB3C 29-31
Antimony	mg/kg	--	13.2	103	0.29	<0.0518
Cadmium	mg/kg	0.69	27.448	34	1.2	0.87
Chromium	mg/kg	65.3	42.048	361	43	31
Manganese	mg/kg	2,543	951.92	529	518	828
Vanadium	mg/kg	108	730.1	68	59	59
Dieldrin	ug/kg	--	2.157	NT	NT	NT
Aroclor 1254	ug/kg	--	1,085	NT	NT	NT
Chloroform	ug/kg	--	0.907	<0.589	<0.709	1.1
Methylene chloride	ug/kg	--	19.04	5.4	6.8	5.4

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB19A 0-1	57SB19B 10-12	57SB19C 26-28
Antimony	mg/kg	--	13.2	33	0.61	2.2
Cadmium	mg/kg	0.69	27.448	5	<0.11	0.39
Chromium	mg/kg	65.3	42.048	67	24	25
Manganese	mg/kg	2,543	951.92	930	370	1,000
Vanadium	mg/kg	108	730.1	58	25	25
Dieldrin	ug/kg	--	2.157	NT	NT	NT
Aroclor 1254	ug/kg	--	1,085	NT	NT	NT
Chloroform	ug/kg	--	0.907	<0.17	<0.18	<0.2
Methylene chloride	ug/kg	--	19.04	<4.5	4.9	8.4

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB18A 0-1	57SB18B 10-12	57SB18C 26-28
Antimony	mg/kg	--	13.2	87	0.27	2.7
Cadmium	mg/kg	0.69	27.448	16	<0.11	1.2
Chromium	mg/kg	65.3	42.048	150	27	44
Manganese	mg/kg	2,543	951.92	980	690	190
Vanadium	mg/kg	108	730.1	130	24	39
Dieldrin	ug/kg	--	2.157	NT	NT	NT
Aroclor 1254	ug/kg	--	1,085	NT	NT	NT
Chloroform	ug/kg	--	0.907	<3.9	<0.19	<0.21
Methylene chloride	ug/kg	--	19.04	24	<5	<5.6

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB5A 0-1	57SB5AB* 1.25-4	57SB5B 6-8	57SB5C 13-15
Antimony	mg/kg	--	13.2	14	0.495	0.52	0.26
Cadmium	mg/kg	0.69	27.448	6.5	2.55	<0.11	0.35
Chromium	mg/kg	65.3	42.048	47	41.5	33	23
Manganese	mg/kg	2,543	951.92	1,600	2,100	590	390
Vanadium	mg/kg	108	730.1	40	35.5	30	18
Dieldrin	ug/kg	--	2.157	<0.63	1.8525	<0.64	<0.6
Aroclor 1254	ug/kg	--	1,085	200	190	21	<5.7
Chloroform	ug/kg	--	0.907	<0.2	<0.2	<0.2	<0.19
Methylene chloride	ug/kg	--	19.04	<5.4	4.425	<5.5	<5.1

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB14A 0-1	57SB14B 10-12	57SB14C 34-36
Antimony	mg/kg	--	13.2	0.93	0.11	0.21
Cadmium	mg/kg	0.69	27.448	0.25	<0.11	0.29
Chromium	mg/kg	65.3	42.048	19	23	40
Manganese	mg/kg	2,543	951.92	930	260	550
Vanadium	mg/kg	108	730.1	16	23	31
Dieldrin	ug/kg	--	2.157	NT	NT	NT
Aroclor 1254	ug/kg	--	1,085	NT	NT	NT
Chloroform	ug/kg	--	0.907	<0.17	<0.19	<4.3
Methylene chloride	ug/kg	--	19.04	4.8	<5	28

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB2A 0-1	57SB2AB 1.5-2	57SB2B 8-12	57SB2C 33-35
Antimony	mg/kg	--	13.2	3.6	14	<0.0518	0.073
Cadmium	mg/kg	0.69	27.448	6.7	12	0.46	1.3
Chromium	mg/kg	65.3	42.048	70	160	9.3	33
Manganese	mg/kg	2,543	951.92	361	860	1,090	632
Vanadium	mg/kg	108	730.1	76	130	18	50
Dieldrin	ug/kg	--	2.157	NT	NT	NT	NT
Aroclor 1254	ug/kg	--	1,085	NT	NT	NT	NT
Chloroform	ug/kg	--	0.907	<0.589	<0.2	<0.589	15
Methylene chloride	ug/kg	--	19.04	6	<5.3	4.9	4.8

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB1A 0-1	57SB1AB* 10-12	57SB1B 10-12	57SB1C 18-20
Antimony	mg/kg	--	13.2	1.2	0.165	0.21	0.15
Cadmium	mg/kg	0.69	27.448	1.5	<0.11	2.8	4
Chromium	mg/kg	65.3	42.048	20	24.5	28	88
Manganese	mg/kg	2,543	951.92	699	175	264	354
Vanadium	mg/kg	108	730.1	29	24.5	69	58
Dieldrin	ug/kg	--	2.157	NT	NT	NT	NT
Aroclor 1254	ug/kg	--	1,085	NT	NT	NT	NT
Chloroform	ug/kg	--	0.907	<0.517	1.17	17	24
Methylene chloride	ug/kg	--	19.04	3.6	<5.1	5.3	6.4

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB4A 0-1	57SB4A2 1.5	57SB4AB* 1.5-4	57SB4B 6-8	57SB4C 13-15.5
Antimony	mg/kg	--	13.2	6.3	9.7	0.805	0.4	0.045
Cadmium	mg/kg	0.69	27.448	1.5	1.6	<0.11	<0.11	<0.11
Chromium	mg/kg	65.3	42.048	43	45	23	33	18
Manganese	mg/kg	2,543	951.92	3,200	273	310	990	500
Vanadium	mg/kg	108	730.1	84	66	22	21	11
Dieldrin	ug/kg	--	2.157	<0.464	NT	<0.6	<0.59	<0.59
Aroclor 1254	ug/kg	--	1,085	12	NT	<5.8	<5.6	<5.6
Chloroform	ug/kg	--	0.907	<0.629	<0.602	<0.19	<0.19	<0.19
Methylene chloride	ug/kg	--	19.04	<3.96	<3.79	<5.2	<5.1	<5.1

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB10A 0-1	57SB10B 10-12	57SB10C 34-36
Antimony	mg/kg	--	13.2	0.34	0.23	0.057
Cadmium	mg/kg	0.69	27.448	0.62	<0.11	0.13
Chromium	mg/kg	65.3	42.048	21	40	21
Manganese	mg/kg	2,543	951.92	350	3,900	190
Vanadium	mg/kg	108	730.1	20	33	16
Dieldrin	ug/kg	--	2.157	NT	NT	NT
Aroclor 1254	ug/kg	--	1,085	NT	NT	NT
Chloroform	ug/kg	--	0.907	<0.18	<0.21	0.23
Methylene chloride	ug/kg	--	19.04	<4.8	<5.6	<5.1

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB7A 0-1	57SB7AB 2-5	57SB7B 6-9	57SB7C 14-16
Antimony	mg/kg	--	13.2	340	4.2	0.34	0.28
Cadmium	mg/kg	0.69	27.448	120	0.24	<0.11	<0.11
Chromium	mg/kg	65.3	42.048	1,500	46	23	50
Manganese	mg/kg	2,543	951.92	170	2,800	1,200	280
Vanadium	mg/kg	108	730.1	1,200	39	20	40
Dieldrin	ug/kg	--	2.157	<1.2	<0.64	<0.57	<0.67
Aroclor 1254	ug/kg	--	1,085	420	<6.1	<5.5	<6.4
Chloroform	ug/kg	--	0.907	<0.39	<0.21	<0.18	<0.21
Methylene chloride	ug/kg	--	19.04	<11	<5.5	<4.9	<5.7

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB8A 0-1	57SB8AB 1.3-4	57SB8B 6-8	57SB8C 13-15
Antimony	mg/kg	--	13.2	15	0.21	14	1.2
Cadmium	mg/kg	0.69	27.448	1.8	<0.11	1.1	<0.11
Chromium	mg/kg	65.3	42.048	37	22	37	29
Manganese	mg/kg	2,543	951.92	4,400	3,400	6,000	3,200
Vanadium	mg/kg	108	730.1	30	19	29	22
Dieldrin	ug/kg	--	2.157	5.4	2.7	1.6	<0.63
Aroclor 1254	ug/kg	--	1,085	290	230	79	31
Chloroform	ug/kg	--	0.907	<0.21	<0.19	<0.2	<0.2
Methylene chloride	ug/kg	--	19.04	<5.5	<5.1	<5.3	<5.4

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB17A 0-1	57SB17B 10-12	57SB17C 57-59
Antimony	mg/kg	--	13.2	0.26	0.15	0.17
Cadmium	mg/kg	0.69	27.448	0.27	<0.11	<0.11
Chromium	mg/kg	65.3	42.048	17	20	34
Manganese	mg/kg	2,543	951.92	1,100	40	230
Vanadium	mg/kg	108	730.1	16	20	67
Dieldrin	ug/kg	--	2.157	NT	NT	NT
Aroclor 1254	ug/kg	--	1,085	NT	NT	NT
Chloroform	ug/kg	--	0.907	<0.17	<0.17	5.1
Methylene chloride	ug/kg	--	19.04	<4.6	<4.6	<5.1

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF 20)	57SB6A 0-1	57SB6AB 1.5-4	57SB6B 6-9	57SB6C 13-15.5
Antimony	mg/kg	--	13.2	280	2.2	17	0.39
Cadmium	mg/kg	0.69	27.448	51	0.12	2.5	<0.11
Chromium	mg/kg	65.3	42.048	370	30	39	33
Manganese	mg/kg	2,543	951.92	670	7,700	1,900	910
Vanadium	mg/kg	108	730.1	310	32	37	23
Dieldrin	ug/kg	--	2.157	<1.6	<0.6	13	<0.63
Aroclor 1254	ug/kg	--	1,085	2,000	<5.7	550	<6
Chloroform	ug/kg	--	0.907	<0.51	<0.19	<0.21	<0.2
Methylene chloride	ug/kg	--	19.04	<14	<5.1	<5.6	<5.4

57SB1A	= Location ID
0-1	= feet below ground surface

Legend

- Approximate SWMU Boundary
- Soil Boring Location
- Exceeds SSL DAF20 and Facility-wide Background Point Estimate
- Parameters do not exceed SSL DAF20
- Parameters exceed SSL DAF20

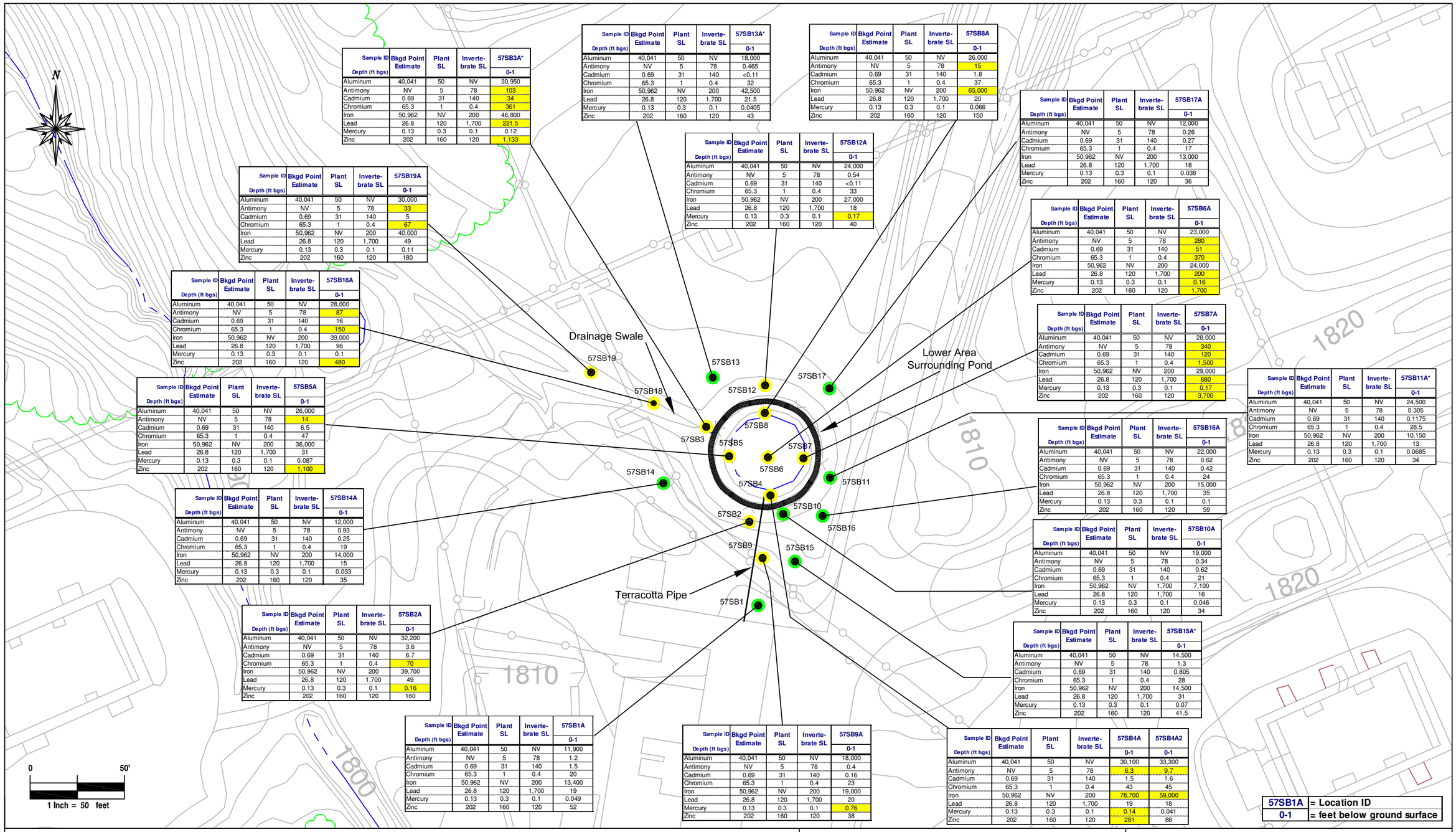
mg/kg	Inorganic concentrations in milligrams per kilogram
ug/kg	Organic concentrations in micrograms per kilogram
*	Duplicate Average
NT	Not tested

FIGURE 4-3
Extent of SSL DAF20 Exceedances

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.4-4 SSLs

SWMU 57
RFI / CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB3A* 0-1
Aluminum	40,041	50	NV	30,950
Antimony	NV	5	78	103
Cadmium	0.69	31	140	34
Chromium	65.3	1	0.4	361
Iron	50,962	NV	200	46,800
Lead	26.8	120	1,700	221.5
Mercury	0.13	0.3	0.1	0.12
Zinc	202	160	120	1,133

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB13A* 0-1
Aluminum	40,041	50	NV	18,000
Antimony	NV	5	78	0.465
Cadmium	0.69	31	140	<0.11
Chromium	65.3	1	0.4	32
Iron	50,962	NV	200	42,500
Lead	26.8	120	1,700	21.5
Mercury	0.13	0.3	0.1	0.0405
Zinc	202	160	120	43

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB8A 0-1
Aluminum	40,041	50	NV	26,000
Antimony	NV	5	78	15
Cadmium	0.69	31	140	1.8
Chromium	65.3	1	0.4	37
Iron	50,962	NV	200	65,000
Lead	26.8	120	1,700	20
Mercury	0.13	0.3	0.1	0.066
Zinc	202	160	120	150

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB19A 0-1
Aluminum	40,041	50	NV	30,000
Antimony	NV	5	78	33
Cadmium	0.69	31	140	5
Chromium	65.3	1	0.4	67
Iron	50,962	NV	200	40,000
Lead	26.8	120	1,700	49
Mercury	0.13	0.3	0.1	0.11
Zinc	202	160	120	180

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB12A 0-1
Aluminum	40,041	50	NV	24,000
Antimony	NV	5	78	0.54
Cadmium	0.69	31	140	<0.11
Chromium	65.3	1	0.4	33
Iron	50,962	NV	200	27,000
Lead	26.8	120	1,700	18
Mercury	0.13	0.3	0.1	0.17
Zinc	202	160	120	40

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB17A 0-1
Aluminum	40,041	50	NV	12,000
Antimony	NV	5	78	0.26
Cadmium	0.69	31	140	0.27
Chromium	65.3	1	0.4	17
Iron	50,962	NV	200	13,000
Lead	26.8	120	1,700	18
Mercury	0.13	0.3	0.1	0.038
Zinc	202	160	120	36

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB6A 0-1
Aluminum	40,041	50	NV	23,000
Antimony	NV	5	78	280
Cadmium	0.69	31	140	51
Chromium	65.3	1	0.4	370
Iron	50,962	NV	200	24,000
Lead	26.8	120	1,700	200
Mercury	0.13	0.3	0.1	0.16
Zinc	202	160	120	1,700

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB18A 0-1
Aluminum	40,041	50	NV	28,000
Antimony	NV	5	78	87
Cadmium	0.69	31	140	16
Chromium	65.3	1	0.4	150
Iron	50,962	NV	200	39,000
Lead	26.8	120	1,700	96
Mercury	0.13	0.3	0.1	0.1
Zinc	202	160	120	480

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB7A 0-1
Aluminum	40,041	50	NV	28,000
Antimony	NV	5	78	340
Cadmium	0.69	31	140	120
Chromium	65.3	1	0.4	1,500
Iron	50,962	NV	200	29,000
Lead	26.8	120	1,700	680
Mercury	0.13	0.3	0.1	0.17
Zinc	202	160	120	3,700

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB11A* 0-1
Aluminum	40,041	50	NV	24,500
Antimony	NV	5	78	0.305
Cadmium	0.69	31	140	0.1175
Chromium	65.3	1	0.4	28.5
Iron	50,962	NV	200	10,150
Lead	26.8	120	1,700	13
Mercury	0.13	0.3	0.1	0.0685
Zinc	202	160	120	34

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB5A 0-1
Aluminum	40,041	50	NV	26,000
Antimony	NV	5	78	14
Cadmium	0.69	31	140	6.5
Chromium	65.3	1	0.4	47
Iron	50,962	NV	200	36,000
Lead	26.8	120	1,700	31
Mercury	0.13	0.3	0.1	0.087
Zinc	202	160	120	1,100

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB16A 0-1
Aluminum	40,041	50	NV	22,000
Antimony	NV	5	78	0.62
Cadmium	0.69	31	140	0.42
Chromium	65.3	1	0.4	24
Iron	50,962	NV	200	15,000
Lead	26.8	120	1,700	35
Mercury	0.13	0.3	0.1	0.1
Zinc	202	160	120	59

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB14A 0-1
Aluminum	40,041	50	NV	12,000
Antimony	NV	5	78	0.93
Cadmium	0.69	31	140	0.25
Chromium	65.3	1	0.4	19
Iron	50,962	NV	200	14,000
Lead	26.8	120	1,700	15
Mercury	0.13	0.3	0.1	0.033
Zinc	202	160	120	35

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB10A 0-1
Aluminum	40,041	50	NV	19,000
Antimony	NV	5	78	0.34
Cadmium	0.69	31	140	0.62
Chromium	65.3	1	0.4	21
Iron	50,962	NV	1,700	7,100
Lead	26.8	120	1,700	16
Mercury	0.13	0.3	0.1	0.046
Zinc	202	160	120	34

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB2A 0-1
Aluminum	40,041	50	NV	32,200
Antimony	NV	5	78	3.6
Cadmium	0.69	31	140	6.7
Chromium	65.3	1	0.4	70
Iron	50,962	NV	200	39,700
Lead	26.8	120	1,700	49
Mercury	0.13	0.3	0.1	0.16
Zinc	202	160	120	160

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB15A* 0-1
Aluminum	40,041	50	NV	14,500
Antimony	NV	5	78	1.3
Cadmium	0.69	31	140	0.805
Chromium	65.3	1	0.4	28
Iron	50,962	NV	200	14,500
Lead	26.8	120	1,700	31
Mercury	0.13	0.3	0.1	0.07
Zinc	202	160	120	41.5

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB1A 0-1
Aluminum	40,041	50	NV	11,900
Antimony	NV	5	78	1.2
Cadmium	0.69	31	140	1.5
Chromium	65.3	1	0.4	20
Iron	50,962	NV	200	13,400
Lead	26.8	120	1,700	19
Mercury	0.13	0.3	0.1	0.049
Zinc	202	160	120	52

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB9A 0-1
Aluminum	40,041	50	NV	18,000
Antimony	NV	5	78	0.4
Cadmium	0.69	31	140	0.16
Chromium	65.3	1	0.4	23
Iron	50,962	NV	200	19,000
Lead	26.8	120	1,700	20
Mercury	0.13	0.3	0.1	0.76
Zinc	202	160	120	38

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	Plant SL	Inverte-brate SL	57SB4A 0-1	57SB4A2 0-1
Aluminum	40,041	50	NV	30,100	33,300
Antimony	NV	5	78	6.3	9.7
Cadmium	0.69	31	140	1.5	1.6
Chromium	65.3	1	0.4	43	45
Iron	50,962	NV	200	78,700	59,000
Lead	26.8	120	1,700	19	18
Mercury	0.13	0.3	0.1	0.14	0.041
Zinc	202	160	120	281	88

57SB1A	= Location ID
0-1	= feet below ground surface

Legend

- Approximate SWMU Boundary
- Soil Boring Location
- Exceeds Screening Level (SL) and Facility-wide Background Point Estimate
- Parameters do not exceed Screening Levels and Facility-wide Background Point Estimate
- Parameters exceed one or more SL and Facility-wide Background Point Estimate

NV No Value Available

mg/kg Concentrations in milligrams per kilogram

* Duplicate Average

Note: Wildlife Receptor LOAEL-based Refined Screening Level exceedances:
American Robin for Chromium - (Screening Level = 900 mg/kg)
(Exceedance: 57SB7A)

FIGURE 4-4

Extent of Metals in Soil - Ecological

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.4-4 Metals

SWMU 57

RFI / CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
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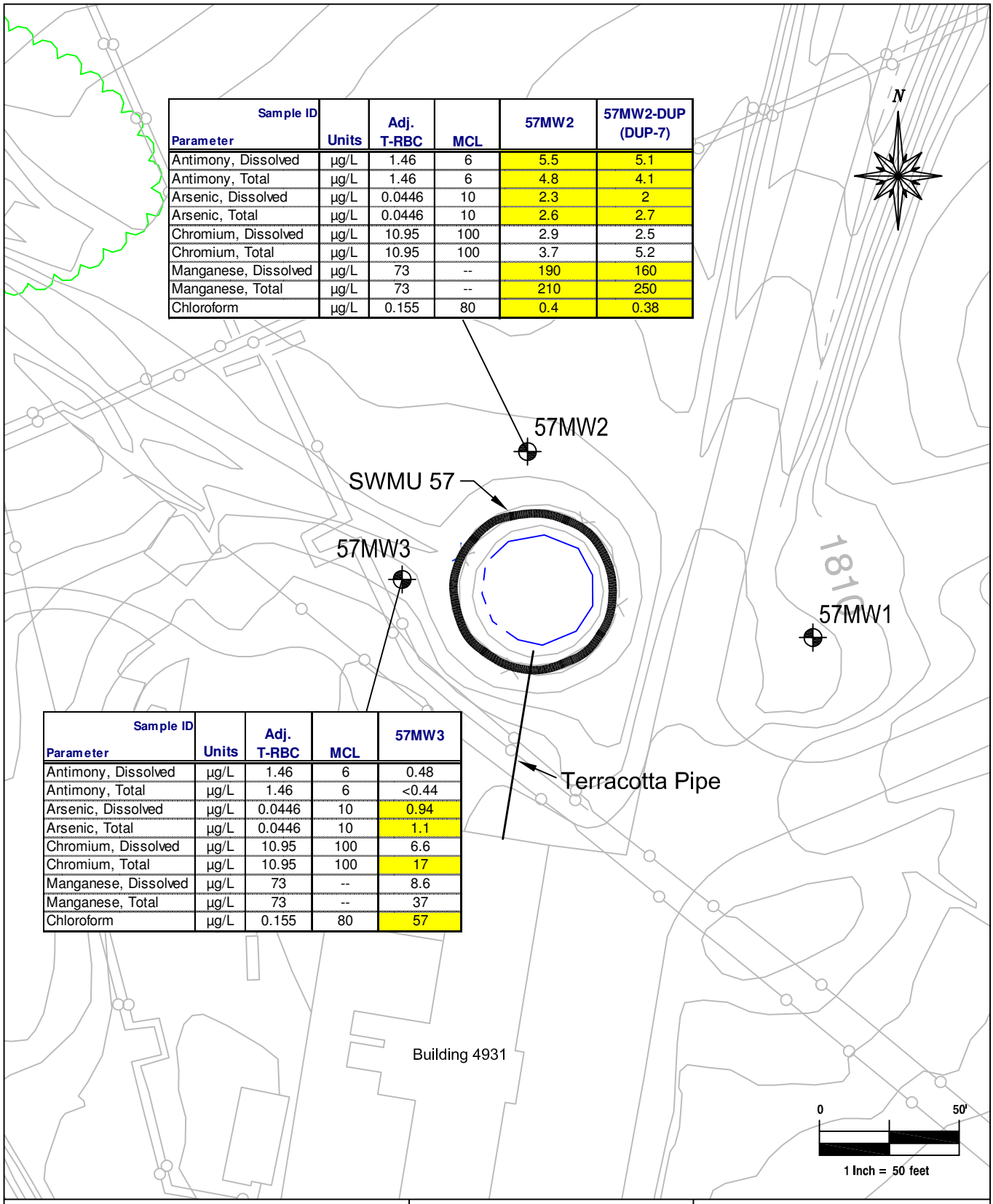

Sample ID / Parameter	Units	Adj. T-RBC	MCL	57MW2	57MW2-DUP (DUP-7)
Antimony, Dissolved	µg/L	1.46	6	5.5	5.1
Antimony, Total	µg/L	1.46	6	4.8	4.1
Arsenic, Dissolved	µg/L	0.0446	10	2.3	2
Arsenic, Total	µg/L	0.0446	10	2.6	2.7
Chromium, Dissolved	µg/L	10.95	100	2.9	2.5
Chromium, Total	µg/L	10.95	100	3.7	5.2
Manganese, Dissolved	µg/L	73	--	190	160
Manganese, Total	µg/L	73	--	210	250
Chloroform	µg/L	0.155	80	0.4	0.38

Sample ID / Parameter	Units	Adj. T-RBC	MCL	57MW3
Antimony, Dissolved	µg/L	1.46	6	0.48
Antimony, Total	µg/L	1.46	6	<0.44
Arsenic, Dissolved	µg/L	0.0446	10	0.94
Arsenic, Total	µg/L	0.0446	10	1.1
Chromium, Dissolved	µg/L	10.95	100	6.6
Chromium, Total	µg/L	10.95	100	17
Manganese, Dissolved	µg/L	73	--	8.6
Manganese, Total	µg/L	73	--	37
Chloroform	µg/L	0.155	80	57

Legend

- Approximate SWMU Boundary
- Topographic Contour
- Exceeds Adjusted Tap Water RBC (T-RBC)
- ug/L Micrograms per Liter
- Monitoring Well Location
- Vegetation
- Fence
- Aboveground Piping

FIGURE 4-5

Groundwater Results

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.4-3 GW

SWMU 57

RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
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Suite 201
Richmond, Virginia 23230

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Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB1A 10/7/2003 0-1		MDL	RL	57SB1AB 1/10/2008 10-12		MDL	RL	57SB1AB-DUP(DUP-4) 1/10/2008 10-12		MDL	RL	57SB1B 10/7/2003 10-12		MDL	RL	57SB1C 10/7/2003 18-20		MDL	RL	57SB2A 10/7/2003 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	11,900		1.83	50	26,000	,J,s	2.1	10	28,000	,J,s	2.1	10	23,800		1.83	50	38,900		9.15	250	32,200		9.15	250
Antimony	7440-36-0	N	--	3.13	40.88	13.2	1.2		0.0518	0.5	0.17	J	0.042	0.2	0.16	J	0.042	0.2	0.21	J	0.0518	0.5	0.15	J	0.0518	0.5	3.6		0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	*1.6*		0.0232	0.4	*1.6*	,L,m	0.071	0.2	*1.7*	,L,m	0.071	0.2	*1.6*		0.0232	0.4	***3.1***		0.0232	0.4	***3.6***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	99		0.106	5	49		0.17	1	45		0.17	1	56		0.106	5	73		0.106	5	80		0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.44	J,J,s	0.0391	1	1.1		0.021	1	1.1		0.021	1	0.58	J,J,s	0.0391	1	0.84	J,J,s	0.0391	1	0.48	J,J,s	0.0391	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.45	1.5		0.182	1	<2	U	0.11	2	<2	U	0.11	2	2.8		0.182	1	4		0.182	1	6.7		0.182	1
Calcium	7440-70-2	--	--	--	--	--	4,440		16.6	250	710		4.2	50	490		4.2	50	1,030		16.6	250	<250	U	16.6	250	1,530		16.6	250
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.048	20		0.912	5	24		0.72	5	25		0.72	5	28		0.912	5	***88***		0.912	5	***70***		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	5.8	,J,s	0.208	1	4.1		0.37	2	3.5		0.37	2	8.7	,J,s	0.208	1	12	,J,s	0.208	1	6.1	,J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	4.9		0.368	1	11	B,L,m	0.044	0.2	12	B,L,m	0.044	0.2	13		0.368	1	28		0.368	1	18		0.368	1
Iron	7439-89-6	N	50,962	5,475	71,540	--	13,400		17.9	250	34,000		0.48	10	37,000		0.48	10	41,300		35.8	500	37,300		35.8	500	39,700		35.8	500
Lead[2]	7439-92-1	--	26.8	400	750	--	19		0.0218	1	15		0.022	0.2	15		0.022	0.2	29		0.0218	1	19		0.0218	1	49		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	2,700		3.21	250	1,200		5	50	1,100		5	50	1,430		3.21	250	5,120		3.21	250	1,560		3.21	250
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	699		0.264	5	180		0.16	1	170		0.16	1	264		0.264	5	354		0.264	5	361		0.264	5
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.049	J	0.0077	0.1	0.14		0.0075	0.05	0.091		0.0075	0.05	0.035	J	0.0077	0.1	0.053	J	0.0077	0.1	0.16		0.0077	0.1
Nickel	7440-02-0	N	62.8	156.4	2,044	--	6		0.0356	0.5	9.3	,J,s	0.036	0.1	9.1	,J,s	0.036	0.1	14		0.0356	0.5	18		0.0356	0.5	12		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	528	,J,s	5	100	950		5.3	50	1,000		5.3	50	1,240	,J,s	5	100	3,290	,J,s	5	100	968	,J,s	5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	0.51	J	0.0502	1	0.24	J,L,m	0.089	0.3	0.2	J,L,m	0.089	0.3	0.33	J	0.0502	1	0.71	J	0.0502	1	0.69	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.054	J	0.0044	3	0.046	J	0.013	0.1	0.04	J	0.013	0.1	0.028	J	0.0044	3	0.11	J	0.0044	3	0.1	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	33	J,B,p	8.92	100	48	J,B,p	13	100	52	J,B,p	13	100	74	J,B,p	8.92	100	343		8.92	100	312		8.92	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.17	J	0.027	0.5	0.2		0.0049	0.1	0.19		0.0049	0.1	0.18	J	0.027	0.5	0.24	J	0.027	0.5	0.25	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	29		0.207	1	24	,L,m	0.034	0.1	25	,L,m	0.034	0.1	69		0.207	1	58		0.207	1	76		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	52		0.517	4	40		1	5	43		1	5	54		0.517	4	97		0.517	4	160		2.59	20
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	NT				NT				NT				NT				NT				NT			
Endosulfan II[4]	33213-65-9	N	--	4.7E+04	6.1E+05	--	NT				NT				NT				NT				NT				NT			
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				NT				NT				NT				NT				NT			
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	NT				NT				NT				NT				NT				NT			
Aroclor 1254[5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	NT				NT				NT				NT				NT				NT			
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	NT				NT				NT				NT				NT				NT			
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	29		5.8	24	<26	U	3.1	26	<26	U	3.1	26	24	J	6.65	26	26	J	7.45	30	30		6.6	26
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	100	B,B,z	5.8	24	38		5.4	26	28		5.5	26	50	B,B,z	6.65	26	54	B,B,z	7.45	30	100	B,B,z	6.6	26
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<5.8	U	0.611	5.8	<6.4	U	0.16	6.4	<6.5	U	0.17	6.5	<6.7	U	0.701	6.7	<7.5	U	0.785	7.5	<6.6	U	0.696	6.6
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	<5.8	U	0.581	5.8	<6.4	U	0.32	6.4	<6.5	U	0.32	6.5	<6.7	U	0.666	6.7	<7.5	U	0.746	7.5	<6.6	U	0.661	6.6
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	<5.8	U,UJ,c	1.68	5.8	<6.4	U	0.34	6.4	<6.5	U	0.34	6.5	<6.7	U,UJ,c	1.93	6.7	<7.5	U,UJ,c	2.16	7.5	<6.6	U	1.91	6.6
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<5.8	U	0.517	5.8	1.5	J	0.19	6.4	0.84	J	0.19	6.5	*17*		0.593	6.7	***24***		0.665	7.5	<6.6	U	0.589	6.6
Chloromethane	74-87-3	--	--	--	--	9.3E+02	<5.8	U	0.967	5.8	<6.4	U	0.31	6.4	<6.5	U	0.31	6.5	<6.7	U	1.11	6.7	<7.5	U	1.24	7.5	<6.6	U	1.1	6.6
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<5.8	U	0.491	5.8	<6.4	U	0.16	6.4	<6.5	U	0.16	6.5	<6.7	U	0.563	6.7	<7.5	U	0.63	7.5	<6.6	U	0.558	6.6
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	<24	U,UJ,c	4.03	24	3.4	J	1.1	26	3.5	J	1.1	26	<26	U,UJ,c	4.62	26	<30	U,UJ,c	5.17	30	<26	U,UJ,c	4.58	26
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	3.6	J	3.26	24	<26	U	5.1	26	<26	U	5.1	26	5.3	J	3.74	26	6.4	J	4.19	30	6	J	3.71	26
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	<5.8	U	0.711	5.8	<6.4	U	0.57	6.4	<6.5	U	0.57	6.5	<6.7	U	0.815	6.7	<7.5	U	0.913	7.5	<6.6	U	0.809	6.6
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<5.8	U	0.538	5.8	<6.4	U	0.52	6.4	<6.5	U	0.52	6.5	<6.7	U	0.617	6.7	<7.5	U	0.691	7.5	<6.6	U	0.612	6.6
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<5.8	U	0.785	5.8	<6.4	U	0.72	6.4	<6.5	U	0.73	6.5	<6.7	U	0.9	6.7	<7.5	U	1.01	7.5	<6.6	U	0.894	6.6
Xylenes (total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<5.8	U	0.488	5.8	<6.4	U	0.75	6.4	<6.5	U	0.76	6.5	<6.7	U	0.56	6.7	<7.5	U	0.627	7.5	<6.6	U	0.556	6.6
VOC TICs (ug/kg)																														
Hexanal	--	--	--	--	--	--	7	E,NJ,t	0	1	NT				NT				NI				NI				28	E,NJ,t	0	1
TCL SVOCs (ug/kg)																														
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	<200	U	2.95	200	NT				NT				<220	U	3.2	220	<260	U	3.69	260	<220	U	3.2	220
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	<200	U	3.29	200	NT				NT				<220	U	3.56	220	<260	U	4.11	260	<220	U	3.56	220
4-Chloro-3-Methylphenol[6]	59-50-7	N	--	3.9E+05	5.1E+06	--	23	J,B,x	6.25	200	NT				NT				29	J	6.77	220	44	J	7.82	260	19	J,B,x	6.77	220
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	<200	U	2.06	200	NT				NT				<220	U	2.24	220	<260	U	2.58	260	<220	U	2.24	220
Acenaphthylene[7]	208-96-8	N	--	2.3E+05	3.1E+06	--	<200	U	1.8	200	NT				NT				<220	U	1.95	220	<260	U	2.25	260	2	J,J,l	1.95	220
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	<200	U	2.28	200	NT				NT				<220	U	2.47	220	<260	U	2.85	260	<220	U	2.47	220
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<200	U	5.54	200	NT				NT				<220	U	6.01	220	<260	U	6.93	260	<220	U	6.01	220
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	<200	U	16	200	NT				NT				<220	U	17.3	220	<260	U	20	260	<220	U	17.3	220
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	12	J	6.85	200	NT				NT				<220	U	7.42	220	<260	U	8.57	260	30	J	7.42	220
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	23	J	11.7	200	NT				NT				<220	U	12.7	220	<260	U	14.6	260	55	J,J,l	12.7	220
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	<200	U	10.5	200	NT				NT				<220	U	11.3	220	<260	U	13.1	260	<220	U	11.3	220
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<200	U	16.1	200	NT				NT				<220	U	17.4	220	<260	U	20.1	260	<220	U	17.4	220
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	27	J	2.48	200	NT				NT				22	J	2.69	220	63	J	3.11	260	62	J,B,z	2.69	220
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	<200	U	5.38	200	NT				NT				10	J	5.82	220	30	J	6.72	260	44	J	5.82	220
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	15	J	7.66	400	NT				NT				11	J	8.29	430	36	J	9.57	500	<430	U	8.29	430
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	17	J	12.2	200	NT				NT				<220	U	13.3	220	<260	U	15.3	260	<220	U	13.3	220
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	330		4.58	200	NT				NT				430		4.97	220	410		5.73	260	55	J,B,z	4.97	220
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	<200	U	7.08	200	NT				NT				<220	U	7.67	220	<260	U	8.85	260	<220	U	7.67	220
Dibenzofuran	132-64-9	N	--	7.8E+03	1.0E+05	--	<200	U	3.79	200	NT				NT				<220	U	4.11	220	<260	U	4.74	260	<220	U	4.11	220
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	8	J,B,x	2.28	200	NT				NT				10	J,B,x	2.47	220	12	J,B,x	2.85	260	7	J,B,x	2.47	220
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	30	J	2.82	200	NT				NT				<220	U	3.06	220	<260	U	3.53	260	26	J	3.06	220
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	<200	U	2.02	200	NT				NT				<220	U	2.18	220	<260	U	2.52	260	<220	U	2.18	220
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	7	J	4.7	200	NT				NT				<220	U	5.1	220	<260	U	5.88	260	42	J,J,l	5.1	220
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	<200	U	3.3	200	NT				NT				<220	U	3.58	220	<260	U	4.13	260	<220	U	3.58	220
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	13	J	2.76	200	NT				NT				<220	U	2.99	220	<260	U	3.45	260	18	J	2.99	220
Phenol	108-95-2	N	--	2.3E+06	3.1E+07	6.7E+04	<200	U	4.75	200	NT				NT				<220	U	5.15	220	<260	U	5.94	260	<220	U	5.15	220

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID							57SB1A				57SB1AB				57SB1AB-DUP(DUP-4)				57SB1B				57SB1C				57SB2A			
Sample Date							10/7/2003				1/10/2008				1/10/2008				10/7/2003				10/7/2003				10/7/2003			
Sample Depth (ft bgs)			Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	0-1		MDL	RL	10-12		MDL	RL	10-12		MDL	RL	10-12		MDL	RL	18-20		MDL	RL	0-1		MDL	RL
	CAS #	C/N					Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	29	J	1.78	200	NT				NT				<220	U	1.92	220	<260	U	2.22	260	38	J	1.92	220
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	--				NT				NT				810	E,NJ,t	0	100	79	E,NJ,t	0	100	NI			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	--				NT				NT				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	--				NT				NT				NI				NI				51	E,NJ,t	0	10
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	--				NT				NT				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	--				NT				NT				NI				470	E,NJ,t	0	1	NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	440	E,NJ,t	0	100	NT				NT				540	E,NJ,t	0	100	NI				NI			
1-Heptadecanol	1454-85-9	--	--	--	--	--	--				NT				NT				NI				NI				NI			
1-Hexadecanol	36653-82-4	--	--	--	--	--	--				NT				NT				NI				NI				NI			
1-Octadecanol	112-92-5	--	--	--	--	--	--				NT				NT				NI				NI				NI			
1-Pentadecanol	629-76-5	--	--	--	--	--	--				NT				NT				NI				NI				NI			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	260	E,NJ,t	0	100	NT				NT				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	94	E,NJ,t	0	100	NT				NT				130	E,NJ,t	0	100	NI				NI			
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	--	--	--	--	--	--				NT				NT				NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	--				NT				NT				NI				NI				NI			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	--				NT				NT				NI				120	E,NJ,t	0	100	NI			
Erucylamide	112-84-5	--	--	--	--	--	--				NT				NT				NI				NI				600	E,B,x	0	10
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	--				NT				NT				NI				NI				NI			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	--				NT				NT				NI				NI				NI			
Phenol, 4-(1,1-dimethylpropyl)-	--	--	--	--	--	--	--				NT				NT				NI				NI				NI			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	--				NT				NT				NI				NI				NI			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	--				NT				NT				NI				NI				NI			
Stearic Acid	57-11-4	--	--	--	--	--	--				NT				NT				64	E,NJ,t	0	1	110	E,NJ,t	0	1	NI			
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	1.9	J,L,s	0.84	24	NT				NT				<28	U,UL,s	0.91	28	<31	U	1.05	31	1.5	J	0.91	28
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	<24	U,UL,s	0.96	24	NT				NT				<28	U,UL,s	1.04	28	<31	U	1.2	31	7.1	J	1.04	28
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	18	J,L,s	1.2	24	NT				NT				<28	U,UL,s	1.3	28	<31	U	1.5	31	10	J	1.3	28
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	14	J,L,s	1.56	24	NT				NT				<28	U,UL,s	1.69	28	<31	U	1.95	31	<28	U	1.69	28
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	27	,L,s	15	24	NT				NT				<28	U,UL,s	16.3	28	<31	U	18.8	31	<28	U	16.3	28
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	8.5	J,L,s	1.2	24	NT				NT				<28	U,UL,s	1.3	28	<31	U	1.5	31	<28	U	1.3	28
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	11	J,L,s	1.44	24	NT				NT				<28	U,UL,s	1.56	28	<31	U	1.8	31	9.2	J	1.56	28
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	57	,L,s	2.04	24	NT				NT				<28	U,UL,s	2.21	28	<31	U	2.55	31	29		2.21	28
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	11	J,L,s	0.84	24	NT				NT				<28	U,UL,s	0.91	28	<31	U	1.05	31	7.2	J	0.91	28
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	24	,L,s	0.72	24	NT				NT				<28	U,UL,s	0.78	28	<31	U	0.9	31	11	J	0.78	28
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	82	,L,s	1.08	24	NT				NT				<28	U,UL,s	1.17	28	<31	U	1.35	31	20	J	1.17	28
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.1	J	0.0356	0.5	NT				NT				<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	0.09	J	0.0356	0.5
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	86		0.1	0.1	78		0.1	0.1	77		0.1	0.1	75		0.1	0.1	67		0.1	0.1	76		0.1	0.1
Total Organic Carbon (%)																														
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
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Radford Army Ammunition Plant, Radford, Virginia

Sample ID							57SB2AB				57SB2B				57SB2C				57SB3A				57SB3A-DUP(SBD6)				57SB3B			
Sample Date							1/9/2008				10/7/2003				10/7/2003				10/7/2003				10/7/2003				10/7/2003			
Sample Depth (ft bgs)			Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	1.5-2		MDL	RL	8-12		MDL	RL	33-35		MDL	RL	0-1		MDL	RL	0-1		MDL	RL	14-16		MDL	RL
	CAS #	C/N					Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	35,000		2.1	10	13,900		1.83	50	21,800		1.83	50	28,900		9.15	250	33,000		9.15	250	37,400		9.15	250
Antimony	7440-36-0	N	--	3.13	40.88	13.2	*14*		0.042	0.2	<0.5	U	0.0518	0.5	0.073	J	0.0518	0.5	*102*		1.3	0.5	*104*		1.3	0.5	0.29	J	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	*3.6*	,L,m	0.071	0.2	*1.1*		0.0232	0.4	*7.1*		0.0232	0.4	*5.1*		0.0232	0.4	*5.3*		0.0232	0.4	*12*		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	94		0.17	1	39		0.106	5	42		0.106	5	107	,J,f	0.106	5	154	,J,f	0.106	5	62		0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	1.3		0.021	1	1.1	,J,s	0.0391	1	3.2	,J,s	0.0391	1	0.45	J,J,s	0.0391	1	0.39	J,J,s	0.0391	1	1.4	,J,s	0.0391	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.45	12		0.11	2	0.46	J	0.182	1	1.3		0.182	1	27	,J,f	0.182	1	*41*	,J,f	0.182	1	1.2		0.182	1
Calcium	7440-70-2	--	--	--	--	--	3,800		4.2	50	<250	U	16.6	250	207	J	16.6	250	1,750	,J,f	16.6	250	2,760	,J,f	16.6	250	<250	U	16.6	250
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.048	*160*		0.72	5	9.3		0.912	5	33		0.912	5	*268*	,J,f	4.56	25	*454*	,J,f	4.56	25	*43*		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	5.1		0.37	2	26	,J,s	0.208	1	19	,J,s	0.208	1	75	,J,s	0.208	1	8	,J,s	0.208	1	23	,J,s	0.208	1
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	17	,J,s	0.044	0.2	15		0.368	1	23		0.368	1	27		0.368	1	38		0.368	1	38		0.368	1
Iron	7439-89-6	N	50,962	5,475	71,540	--	37,000		0.48	10	34,500		35.8	500	39,500		35.8	500	47,100		35.8	500	46,500		71.6	1,000	53,400		71.6	1,000
Lead[2]	7439-92-1	--	26.8	400	750	--	50		0.11	1	2.6		0.0218	1	9.8		0.0218	1	175		0.545	25	268		1.09	50	19		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	2,700		5	50	487		3.21	250	22,300		3.21	250	1,420		3.21	250	1,990		3.21	250	4,280		3.21	250
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	860	,K,m	0.16	1	*1,090*		1.32	25	632		0.264	5	544		0.264	5	514		0.264	5	518		0.264	5
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.18		0.0075	0.05	0.013	J	0.0077	0.1	<0.1	U	0.0077	0.1	0.11		0.0077	0.1	0.13		0.0077	0.1	0.023	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.4	2,044	--	11	,J,s	0.036	0.1	11		0.0356	0.5	75		0.356	5	13		0.0356	0.5	14		0.0356	0.5	28		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	1,100		5.3	50	999	,J,s	5	100	4,570	,J,s	5	100	967	,J,s	5	100	1,060	,J,s	5	100	3,020	,J,s	5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	<0.3	U,UL,m	0.089	0.3	0.55	J	0.0502	1	0.75	J	0.0502	1	0.57	J	0.0502	1	0.64	J	0.0502	1	0.55	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.067	J	0.013	0.1	0.034	J	0.0044	3	0.12	J	0.0044	3	0.11	J	0.0044	3	0.15	J	0.0044	3	0.11	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	270		13	100	161		8.92	100	84	J,B,p	8.92	100	76	J,B,p	8.92	100	97	J,B,p	8.92	100	339		8.92	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.29		0.0049	0.1	0.11	J	0.027	0.5	0.18	J	0.027	0.5	0.24	J	0.027	0.5	0.24	J	0.027	0.5	0.28	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	130	,K,m	0.17	0.5	18		0.207	1	50		0.207	1	69		0.207	1	67		0.207	1	59		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	280	,K,m	1	5	9.3		0.517	4	43		0.517	4	895	,J,f	5.17	40	1,370	,J,f	12.9	100	53		0.517	4
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	NT				NT				NT				NT				NT				NT			
Endosulfan II [4]	33213-65-9	N	--	4.7E+04	6.1E+05	--	NT				NT				NT				NT				NT				NT			
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				NT				NT				NT				NT				NT			
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	NT				NT				NT				NT				NT				NT			
Aroclor 1254 [5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	NT				NT				NT				NT				NT				NT			
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	NT				NT				NT				NT				NT				NT			
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	28		3.2	27	23	J	6.6	26	21	J	6.6	26	28		6.5	26	32		6.6	26	29	J	7.95	32
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	160	,J,c	5.6	27	51	B,B,z	6.6	26	37	B,B,z	6.6	26	99	B,B,z	6.5	26	160	,B,z	6.6	26	77	B,B,z	7.95	32
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<6.6	U	0.17	6.6	<6.6	U	0.696	6.6	<6.6	U	0.696	6.6	<6.5	U	0.685	6.5	<6.6	U	0.696	6.6	<7.9	U	0.838	7.9
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	<6.6	U	0.33	6.6	<6.6	U	0.661	6.6	*1.2*	J	0.661	6.6	<6.5	U	0.651	6.5	<6.6	U	0.661	6.6	<7.9	U	0.797	7.9
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	0.65	J	0.35	6.6	<6.6	U,UJ,m	1.91	6.6	<6.6	U	1.91	6.6	<6.5	U	1.89	6.5	<6.6	U	1.91	6.6	<7.9	U	2.31	7.9
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<6.6	U	0.2	6.6	<6.6	U	0.589	6.6	*15*		0.589	6.6	<6.5	U	0.58	6.5	<6.6	U	0.589	6.6	<7.9	U	0.709	7.9
Chloromethane	74-87-3	--	--	--	--	9.3E+02	<6.6	U	0.32	6.6	<6.6	U	1.1	6.6	<6.6	U	1.1	6.6	<6.5	U	1.08	6.5	<6.6	U	1.1	6.6	<7.9	U	1.33	7.9
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<6.6	U	0.17	6.6	<6.6	U	0.558	6.6	<6.6	U	0.558	6.6	0.66	J	0.55	6.5	<6.6	U	0.558	6.6	<7.9	U	0.673	7.9
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	7.6	J	1.1	27	<26	U,UJ,c	4.58	26	<26	U,UJ,c	4.58	26	<26	U,UJ,c	4.51	26	<26	U,UJ,c	4.58	26	<32	U,UJ,c	5.52	32
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<27	U	5.3	27	4.9	J	3.71	26	4.8	J	3.71	26	6.5	J	3.65	26	4.3	J	3.71	26	6.8	J	4.47	32
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	<6.6	U	0.59	6.6	<6.6	U	0.809	6.6	<6.6	U	0.809	6.6	<6.5	U	0.797	6.5	<6.6	U	0.809	6.6	<7.9	U	0.975	7.9
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<6.6	U	0.53	6.6	<6.6	U	0.612	6.6	<6.6	U	0.612	6.6	1.3	J	0.603	6.5	2.6	J	0.612	6.6	<7.9	U	0.738	7.9
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<6.6	U	0.75	6.6	<6.6	U	0.894	6.6	<6.6	U	0.894	6.6	*1.9*	J	0.88	6.5	*1.6*	J	0.894	6.6	<7.9	U	1.08	7.9
Xylenes (total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<6.6	U	0.78	6.6	<6.6	U	0.556	6.6	<6.6	U	0.556	6.6	<6.5	U	0.547	6.5	<6.6	U	0.556	6.6	<7.9	U	0.669	7.9
VOC TICs (ug/kg)																														
Hexanal	--	--	--	--	--	--	NT				NI				NI				NI				NI				NI			
TCL SVOCs (ug/kg)																														
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	NT				<220	U	3.2	220	<220	U	3.2	220	<220	U	3.2	220	<220	U	3.2	220	<270	U	3.94	270
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	NT				<220	U	3.56	220	<220	U	3.56	220	6	J	3.56	220	12	J	3.56	220	<270	U	4.38	270
4-Chloro-3-Methylphenol [6]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				16	J,B,x	6.77	220	<220	U	6.77	220	46	J	6.77	220	38	J	6.77	220	16	J,B,x	8.34	270
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	NT				<220	U	2.24	220	<220	U	2.24	220	<220	U	2.24	220	<220	U	2.24	220	<270	U	2.75	270
Acenaphthylene [7]	208-96-8	N	--	2.3E+05	3.1E+06	--	NT				<220	U	1.95	280	<220	U	1.95	220	4	J	1.95	220	9		1.95	220	<270	U	2.42	270
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	NT				<220	U	2.47	220	<220	U	2.47	220	36	J	2.47	220	75	J	2.47	220	<270	U	3.04	270
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				<220	U	6.01	220	<220	U	6.01	220	<220	U	6.01	220	9	J	6.01	220	<270	U	7.39	270
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				<220	U	17.3	220	<220	U	17.3	220	<220	U	17.3	220	<220	U	17.3	220	<270	U	21.3	270
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				<220	U	7.42	220	<220	U	7.42	220	12	J	7.42	220	20	J	7.42	220	<270	U	9.14	270
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				<220	U	12.7	220	<220	U	12.7	220	20	J	12.7	220	35	J	12.7	220	<270	U	15.6	270
Benzo(g,h,i)perylene [7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				<220	U	11.3	220	<220	U	11.3	220	<220	U	11.3	220	15	J	11.3	220	<270	U	14	270
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				<220	U	17.4	220	<220	U	17.4	220	<220	U	17.4	220	<220	U	17.4	220	<270	U	21.4	270
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				20	J	2.69	220	48	J,B,z	2.69	220	480		2.69	220	62	J	2.69	220	60	J,B,z	3.31	270
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	NT				<220	U	5.82	220	<220	U	5.82	220	<220	U	5.82	220	<220	U	5.82	220	<270	U	7.17	270
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	NT				<430	U	8.29	430	<430	U	8.29	430	43	J	8.29	430	25	J	8.29	430	<530	U	10.2	530
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				<220	U	13.3	220	<220	U	13.3	220	23	J	13.3	220	22	J	13.3	220	<270	U	16.3	270
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				44	J	4.97	220	38	J,B,z	4.97	220	360		4.97	220	230		4.97	220	55	J,B,z	6.11	270
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	NT				<220	U	7.67	220	<220	U	7.67	220	<220	U	7.67	220	<220	U	7.67	220	<270	U	9.44	270
Dibenzofuran	132-64-9	N	--	7.8E+03	1.0E+05	--	NT				<220	U	4.11	220	<220	U	4.11	220	<220	U	4.11	220	<220	U	4.11	220	<270	U	5.06	270
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				12	J,B,x	2.47	220	5	J,B,x	2.47	220	19	J,B,x	2.47	220	21	J,B,x	2.47	220	<270	U	3.04	270
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				<220	U	3.06	220	<220	U	3.06	220	40	J	3.06	220	45	J	3.06	220	<270	U	3.76	270
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	NT				<220	U	2.18	220	<220	U	2.18	220	<220	U	2.18	220	3	J	2.18	220	<270	U	2.69	270
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				<220	U	5.1	220	<220	U	5.1	220	7	J	5.1	220	12	J	5.1	220	<270	U	6.27	270
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	NT				<220	U	3.58	220	<220	U	3.58	220	4	J	3.58	220	6	J	3.58	220	<270	U	4.42	270
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				<220	U	2.99	220	<220	U	2.99	220	27	J	2.99	220	50	J	2.99	220	<270	U	3.68	270
Phenol	108-95-2	N	--	2.3E+06	3.1E+07	6.7E+04	NT				<220	U	5.15	220	<220	U	5.15	220	<220	U	5.15	220	<220	U	5.15	220	<270	U	6.34	270

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB2AB 1/9/2008 1.5-2		MDL	RL	57SB2B 10/7/2003 8-12		MDL	RL	57SB2C 10/7/2003 33-35		MDL	RL	57SB3A 10/7/2003 0-1		MDL	RL	57SB3A-DUP(SBD6) 10/7/2003 0-1		MDL	RL	57SB3B 10/7/2003 14-16		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				<220	U	1.92	220	<220	U	1.92	220	40	J	1.92	220	44	J	1.92	220	<270	U	2.37	270
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NI				80	E,NJ,t	0	100	1,300	E,NJ,t	0	100	760	E,NJ,t	0	100	NI			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	NT				NI				NI				390	E,NJ,t	0	10	NI				NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NI				34	E,NJ,t	0	50	NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NI				NI				330	E,NJ,t	0	1	NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				38	E,B,x	0	100	NI				NI				530	E,NJ,t	0	100	56	E,B,x	0	100
1-Heptadecanol	1454-85-9	--	--	--	--	--	NT				NI				NI				NI				NI				NI			
1-Hexadecanol	36653-82-4	--	--	--	--	--	NT				NI				31	E,NJ,t	0	100	NI				NI				NI			
1-Octadecanol	112-92-5	--	--	--	--	--	NT				NI				NI				NI				NI				NI			
1-Pentadecanol	629-76-5	--	--	--	--	--	NT				NI				52	E,NJ,t	0	10	NI				NI				NI			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	NT				NI				NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				68	E,NJ,t	0	100	NI				NI				NI				110	E,NJ,t	0	100
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	--	--	--	--	--	NT				NI				NI				NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NI				NI				NI				NI				28	E,NJ,t	0	1
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	NT				NI				NI				NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	NT				NI				330	E,B,x	0	10	NI				NI				630	E,B,x	0	10
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	NT				NI				NI				NI				NI				NI			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	NT				NI				NI				NI				NI				NI			
Phenol, 4-(1,1-dimethylpropyl)-	--	--	--	--	--	--	NT				NI				NI				NI				NI				NI			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	NT				NI				NI				NI				1,400	E,NJ,t	0	100	NI			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	NT				NI				NI				NI				560	E,NJ,t	0	100	NI			
Stearic Acid	57-11-4	--	--	--	--	--	NT				NI				NI				NI				NI				NI			
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				<28	U	0.91	28	<28	U,UL,s	0.924	28	1.6	J	0.77	24	3	J,L,s	0.91	28	<33	U,UL,s	1.12	33
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				<28	U	1.04	28	<28	U,UL,s	1.06	28	<24	U	0.88	24	<28	U,UL,s	1.04	28	<33	U,UL,s	1.28	33
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				<28	U	1.3	28	<28	U,UL,s	1.32	28	<24	U	1.1	24	<28	U,UL,s	1.3	28	<33	U,UL,s	1.6	33
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				<28	U	1.69	28	<28	U,UL,s	1.72	28	<24	U	1.43	24	<28	U,UL,s	1.69	28	<33	U,UL,s	2.08	33
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				<28	U	16.3	28	<28	U,UL,s	16.5	28	<24	U	13.8	24	<28	U,UL,s	16.3	28	<33	U,UL,s	20	33
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				<28	U	1.3	28	<28	U,UL,s	1.32	28	<24	U	1.1	24	<28	U,UL,s	1.3	28	<33	U,UL,s	1.6	33
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				<28	U	1.56	28	<28	U,UL,s	1.58	28	5.2	J	1.32	24	12	J,L,s	1.56	28	<33	U,UL,s	1.92	33
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				<28	U	2.21	28	<28	U,UL,s	2.24	28	46		1.87	24	84	,L,s	2.21	28	<33	U,UL,s	2.72	33
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				<28	U	0.91	28	<28	U,UL,s	0.924	28	<24	U	0.77	24	<28	U,UL,s	0.91	28	<33	U,UL,s	1.12	33
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				<28	U	0.78	28	<28	U,UL,s	0.792	28	18	J	0.66	24	30	,L,s	0.78	28	<33	U,UL,s	0.96	33
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				<28	U	1.17	28	<28	U,UL,s	1.19	28	31		0.99	24	54	,L,s	1.17	28	<33	U,UL,s	1.44	33
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				0.08	J	0.0356	0.5	<0.5	U	0.0356	0.5	0.17	J	0.0356	0.5	0.16	J	0.0356	0.5	0.08	J	0.0356	0.5
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	75		0.1	0.1	76		0.1	0.1	76		0.1	0.1	77		0.1	0.1	76		0.1	0.1	63		0.1	0.1
Total Organic Carbon (%)																														
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB3C 10/7/2003 29-31		MDL	RL	57SB4A 10/8/2003 0-1		MDL	RL	57SB4A2 10/8/2003 1.5		MDL	RL	57SB4AB 1/11/2008 1.5-4		MDL	RL	57SB4AB-DUP(DUP-5) 1/11/2008 1.5-4		MDL	RL	57SB4B 1/11/2008 6-8		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	29,600		9.15	250	30,100		9.15	250	33,300		9.15	250	26,000	,J,s	2.1	10	24,000	,J,s	2.1	10	18,000	,J,s	2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	<0.5	U	0.0518	0.5	6.3		0.0518	0.5	9.7		0.0518	0.5	0.81		0.042	0.2	0.8		0.042	0.2	0.4		0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***5.9***		0.0232	0.4	4.7		0.0232	0.4	***2***		0.0232	0.4	***2.7***	,L,m	0.071	0.2	***2.3***	,L,m	0.071	0.2	***3.4***	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	52		0.106	5	149		0.106	5	51		0.106	5	54		0.17	1	52		0.17	1	48		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	2	,J,s	0.0391	1	0.6	J,J,s	0.0391	1	0.45	J	0.0333	1	0.8	J	0.021	1	0.76	J	0.021	1	1.8		0.021	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.45	0.87	J	0.182	1	1.5		0.182	1	1.6		0.182	1	<2	U	0.11	2	<2	U	0.11	2	<2	U	0.11	2
Calcium	7440-70-2	--	--	--	--	--	294		16.6	250	1,420		16.6	250	372	,J,m	16.6	250	730		4.2	50	640		4.2	50	480		4.2	50
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.048	31		0.912	5	***43***		0.912	5	***45***	,J,m	0.912	5	23		0.72	5	23		0.72	5	33		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	18	,J,s	0.208	1	9.7	,J,s	0.208	1	13	,J,s	0.208	1	4		0.37	2	4.1		0.37	2	14		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	17		0.368	1	26		0.368	1	18	J,s	0.368	2	13	,L,m	0.044	0.2	12	,L,m	0.044	0.2	9.8	,L,m	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	35,200		35.8	500	78,700		71.6	1,000	59,000		42.4	200	29,000		0.48	10	33,000		0.48	10	87,000		4.8	100
Lead[2]	7439-92-1	--	26.8	400	750	--	9.2		0.0218	1	19		0.0218	1	18		0.0218	1	13		0.022	0.2	11		0.022	0.2	6.9		0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	35,000		16.1	1,250	923		3.21	250	971	,J,m	3.21	250	830		5	50	780		5	50	520		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	828		0.264	5	3,200		1.32	25	273		0.264	5	300		0.16	1	320		0.16	1	***990***		0.16	1
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	<0.1	U	0.0077	0.1	0.14		0.0077	0.1	0.041	J	0.0077	0.1	0.047	J	0.0075	0.05	0.044	J	0.0075	0.05	0.035	J	0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	50		0.0356	0.5	8.7		0.0356	0.5	12		0.0356	0.5	6.6	,J,s	0.036	0.1	5.9	,J,s	0.036	0.1	4.9	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	5,900	,J,s	5	100	908	,J,s	5	100	1,080		5	100	840		5.3	50	810		5.3	50	720		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.88	J	0.0502	1	0.57	J	0.0502	1	0.4	J	0.0502	1	0.095	J,L,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	0.17	J,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.15	J	0.0044	3	0.076	J	0.0044	3	0.063	J	0.0044	3	0.036	J	0.013	0.1	0.023	J	0.013	0.1	0.039	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	169		8.92	100	127		8.92	100	497		18.1	100	120		13	100	110		13	100	180		13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.22	J	0.027	0.5	0.3	J	0.027	0.5	0.18	J,B,x	0.027	0.5	0.15		0.0049	0.1	0.14		0.0049	0.1	0.12		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	59		0.207	1	84		0.207	1	66		0.207	1	22	,L,m	0.034	0.1	22	,L,m	0.034	0.1	21	,L,m	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	52		0.517	4	281		2.59	20	88		0.517	4	35		1	5	37		1	5	24		1	5
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	NT				<28	U	0.464	28	NT				<4.3	U	0.6	4.3	<4.1	U	0.57	4.1	<4.2	U	0.59	4.2
Endosulfan II[4]	33213-65-9	N	--	4.7E+04	6.1E+05	--	NT				<28	U	0.321	28	NT				<4.3	U	1.1	4.3	<4.1	U	1.1	4.1	<4.2	U	1.1	4.2
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				<28	U	0.447	28	NT				<4.3	U	0.7	4.3	<4.1	U	0.67	4.1	<4.2	U	0.69	4.2
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	NT				<28	U	0.683	28	NT				<2.2	U	0.54	2.2	<2.1	U	0.52	2.1	<2.2	U	0.53	2.2
Aroclor 1254[5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	NT				12	J,J,g	4.2	46	NT				<43	U	5.8	43	<41	U	5.5	41	<42	U	5.6	42
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	NT				<46	U	9.8	46	NT				<88	U	21	88	<83	U	20	83	<86	U	20	86
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	25	J	6.65	26	30		7.05	14	27	J	6.75	28	11	J	3.2	26	9.2	J	3	25	<26	U	3.1	26
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	55	B,B,z	6.65	26	55	B,B,z	7.05	14	66	B,B,z	6.75	28	51	J,J,c	5.5	26	76		5.3	25	45		5.4	26
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<6.7	U	0.701	6.7	<7	U	0.743	7	<6.8	U	0.711	6.8	<6.5	U	0.17	6.5	<6.2	U	0.16	6.2	<6.4	U	0.16	6.4
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	<6.7	U	0.666	6.7	<7	U	0.706	7	<6.8	U	0.676	6.8	<6.5	U	0.32	6.5	<6.2	U	0.31	6.2	<6.4	U	0.32	6.4
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	<6.7	U	1.93	6.7	<7	U	2.04	7	<6.8	U	1.96	6.8	1.6	J,J,c	0.34	6.5	1.2	J,J,c	0.33	6.2	<6.4	U	0.34	6.4
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	*1.1*	J	0.593	6.7	<7	U	0.629	7	<6.8	U	0.602	6.8	<6.5	U	0.19	6.5	<6.2	U	0.18	6.2	<6.4	U	0.19	6.4
Chloromethane	74-87-3	--	--	--	--	9.3E+02	<6.7	U	1.11	6.7	<7	U	1.18	7	<6.8	U	1.13	6.8	<6.5	U	0.32	6.5	<6.2	U	0.3	6.2	<6.4	U	0.31	6.4
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<6.7	U	0.563	6.7	<7	U	0.596	7	<6.8	U	0.571	6.8	<6.5	U	0.16	6.5	<6.2	U	0.16	6.2	<6.4	U	0.16	6.4
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	<26	U,UJ,c	4.62	26	<14	U,UJ,c	4.89	14	<28	U,UJ,c	4.68	28	12	J	1.1	26	3.1	J	1	25	2	J	1.1	26
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	5.4	J	3.74	26	<7	U	3.96	7	<28	U	3.79	28	<26	U	5.2	26	<25	U	4.9	25	<26	U	5.1	26
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	<6.7	U	0.815	6.7	<7	U	0.864	7	<6.8	U	0.828	6.8	<6.5	U	0.58	6.5	<6.2	U	0.55	6.2	<6.4	U	0.57	6.4
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<6.7	U	0.617	6.7	<7	U	0.654	7	<6.8	U	0.626	6.8	<6.5	U	0.53	6.5	<6.2	U	0.5	6.2	<6.4	U	0.51	6.4
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<6.7	U	0.9	6.7	<7	U	0.955	7	<6.8	U	0.914	6.8	<6.5	U	0.73	6.5	<6.2	U	0.7	6.2	<6.4	U	0.72	6.4
Xylenes (total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<6.7	U	0.56	6.7	<7	U	0.594	7	<6.8	U	0.568	6.8	<6.5	U	0.77	6.5	<6.2	U	0.73	6.2	<6.4	U	0.75	6.4
VOC TICs (ug/kg)																														
Hexanal	--	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
TCL SVOCs (ug/kg)																														
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	<220	U	3.2	220	<240	U	3.44	240	<230	U	3.44	230	<220	U	0.6	220	<210	U	0.57	210	<220	U	0.59	220
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	<220	U	3.56	220	<240	U	3.84	240	<230	U	3.84	230	<220	U	0.63	220	<210	U	0.6	210	<220	U	0.61	220
4-Chloro-3-Methylphenol[6]	59-50-7	N	--	3.9E+05	5.1E+06	--	<220	U	6.77	220	17	J,B,x	7.29	240	18	J	7.29	230	<220	U	2.3	220	<210	U	2.2	210	<220	U	2.3	220
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	<220	U	2.24	220	<240	U	2.41	240	<230		2.41	230	0.87	J	0.52	22	<21	U	0.5	21	0.85	J	0.51	22
Acenaphthylene[7]	208-96-8	N	--	2.3E+05	3.1E+06	--	<220	U	1.95	220	<240	U	2.12	240	<230		2.1	230	<22	U	0.79	22	<21	U	0.75	21	<22	U	0.77	22
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	<220	U	2.47	220	<240	U	2.66	240	<230	U	2.66	230	<220	U	8.8	220	<210	U	8.4	210	<220	U	8.6	220
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<220	U	6.01	220	<240	U	6.47	240	<230		6.47	230	<22	U	0.56	22	<21	U	0.53	21	<22	U	0.54	22
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	<220	U	17.3	220	<240	U	18.6	240	<230		18.6	230	<22	U	0.7	22	<21	U	0.67	21	<22	U	0.69	22
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	<220	U	7.42	220	<240	U	7.99	240	<230		7.99	230	<22	U	1.3	22	<21	U	1.3	21	<22	U	1.3	22
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	<220	U	12.7	220	<240	U	13.7	240	<230		13.7	230	<22	U	1.1	22	<21	U	1.1	21	<22	U	1.1	22
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	<220	U	11.3	220	<240	U	12.2	240	<230		12.2	230	<88	U	3	88	<83	U	2.9	83	<86	U	2.9	86
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<220	U	17.4	220	<240	U	18.8	240	<230		18.8	230	<22	U	0.94	22	<21	U	0.89	21	<22	U	0.92	22
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	52	J,B,z	2.69	220	21	J,B,z	2.9	240	24	J,B,z	2.9	230	82	J	1.7	220	74	J	1.6	210	29	J	1.7	220
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	<220	U	5.82	220	<240	U	6.27	240	<230	U	6.27	230	6.1	J	2.7	220	<210	U	2.6	210	4.7	J	2.7	220
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	<430	U	8.29	430	<460	U	8.93	460	<440	U	8.93	440	<430	U	30	430	<410	U	29	410	<420	U	29	420
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	<220	U	13.3	220	<240	U	14.3	240	<230		14.3	230	<22	U	0.62	22	<21	U	0.59	21	<22	U	0.61	22
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	38	J,B,z	4.97	220	41	J,B,z	5.35	240	76	J,B,z	5.35	230	20	J	1.6	220	9.5	J,B,z	1.5	210	9.8	J,B,z	1.5	220
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	<220	U	7.67	220	<240	U	8.26	240	<230		8.26	230	<88	U	0.7	88	<83	U	0.67	83	<86	U	0.69	86
Dibenzofuran	132-64-9	N	--	7.8E+03	1.0E+05	--	<220	U	4.11	220	<240	U	4.42	240	<230	U	4.42	230	<220	U	0.34	220	<210	U	0.33	210	<220	U	0.34	220
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	7	J,B,x	2.47	220	11	J,B,x	2.66	240	6	J,J,l	2.66	230	0.87	J	0.49	220	<210	U	0.46	210	<220	U	0.48	220
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	<220	U	3.06	220	<240	U	3.29	240	<230		3.29	230	<22	U	4.9	22	<21	U	4.7	21	<22	U	4.8	22
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	<220	U	2.18	220	<240	U	2.35	240	<230		2.35	230	<22	U	0.37	22	<21	U	0.35	21	<22	U	0.36	22
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	<220	U	5.1	220	<240	U	5.49	240	<230		5.49	230	<88	U	0.92	88	<83	U	0.87	83	<86	U	0.9	86
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	<220	U	3.58	220	<240	U	3.85	240	<230		3.85	230	0.44	J	0.31	22	<21	U	0.29	21	0.43	J	0.3	22
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	<220	U	2.99	220	<240	U	3.22	240	<230		3.22	230	<22	U	4.7	22	<21	U	4.5	21	<22	U	4.6	22
Phenol	108-95-2	N	--	2.3E+06	3.1E+07	6.7E+04	<220	U	5.15	220	<240	U	5.54	240	<230	U	5.54	230	<220	U	0.92	220	<210	U	0.87	210	<220	U	0.9	220

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Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB3C 10/7/2003 29-31		MDL	RL	57SB4A 10/8/2003 0-1		MDL	RL	57SB4A2 10/8/2003 1.5		MDL	RL	57SB4AB 1/11/2008 1.5-4		MDL	RL	57SB4AB-DUP(DUP-5) 1/11/2008 1.5-4		MDL	RL	57SB4B 1/11/2008 6-8		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	<220	U	1.92	220	<240	U	2.07	240	<230		2.07	230	<22	U	0.42	22	<21	U	0.39	21	<22	U	0.41	22
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	60	E,NJ,t	0	100	NI				NI				NT				NT				NT			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NI				NI				160	E,NJ,t	0	10	NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	32	E,NJ,t	0	100	41	E,B,x	0	100	NI				NT				NT				NT			
1-Heptadecanol	1454-85-9	--	--	--	--	--	37	E,NJ,t	0	10	NI				NI				NT				NT				NT			
1-Hexadecanol	36653-82-4	--	--	--	--	--	NI				NI				48	E,NJ,t	0	100	NT				NT				NT			
1-Octadecanol	112-92-5	--	--	--	--	--	NI				31	E,NJ,t	0	100	NI				NT				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NI				65	E,NJ,t	0	100	58	E,NJ,t	0	100	NT				NT				NT			
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	--	--	--	--	--	NI				NI				29	E,NJ,t	0	10	NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	340	E,B,x	0	10	320	E,B,x	0	10	NI				NT				NT				NT			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	NI				58	E,NJ,t	0	10	NI				NT				NT				NT			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	NI				29	E,NJ,t	0	10	NI				NT				NT				NT			
Phenol, 4-(1,1-dimethylpropyl)-	--	--	--	--	--	--	NI				NI				720	E,NJ,t	0	10	NT				NT				NT			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
Stearic Acid	57-11-4	--	--	--	--	--	NI				40	E,NJ,t	0	1	NI				NT				NT				NT			
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<28	U	0.91	28	<30	U	0.98	30	<28	U	0.98	28	NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	<28	U	1.04	28	<30	U	1.12	30	<28	U	1.12	28	NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	<28	U	1.3	28	<30	U	1.4	30	<28	U	1.4	28	NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	<28	U	1.69	28	<30	U	1.82	30	<28	U	1.82	28	NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	<28	U	16.3	28	<30	U	17.5	30	<28	U	17.5	28	NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<28	U	1.3	28	<30	U	1.4	30	<28	U	1.4	28	NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	<28	U	1.56	28	<30	U	1.68	30	<28	U	1.68	28	NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	<28	U	2.21	28	<30	U	2.38	30	<28	U	2.38	28	NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	<28	U	0.91	28	<30	U	0.98	30	<28	U	0.98	28	NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	<28	U	0.78	28	<30	U	0.84	30	<28	U	0.84	28	NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	<28	U	1.17	28	<30	U	1.26	30	<28	U	1.26	28	NT				NT				NT			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	<0.5	U	0.0356	0.5	0.05	J	0.0356	0.5	<0.5	U	0.0356	0.5	NT				NT				<0.5	U	0.0356	0.5
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	75		0.1	0.1	71		0.1	0.1	74		0.1	0.1	76		0.1	0.1	80		0.1	0.1	78		0.1	0.1
Total Organic Carbon (%)																														
Carbon, Total Organic	--	--	--	--	--	--	NT				0.81		0.047	0.1	NT				NT				NT				NT			

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Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB4C 1/11/2008 13-15.5		MDL	RL	57SB5A 1/14/2008 0-1		MDL	RL	57SB5AB 1/14/2008 1.25-4		MDL	RL	57SB5AB-DUP(DUP-6) 1/14/2008 1.25-4		MDL	RL	57SB5B 1/14/2008 6-8		MDL	RL	57SB5C 1/14/2008 13-15		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	12,000	,J,s	2.1	10	26,000	,J,s	2.1	10	19,000	,J,s	2.1	10	18,000	,J,s	2.1	10	27,000	,J,s	2.1	10	13,000	,J,s	2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.045	J	0.042	0.2	*14*		0.042	0.2	0.51		0.042	0.2	0.48		0.042	0.2	0.52		0.042	0.2	0.26		0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	*0.85*	,L,m	0.071	0.2	*3.1*	,L,m	0.071	0.2	*2*	,L,m	0.071	0.2	*1.9*	,L,m	0.071	0.2	*4.7*	,L,m	0.071	0.2	*2.9*	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	25		0.17	1	100		0.17	1	100		0.17	1	95		0.17	1	45		0.17	1	48		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	1.6		0.021	1	1.2		0.021	1	0.83	J	0.021	1	1.1		0.021	1	1.5		0.021	1	1.9		0.021	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.45	<2	U	0.11	2	6.5		0.11	2	2.5		0.11	2	2.6		0.11	2	<2	U	0.11	2	0.35	J	0.11	2
Calcium	7440-70-2	--	--	--	--	--	220		4.2	50	640		4.2	50	410		4.2	50	390		4.2	50	1,200		4.2	50	260		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	18		0.72	5	*47*		0.72	5	*48*		0.72	5	35		0.72	5	33		0.72	5	23		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	12		0.37	2	41		0.37	2	18		0.37	2	20		0.37	2	8.2		0.37	2	28		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	1.4	,L,m	0.044	0.2	19	,L,m	0.044	0.2	10	,L,m	0.044	0.2	9.3	,L,m	0.044	0.2	22	,L,m	0.044	0.2	22	,L,m	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	31,000		0.48	10	36,000		0.48	10	30,000		0.48	10	28,000		0.48	10	36,000		0.48	10	27,000		0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	0.86		0.022	0.2	31		0.022	0.2	15		0.022	0.2	18		0.022	0.2	12		0.022	0.2	5.1		0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	550		5	50	1,600		5	50	760		5	50	820		5	50	2,100		5	50	710		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	500		0.16	1	*1,600*		0.16	1	*2,100*		0.16	1	*2,100*		0.16	1	590		0.16	1	390		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	<0.05	U	0.0075	0.05	0.087		0.0075	0.05	0.086		0.0075	0.05	0.081		0.0075	0.05	0.04	J	0.0075	0.05	0.012	J	0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	12	,J,s	0.036	0.1	17	,J,s	0.036	0.1	7.5	,J,s	0.036	0.1	7.9	,J,s	0.036	0.1	15	,J,s	0.036	0.1	13	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,200		5.3	50	1,700		5.3	50	850		5.3	50	910		5.3	50	1,700		5.3	50	1,100		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.26	J,L,m	0.089	0.3	0.14	J,L,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	0.35	,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.018	J	0.013	0.1	0.024	J	0.013	0.1	0.02	J	0.013	0.1	0.02	J	0.013	0.1	0.054	J	0.013	0.1	0.041	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	980		13	100	130		13	100	100		13	100	89	J	13	100	97	J	13	100	510		13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.041	J	0.0049	0.1	0.34		0.0049	0.1	0.55		0.0049	0.1	0.43		0.0049	0.1	0.15		0.0049	0.1	0.064	J	0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	11	,L,m	0.034	0.1	40	,L,m	0.034	0.1	41	,L,m	0.034	0.1	30	,L,m	0.034	0.1	30	,L,m	0.034	0.1	18	,L,m	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	12		1	5	1,100		1	5	35		1	5	29		1	5	40		1	5	20		1	5
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	<4.2	U	0.59	4.2	<4.5	U	0.63	4.5	<4.4	U	0.61	4.4	*3.4*	J,J,g	0.62	4.5	<4.6	U	0.64	4.6	<4.3	U	0.6	4.3
Endosulfan II [4]	33213-65-9	N	--	4.7E+04	6.1E+05	--	<4.2	U	1.1	4.2	<4.5	U	1.2	4.5	<4.4	U	1.1	4.4	<4.5	U	1.2	4.5	<4.6	U	1.2	4.6	<4.3	U	1.1	4.3
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	<4.2	U	0.69	4.2	<4.5	U	0.73	4.5	<4.4	U	0.71	4.4	<4.5	U	0.72	4.5	<4.6	U	0.75	4.6	<4.3	U	0.69	4.3
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	<2.2	U	0.53	2.2	9.6	,J,g	0.56	2.3	6.6	,J,g	0.55	2.3	<2.3	U	0.56	2.3	<2.4	U	0.58	2.4	<2.2	U	0.54	2.2
Aroclor 1254 [5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	<42	U	5.6	42	200		6	45	130	,J,f	5.9	44	250	,J,f	5.9	45	21	J	6.1	46	<43	U	5.7	43
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	<86	U	20	86	73	J,J,g	22	91	<89	U	21	89	<90	U	21	90	<93	U	22	93	<87	U	21	87
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<26	U	3.1	26	<27	U	3.3	27	<27	U	3.2	27	<27	U	3.3	27	<28	U	3.4	28	<26	U	3.1	26
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	60		5.4	26	40		5.7	27	36		5.6	27	39		5.7	27	40		5.9	28	8.2	J	5.5	26
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<6.4	U	0.16	6.4	<6.8	U	0.17	6.8	<6.6	U	0.17	6.6	<6.7	U	0.17	6.7	0.19	J	0.18	6.9	0.25	J	0.17	6.5
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	<6.4	U	0.32	6.4	<6.8	U	0.34	6.8	<6.6	U	0.33	6.6	<6.7	U	0.33	6.7	<6.9	U	0.34	6.9	<6.5	U	0.32	6.5
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	<6.4	U	0.34	6.4	5.2	J,J,c	0.36	6.8	2.7	J,J,c	0.35	6.6	2.8	J,J,c	0.35	6.7	1.2	J,J,c	0.37	6.9	<6.5	U	0.34	6.5
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<6.4	U	0.19	6.4	<6.8	U	0.2	6.8	<6.6	U	0.2	6.6	<6.7	U	0.2	6.7	<6.9	U	0.2	6.9	<6.5	U	0.19	6.5
Chloromethane	74-87-3	--	--	--	--	9.3E+02	<6.4	U	0.31	6.4	<6.8	U	0.33	6.8	<6.6	U	0.32	6.6	<6.7	U	0.33	6.7	<6.9	U	0.34	6.9	<6.5	U	0.31	6.5
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<6.4	U	0.16	6.4	<6.8	U	0.17	6.8	<6.6	U	0.17	6.6	<6.7	U	0.17	6.7	<6.9	U	0.17	6.9	<6.5	U	0.16	6.5
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	<26	U	1.1	26	4.7	J	1.1	27	2.8	J	1.1	27	2.4	J	1.1	27	<28	U	1.2	28	3.4	J	1.1	26
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<26	U	5.1	26	<27	U	5.4	27	<27	U	5.3	27	6.2	J,B,y	5.3	27	<28	U	5.5	28	<26	U	5.1	26
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	<6.4	U	0.57	6.4	<6.8	U	0.6	6.8	0.88	J	0.59	6.6	<6.7	U	0.6	6.7	<6.9	U	0.61	6.9	<6.5	U	0.57	6.5
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<6.4	U	0.51	6.4	<6.8	U	0.55	6.8	<6.6	U	0.53	6.6	<6.7	U	0.54	6.7	<6.9	U	0.56	6.9	<6.5	U	0.52	6.5
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<6.4	U	0.72	6.4	<6.8	U	0.76	6.8	*7.1*		0.75	6.6	<6.7	U	0.76	6.7	<6.9	U	0.78	6.9	<6.5	U	0.73	6.5
Xylenes (total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<6.4	U	0.75	6.4	<6.8	U	0.79	6.8	<6.6	U	0.78	6.6	<6.7	U	0.79	6.7	<6.9	U	0.81	6.9	<6.5	U	0.76	6.5
VOC TICs (ug/kg)																														
Hexanal	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
TCL SVOCs (ug/kg)																														
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	<220	U	0.59	220	<230	U	0.62	230	<230	U	0.61	230	0.9	J	0.62	230	<240	U	0.64	240	<220	U	0.59	220
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	<220	U	0.61	220	0.9	J	0.65	230	<230	U	0.64	230	1.3	J	0.64	230	<240	U	0.66	240	<220	U	0.62	220
4-Chloro-3-Methylphenol [6]	59-50-7	N	--	3.9E+05	5.1E+06	--	<220	U	2.3	220	<230	U	2.4	230	<230	U	2.4	230	<230	U	2.4	230	<240	U	2.5	240	<220	U	2.3	220
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	<22	U	0.51	22	0.9	J	0.54	23	0.89	J	0.53	23	<23	U	0.54	23	0.93	J	0.56	24	<22	U	0.52	22
Acenaphthylene [7]	208-96-8	N	--	2.3E+05	3.1E+06	--	<22	U	0.77	22	<23	U	0.81	23	<23	U	0.8	23	<23	U	0.81	23	<24	U	0.83	24	<22	U	0.78	22
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	<220	U	8.6	220	<230	U	9.1	230	<230	U	8.9	230	<230	U	9.1	230	<240	U	9.3	240	<220	U	8.7	220
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<22	U	0.55	22	<23	U	0.58	23	<23	U	0.57	23	<23	U	0.57	23	<24	U	0.59	24	<22	U	0.55	22
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	<22	U	0.69	22	0.9	J	0.73	23	0.89	J	0.71	23	0.9	J	0.72	23	<24	U	0.75	24	<22	U	0.7	22
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	<22	U	1.3	22	<23	U	1.4	23	<23	U	1.4	23	<23	U	1.4	23	<24	U	1.4	24	<22	U	1.3	22
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	<22	U	1.1	22	<23	U	1.2	23	<23	U	1.1	23	<23	U	1.1	23	<24	U	1.2	24	<22	U	1.1	22
Benzo(g,h,i)perylene [7]	191-24-2	N	--	2.3E+05	3.1E+06	--	<86	U	2.9	86	<91	U	3.1	91	<89	U	3	89	<90	U	3.1	90	<93	U	3.2	93	<87	U	3	87
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<22	U	0.92	22	<23	U	0.97	23	<23	U	0.95	23	<23	U	0.97	23	<24	U	1	24	<22	U	0.93	22
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	59	J	1.7	220	78	J	1.8	230	34	J	1.7	230	74	J	1.8	230	67	J	1.8	240	110	J	1.7	220
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	14	J	2.7	220	<230	U	2.9	230	<230	U	2.8	230	4.5	J	2.8	230	<240	U	2.9	240	<220	U	2.7	220
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	<420	U	29	420	<450	U	31	450	<440	U	30	440	<450	U	31	450	<460	U	32	460	<430	U	30	430
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	<22	U	0.61	22	0.9	J	0.65	23	1.3	J	0.63	23	<23	U	0.64	23	<24	U	0.66	24	<22	U	0.62	22
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	13	J,B,z	1.5	220	21	J	1.6	230	18	J	1.6	230	12	J,B,z	1.6	230	16	J	1.7	240	16	J	1.6	220
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	<86	U	0.69	86	<91	U	0.73	91	<89	U	0.71	89	<90	U	0.72	90	<93	U	0.75	93	<87	U	0.7	87
Dibenzofuran	132-64-9	N	--	7.8E+03	1.0E+05	--	<220	U	0.34	220	<230	U	0.36	230	<230	U	0.35	230	<230	U	0.35	230	<240	U	0.37	240	<220	U	0.34	220
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	<220	U	0.48	220	1.8	J	0.5	230	<230	U	0.49	230	16	J	0.5	230	<240	U	0.52	240	<220	U	0.48	220
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	<22	U	4.8	22	<23	U	5.1	23	<23	U	5	23	<23	U	5.1	23	<24	U	5.2	24	<22	U	4.9	22
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	<22	U	0.36	22	<23	U	0.38	23	<23	U	0.37	23	4.5	J	0.38	23	<24	U	0.39	24	<22	U	0.36	22
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	<86	U	0.9	86	<91	U	0.95	91	<89	U	0.93	89	<90	U	0.94	90	<93	U	0.97	93	<87	U	0.91	87
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	0.43	J	0.3	22	0.45	J	0.32	23	<23	U	0.31	23	0.45	J	0.31	23	0.46	J	0.32	24	<22	U	0.3	22
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	<22	U	4.6	22	<23	U	4.9	23	<23	U	4.8	23	<23	U	4.9	23	<24	U	5	24	<22	U	4.7	22
Phenol	108-95-2	N	--	2.3E+06	3.1E+07	6.7E+04	<220	U	0.9	220	<230	U	0.95	230	<230	U	0.93	230	1.3	J	0.94	230	<240	U	0.97	240	<220	U	0.91	220

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB4C 1/11/2008 13-15.5		MDL	RL	57SB5A 1/14/2008 0-1		MDL	RL	57SB5AB 1/14/2008 1.25-4		MDL	RL	57SB5AB-DUP(DUP-6) 1/14/2008 1.25-4		MDL	RL	57SB5B 1/14/2008 6-8		MDL	RL	57SB5C 1/14/2008 13-15		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	<22	U	0.41	22	1.8	J	0.43	23	0.89	J	0.42	23	0.9	J	0.43	23	<24	U	0.44	24	<22	U	0.41	22
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Heptadecanol	1454-85-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Hexadecanol	36653-82-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Octadecanol	112-92-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, 4-(1,1-dimethylpropyl)-	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Stearic Acid	57-11-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	78		0.1	0.1	74		0.1	0.1	75		0.1	0.1	74		0.1	0.1	72		0.1	0.1	77		0.1	0.1
Total Organic Carbon (%)																														
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				0.24		0.047	0.1	NT				NT				NT			

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Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB6A 1/10/2008 0-1		MDL	RL	57SB6AB 1/10/2008 1.7-4		MDL	RL	57SB6B 1/10/2008 6-9		MDL	RL	57SB6C 1/10/2008 13-15.5		MDL	RL	57SB7A 1/11/2008 0-1		MDL	RL	57SB7AB 1/11/2008 2-5		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	23,000	,J,s	2.1	10	28,000	,J,s	2.1	10	28,000	,J,s	2.1	10	18,000	,J,s	2.1	10	28,000	,J,s	2.1	10	38,000	,J,s	2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	***280***		0.42	2	2.2		0.042	0.2	*17*		0.042	0.2	0.39		0.042	0.2	***340***		0.42	2	4.2		0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***4.9***	,L,m	0.071	0.2	***2.6***	,L,m	0.14	0.4	***2***	,L,m	0.071	0.2	***4***	,L,m	0.071	0.2	***5.1***	,L,m	0.071	0.2	***3.6***	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	130		0.17	1	130		0.17	1	69		0.17	1	59		0.17	1	220		0.17	1	110		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.86	J	0.021	1	1.5		0.021	1	1.1		0.021	1	1.8		0.021	1	1.1		0.021	1	1.1		0.021	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.45	***51***		0.11	2	0.12	J,B,p	0.11	2	2.5		0.11	2	<2	U	0.11	2	***120***		0.11	2	0.24	J	0.11	2
Calcium	7440-70-2	--	--	--	--	--	3,500		4.2	50	730		4.2	50	120		4.2	50	110		4.2	50	2,900		4.2	50	1,500		4.2	50
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.048	***370***		0.72	5	30		0.72	5	39		0.72	5	33		0.72	5	***1,500***		0.72	5	***46***		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	6.1		0.37	2	51		0.37	2	16		0.37	2	23		0.37	2	5.2		0.37	2	16		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	93	B,L,m	0.088	0.4	17	B,L,m	0.088	0.4	16	B,L,m	0.044	0.2	15	,L,m	0.044	0.2	110	,L,m	0.22	1	16	,L,m	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	24,000		0.48	10	67,000		4.8	100	38,000		0.48	10	35,000		0.48	10	29,000		0.48	10	51,000		4.8	100
Lead[2]	7439-92-1	--	26.8	400	750	--	200		0.22	2	23		0.022	0.2	23		0.022	0.2	5.4		0.022	0.2	680		0.9	8	21		0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	1,400		5	50	920		5	50	930		5	50	1,200		5	50	1,600		5	50	880		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	670		0.16	1	***7,700***		0.16	1	***1,900***		0.16	1	910		0.16	1	170		0.16	1	***2,800***		0.16	1
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.16		0.0075	0.05	0.067		0.0075	0.05	0.066		0.0075	0.05	0.015	J	0.0075	0.05	0.17		0.0075	0.05	0.17		0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	11	,J,s	0.036	0.1	9.3	,J,s	0.071	0.2	15	,J,s	0.036	0.1	17	,J,s	0.036	0.1	14	,J,s	0.036	0.1	10	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,200		5.3	50	1,100		5.3	50	920		5.3	50	1,300		5.3	50	1,000		5.3	50	960		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.89	,L,m	0.089	0.3	0.26	J,L,m	0.18	0.6	0.33	,L,m	0.089	0.3	0.34	,L,m	0.089	0.3	0.62	,L,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.1	J	0.013	0.1	0.056	J	0.013	0.1	0.058	J	0.013	0.1	0.058	J	0.013	0.1	0.2		0.013	0.1	0.033	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	160		13	100	220		13	100	910		13	100	870		13	100	250		13	100	190		13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.25		0.0049	0.1	0.77		0.0049	0.1	0.24		0.0049	0.1	0.1		0.0049	0.1	0.34		0.0049	0.1	0.34		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	310	,L,m	0.34	1	32	,L,m	0.069	0.2	37	,L,m	0.034	0.1	23	,L,m	0.034	0.1	***1,200***	,L,m	1.4	4	39	,L,m	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	1,700		1	5	50		1	5	130		1	5	27		1	5	3,700		1	5	82		1	5
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	<12	U	1.6	12	<4.3	U	0.6	4.3	*13*	,J,g	0.66	4.7	<4.5	U	0.63	4.5	<8.8	U	1.2	8.8	<4.6	U	0.64	4.6
Endosulfan II[4]	33213-65-9	N	--	4.7E+04	6.1E+05	--	140	,J,g	3	12	<4.3	U	1.1	4.3	<4.7	U	1.2	4.7	<4.5	U	1.2	4.5	<8.8	U	2.3	8.8	<4.6	U	1.2	4.6
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	<12	U	1.9	12	<4.3	U	0.69	4.3	6.2		0.77	4.7	<4.5	U	0.73	4.5	<8.8	U	1.4	8.8	<4.6	U	0.75	4.6
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	<5.9	U	1.4	5.9	<2.2	U	0.54	2.2	<2.4	U	0.59	2.4	<2.3	U	0.56	2.3	<4.5	U	1.1	4.5	<2.4	U	0.58	2.4
Aroclor 1254[5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	***2,000***		31	230	<43	U	5.7	43	550		6.3	47	<45	U	6	45	420		12	88	<46	U	6.1	46
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	2,000		110	470	<87	U	21	87	390		23	96	<91	U	22	91	210		43	180	<93	U	22	93
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<70	U	8.4	70	<26	U	3.1	26	<29	U	3.5	29	<27	U	3.3	27	17	J	6.5	54	<28	U	3.4	28
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	190	,J,c	15	70	76	,J,c	5.5	26	220	,J,c	6.1	29	97		5.7	27	140	,J,c	11	54	130	,J,c	5.9	28
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<17	U	0.45	17	<6.5	U	0.17	6.5	<7.2	U	0.18	7.2	<6.8	U	0.17	6.8	<13	U	0.34	13	<7	U	0.18	7
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	<17	U	0.87	17	<6.5	U	0.32	6.5	<7.2	U	0.35	7.2	<6.8	U	0.34	6.8	<13	U	0.66	13	<7	U	0.35	7
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	4.7	J,J,c	0.92	17	0.54	J,J,c	0.34	6.5	0.76	J,J,c	0.38	7.2	<6.8	U	0.36	6.8	3.6	J,J,c	0.7	13	3	J,J,c	0.37	7
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<17	U	0.51	17	<6.5	U	0.19	6.5	<7.2	U	0.21	7.2	<6.8	U	0.2	6.8	<13	U	0.39	13	<7	U	0.21	7
Chloromethane	74-87-3	--	--	--	--	9.3E+02	<17	U	0.85	17	<6.5	U	0.31	6.5	<7.2	U	0.35	7.2	<6.8	U	0.33	6.8	<13	U	0.65	13	<7	U	0.34	7
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<17	U	0.44	17	<6.5	U	0.16	6.5	<7.2	U	0.18	7.2	<6.8	U	0.17	6.8	<13	U	0.33	13	<7	U	0.17	7
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	19	J	2.9	70	2.7	J	1.1	26	9.9	J	1.2	29	2	J	1.1	27	32	J	2.2	54	4.4	J	1.2	28
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<70	U	14	70	<26	U	5.1	26	<29	U	5.6	29	<27	U	5.4	27	<54	U	11	54	<28	U	5.5	28
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	<17	U	1.5	17	<6.5	U	0.57	6.5	<7.2	U	0.63	7.2	<6.8	U	0.6	6.8	<13	U	1.2	13	<7	U	0.62	7
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<17	U	1.4	17	<6.5	U	0.52	6.5	<7.2	U	0.58	7.2	<6.8	U	0.55	6.8	<13	U	1.1	13	<7	U	0.56	7
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<17	U	2	17	<6.5	U	0.72	6.5	<7.2	U	0.8	7.2	<6.8	U	0.76	6.8	<13	U	1.5	13	<7	U	0.78	7
Xylenes (total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<17	U	2	17	<6.5	U	0.76	6.5	<7.2	U	0.84	7.2	<6.8	U	0.79	6.8	6.2	J	1.6	13	<7	U	0.82	7
VOC TICs (ug/kg)																														
Hexanal	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
TCL SVOCs (ug/kg)																														
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	<590	U	1.6	590	<220	U	0.59	220	<240	U	0.66	240	<230	U	0.62	230	<450	U	1.2	450	<240	U	0.64	240
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	8.1	J	1.7	590	<220	U	0.62	220	1.4	J	0.68	240	0.9	J	0.65	230	2.7	J	1.3	450	<240	U	0.67	240
4-Chloro-3-Methylphenol[6]	59-50-7	N	--	3.9E+05	5.1E+06	--	<590	U	6.2	590	<220	U	2.3	220	<240	U	2.6	240	<230	U	2.4	230	<450	U	4.8	450	<240	U	2.5	240
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	12	J	1.4	59	<22	U	0.52	22	<24	U	0.57	24	<23	U	0.54	23	1.8	J	1.1	45	0.93	J	0.56	24
Acenaphthylene[7]	208-96-8	N	--	2.3E+05	3.1E+06	--	<59	U	2.1	59	<22	U	0.78	22	<24	U	0.86	24	<23	U	0.81	23	<45	U	1.6	45	<24	U	0.84	24
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	<590	U	23	590	<220	U	8.7	220	<240	U	9.6	240	<230	U	9.1	230	<450	U	18	450	<240	U	9.4	240
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	20	J	1.5	59	<22	U	0.55	22	<24	U	0.61	24	<23	U	0.58	23	<45	U	1.1	45	<24	U	0.59	24
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	42	J	1.9	59	0.86	J	0.69	22	1.4	J	0.77	24	<23	U	0.73	23	4.5	J	1.4	45	<24	U	0.75	24
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	31	J	3.6	59	<22	U	1.3	22	<24	U	1.5	24	<23	U	1.4	23	8.9	J	2.8	45	<24	U	1.4	24
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	51	J	3	59	<22	U	1.1	22	<24	U	1.2	24	<23	U	1.2	23	7.1	J	2.3	45	<24	U	1.2	24
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	15	J	8	230	<87	U	3	87	<96	U	3.3	96	<91	U	3.1	91	8	J	6.1	180	<93	U	3.2	93
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	19	J	2.5	59	<22	U	0.93	22	<24	U	1	24	<23	U	0.97	23	7.1	J	1.9	45	<24	U	1	24
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	560	J	4.5	590	47	J	1.7	220	77	J	1.9	240	62	J	1.8	230	540		3.5	450	31	J	1.8	240
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	<590	U	7.3	590	<220	U	2.7	220	4.8	J	3	240	<230	U	2.9	230	<450	U	5.6	450	4.6	J	2.9	240
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	<1,200	U	80	1200	<430	U	30	430	<470	U	33	470	<450	U	31	450	<880	U	61	880	<460	U	32	460
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	40	J	1.7	59	0.86	J	0.62	22	0.95	J	0.68	24	<23	U	0.65	23	8.9	J	1.3	45	<24	U	0.66	24
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	51	J	4.2	590	19	J	1.6	220	14	J	1.7	240	9	J,B,z	1.6	230	15	J	3.2	450	18	J	1.7	240
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	3.5	J	1.9	230	<87	U	0.69	87	<96	U	0.77	96	<91	U	0.73	91	2.7	J	1.4	180	<93	U	0.75	93
Dibenzofuran	132-64-9	N	--	7.8E+03	1.0E+05	--	5.8	J	0.92	590	<220	U	0.34	220	<240	U	0.38	240	<230	U	0.36	230	<450	U	0.7	450	<240	U	0.37	240
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	<590	U	1.3	590	1.7	J	0.48	220	2.4	J	0.53	240	0.9	J	0.5	230	3.6	J	1	450	0.93	J	0.52	240
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	99		13	59	<22	U	4.9	22	<24	U	5.4	24	<23	U	5.1	23	12	J	10	45	<24	U	5.2	24
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	10	J	0.98	59	<22	U	0.36	22	<24	U	0.4	24	<23	U	0.38	23	<45	U	0.75	45	<24	U	0.39	24
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	19	J	2.4	230	<87	U	0.9	87	<96	U	1	96	<91	U	0.95	91	2.7	J	1.9	180	<93	U	0.98	93
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	7	J	0.81	59	0.43	J	0.3	22	0.95	J	0.33	24	0.45	J	0.32	23	2.7	J	0.62	45	0.46	J	0.32	24
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	97		13	59	<22	U	4.7	22	<24	U	5.2	24	<23	U	4.9	23	<45	U	9.7	45	<24	U	5	24
Phenol	108-95-2	N	--	2.3E+06	3.1E+07	6.7E+04	<590	U	2.4	590	<220	U	0.9	220	<240	U	1	240	<230	U	0.95	230	<450	U	1.9	450	<240	U	0.98	240

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID							57SB6A				57SB6AB				57SB6B				57SB6C				57SB7A				57SB7AB			
Sample Date			Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	1/10/2008		MDL	RL	1/10/2008		MDL	RL	1/10/2008		MDL	RL	1/10/2008		MDL	RL	1/11/2008		MDL	RL	1/11/2008		MDL	RL
Sample Depth (ft bgs)	CAS #	C/N					0-1				1.7-4				6-9				13-15.5				0-1				2-5			
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	81		1.1	59	0.43	J	0.41	22	1.9	J	0.45	24	<23	U	0.43	23	18	J	0.85	45	<24	U	0.44	24
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Heptadecanol	1454-85-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Hexadecanol	36653-82-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Octadecanol	112-92-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, 4-(1,1-dimethylpropyl)-	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Stearic Acid	57-11-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	29		0.1	0.1	77		0.1	0.1	70		0.1	0.1	74		0.1	0.1	37		0.1	0.1	72		0.1	0.1
Total Organic Carbon (%)																														
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB7B 1/11/2008 6-9		MDL	RL	57SB7C 1/11/2008 14-16		MDL	RL	57SB8A 1/14/2008 0-1		MDL	RL	57SB8AB 1/14/2008 1.2-4		MDL	RL	57SB8B 1/14/2008 6-8		MDL	RL	57SB8C 1/14/2008 13-15		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	20,000	,J,s	2.1	10	28,000	,J,s	2.1	10	26,000	,J,s	2.1	10	22,000	,J,s	210	1,000	25,000	,J,s	2.1	10	25,000	,J,s	2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.34		0.042	0.2	0.28		0.042	0.2	*15*		0.042	0.2	0.21		0.042	0.2	*14*		0.042	0.2	1.2		0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	*3.9*	,L,m	0.071	0.2	*4.3*	,L,m	0.071	0.2	*2.7*	,L,m	0.071	0.2	*1.4*	,L,m	0.071	0.2	*1.5*	,L,m	0.071	0.2	*1.5*	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	53		0.17	1	52		0.17	1	130		0.17	1	72		0.17	1	230		0.17	1	87		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	1.2		0.021	1	1.1		0.021	1	2.2		0.021	1	2.1		0.021	1	1.9		0.021	1	2.6		0.021	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.45	<2	U	0.11	2	<2	U	0.11	2	1.8	J	0.11	2	<2	U	0.11	2	1.1	J	0.11	2	<2	U	0.11	2
Calcium	7440-70-2	--	--	--	--	--	350		4.2	50	190		4.2	50	760		4.2	50	57		4.2	50	180		4.2	50	94		4.2	50
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42,048	23		0.72	5	*50*		0.72	5	37		0.72	5	22		0.72	5	37		0.72	5	29		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	12		0.37	2	11		0.37	2	18		0.37	2	16		0.37	2	30		0.37	2	19		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	10	,L,m	0.044	0.2	22	,L,m	0.044	0.2	12	,L,m	0.044	0.2	12	,L,m	0.044	0.2	14	,L,m	0.044	0.2	12	,L,m	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	68,000		4.8	100	35,000		0.48	10	65,000		4.8	100	67,000		480	10,000	55,000		480	10,000	74,000		4.8	100
Lead[2]	7439-92-1	--	26.8	400	750	--	11		0.022	0.2	11		0.022	0.2	20		0.022	0.2	19		0.022	0.2	25		0.022	0.2	20		0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	510		5	50	2,900		5	50	710		5	50	630		5	50	1,000		5	50	600		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	*1,200*		0.16	1	280		0.16	1	*4,400*		0.16	1	*3,400*		16	100	*6,000*		0.16	1	*3,200*		0.16	1
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.062		0.0075	0.05	0.014	J	0.0075	0.05	0.066		0.0075	0.05	0.048	J	0.0075	0.05	0.058		0.0075	0.05	0.041	J	0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	9.1	,J,s	0.036	0.1	18	,J,s	0.036	0.1	6.3	,J,s	0.036	0.1	6.8	,J,s	0.036	0.1	9.8	,J,s	0.036	0.1	7.3	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	730		5.3	50	1,900		5.3	50	900		5.3	50	920		5.3	50	1,300		5.3	50	890		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	<0.3	U,UL,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	0.11	J,L,m	0.089	0.3	0.14	J,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.014	J	0.013	0.1	0.041	J	0.013	0.1	0.023	J	0.013	0.1	0.029	J	0.013	0.1	0.031	J	0.013	0.1	0.029	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	310		13	100	190		13	100	520		13	100	1,100		66	500	880		13	100	970		13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.14		0.0049	0.1	0.19		0.0049	0.1	0.3		0.0049	0.1	0.22		0.0049	0.1	0.37		0.0049	0.1	0.26		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	20	,L,m	0.034	0.1	40	,L,m	0.034	0.1	30	,L,m	0.034	0.1	19	,L,m	0.034	0.1	29	,L,m	0.034	0.1	22	,L,m	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	26		1	5	25		1	5	150		1	5	33		1	5	97		1	5	40		1	5
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	<4.1	U	0.57	4.1	<4.8	U	0.67	4.8	*5.4*	,J,g	0.65	4.6	2.7	J,J,g	0.59	4.3	1.6	J,J,g	0.62	4.5	<4.5	U	0.63	4.5
Endosulfan II[4]	33213-65-9	N	--	4.7E+04	6.1E+05	--	<4.1	U	1.1	4.1	<4.8	U	1.2	4.8	<4.6	U	1.2	4.6	<4.3	U	1.1	4.3	<4.5	U	1.2	4.5	<4.5	U	1.2	4.5
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	<4.1	U	0.67	4.1	<4.8	U	0.77	4.8	2.7	J	0.75	4.6	<4.3	U	0.69	4.3	<4.5	U	0.72	4.5	<4.5	U	0.73	4.5
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	<2.1	U	0.51	2.1	<2.5	U	0.6	2.5	<2.4	U	0.58	2.4	<2.2	U	0.53	2.2	<2.3	U	0.56	2.3	<2.3	U	0.56	2.3
Aroclor 1254[5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	<41	U	5.5	41	<48	U	6.4	48	290		6.2	46	230		5.7	43	79	J,g	5.9	45	31	J	6	45
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	<83	U	20	83	<97	U	23	97	140		22	94	<86	U	21	86	60	J	21	91	<91	U	22	91
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<25	U	3	25	<29	U	3.5	29	<28	U	3.4	28	<26	U	3.1	26	<27	U	3.3	27	<27	U	3.3	27
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	200	,J,c	5.3	25	12	J,J,c	6.1	29	34		5.9	28	190	,J,m	5.5	26	230		5.7	27	130		5.8	27
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<6.2	U	0.16	6.2	<7.2	U	0.18	7.2	<7	U	0.18	7	<6.4	U	0.17	6.4	<6.8	U	0.17	6.8	<6.8	U	0.17	6.8
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	<6.2	U	0.31	6.2	<7.2	U	0.36	7.2	<7	U	0.35	7	<6.4	U	0.32	6.4	<6.8	U	0.34	6.8	<6.8	U	0.34	6.8
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	<6.2	U	0.33	6.2	<7.2	U	0.38	7.2	0.64	J,J,c	0.37	7	<6.4	U	0.34	6.4	2.7	J,J,c	0.36	6.8	0.72	J,J,c	0.36	6.8
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<6.2	U	0.18	6.2	<7.2	U	0.21	7.2	<7	U	0.21	7	<6.4	U	0.19	6.4	<6.8	U	0.2	6.8	<6.8	U	0.2	6.8
Chloromethane	74-87-3	--	--	--	--	9.3E+02	<6.2	U	0.3	6.2	<7.2	U	0.35	7.2	<7	U	0.34	7	<6.4	U	0.31	6.4	<6.8	U	0.33	6.8	<6.8	U	0.33	6.8
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<6.2	U	0.16	6.2	<7.2	U	0.18	7.2	<7	U	0.18	7	<6.4	U	0.16	6.4	<6.8	U	0.17	6.8	<6.8	U	0.17	6.8
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	9.3	J	1	25	<29	U	1.2	29	8	J	1.2	28	3.5	J,J,m	1.1	26	33		1.1	27	6.1	J	1.1	27
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<25	U	4.9	25	<29	U	5.7	29	<28	U	5.5	28	<26	U	5.1	26	<27	U	5.3	27	<27	U	5.4	27
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	<6.2	U	0.55	6.2	<7.2	U	0.64	7.2	<7	U	0.62	7	<6.4	U	0.57	6.4	<6.8	U	0.6	6.8	<6.8	U	0.6	6.8
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<6.2	U	0.5	6.2	<7.2	U	0.58	7.2	<7	U	0.56	7	<6.4	U	0.52	6.4	<6.8	U	0.54	6.8	<6.8	U	0.55	6.8
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<6.2	U	0.7	6.2	<7.2	U	0.81	7.2	<7	U	0.79	7	<6.4	U	0.72	6.4	<6.8	U	0.76	6.8	<6.8	U	0.76	6.8
Xylenes (total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<6.2	U	0.73	6.2	<7.2	U	0.84	7.2	<7	U	0.82	7	<6.4	U	0.75	6.4	<6.8	U	0.79	6.8	<6.8	U	0.8	6.8
VOC TICs (ug/kg)																														
Hexanal	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
TCL SVOCs (ug/kg)																														
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	<210	U	0.57	210	<250	U	0.66	250	0.93	J	0.64	240	1.3	J	0.59	220	1.4	J	0.62	230	0.91	J	0.62	230
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	<210	U	0.59	210	0.96	J	0.69	250	0.93	J	0.67	240	2.6	J	0.62	220	5.9	J	0.65	230	2.7	J	0.65	230
4-Chloro-3-Methylphenol[6]	59-50-7	N	--	3.9E+05	5.1E+06	--	<210	U	2.2	210	<250	U	2.6	250	<240	U	2.5	240	<220	U	2.3	220	<230	U	2.4	230	<230	U	2.4	230
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	<21	U	0.5	21	<25	U	0.58	25	<24	U	0.56	24	<22	U	0.52	22	<23	U	0.54	23	<23	U	0.54	23
Acenaphthylene[7]	208-96-8	N	--	2.3E+05	3.1E+06	--	<21	U	0.75	21	<25	U	0.87	25	<24	U	0.84	24	<22	U	0.77	22	<23	U	0.81	23	<23	U	0.82	23
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	<210	U	8.4	210	<250	U	9.7	250	<240	U	9.4	240	<220	U	8.7	220	<230	U	9.1	230	<230	U	9.1	230
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<21	U	0.53	21	<25	U	0.62	25	<24	U	0.6	24	<22	U	0.55	22	<23	U	0.58	23	<23	U	0.58	23
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	<21	U	0.67	21	<25	U	0.78	25	2.3	J	0.75	24	<22	U	0.69	22	0.9	J	0.73	23	<23	U	0.73	23
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	<21	U	1.3	21	<25	U	1.5	25	<24	U	1.4	24	2.6	J	1.3	22	<23	U	1.4	23	1.8	J	1.4	23
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	<21	U	1.1	21	<25	U	1.2	25	1.9	J	1.2	24	2.1	J	1.1	22	<23	U	1.1	23	<23	U	1.2	23
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	<83	U	2.8	83	<97	U	3.3	97	<94	U	3.2	94	<86	U	3	86	<91	U	3.1	91	<91	U	3.1	91
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<21	U	0.89	21	<25	U	1	25	<24	U	1	24	<22	U	0.92	22	<23	U	0.97	23	<23	U	0.97	23
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	17	J	1.6	210	23	J	1.9	250	130	J	1.8	240	35	J	1.7	220	560		1.8	230	170	J	1.8	230
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	<210	U	2.6	210	5.3	J	3	250	<240	U	2.9	240	<220	U	2.7	220	<230	U	2.8	230	<230	U	2.9	230
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	<410	U	28	410	<480	U	33	480	<460	U	32	460	<430	U	30	430	<450	U	31	450	<450	U	31	450
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	<21	U	0.59	21	<25	U	0.69	25	<24	U	0.67	24	<22	U	0.61	22	0.9	J	0.64	23	<23	U	0.65	23
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	9.1	J,B,z	1.5	210	17	J	1.7	250	20	J	1.7	240	16	J	1.5	220	9	J,B,z	1.6	230	19	J	1.6	230
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	<83	U	0.67	83	<97	U	0.78	97	<94	U	0.75	94	<86	U	0.69	86	<91	U	0.73	91	<91	U	0.73	91
Dibenzofuran	132-64-9	N	--	7.8E+03	1.0E+05	--	<210	U	0.33	210	<250	U	0.38	250	<240	U	0.37	240	<220	U	0.34	220	<230	U	0.36	230	<230	U	0.36	230
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	<210	U	0.46	210	<250	U	0.54	250	7.9	J	0.52	240	4.7	J	0.48	220	3.6	J	0.5	230	7.3	J	0.51	230
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	<21	U	4.7	21	<25	U	5.4	25	<24	U	5.3	24	<22	U	4.8	22	<23	U	5.1	23	<23	U	5.1	23
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	<21	U	0.35	21	<25	U	0.4	25	4.7	J	0.39	24	3.9	J	0.36	22	5	J	0.38	23	4.1	J	0.38	23
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	<83	U	0.87	83	<97	U	1	97	<94	U	0.98	94	<86	U	0.9	86	<91	U	0.95	91	<91	U	0.95	91
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	0.41	J	0.29	21	0.48	J	0.34	25	0.47	J	0.33	24	0.43	J	0.3	22	0.9	J	0.31	23	0.45	J	0.32	23
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	<21	U	4.5	21	<25	U	5.2	25	<24	U	5.1	24	<22	U	4.7	22	<23	U	4.9	23	<23	U	4.9	23
Phenol	108-95-2	N	--	2.3E+06	3.1E+07	6.7E+04	<210	U	0.87	210	<250	U	1	250	1.4	J	0.98	240	2.1	J	0.9	220	<230	U	0.95	230	2.3	J	0.95	230

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID							57SB7B				57SB7C				57SB8A				57SB8AB				57SB8B				57SB8C			
Sample Date							1/11/2008				1/11/2008				1/14/2008				1/14/2008				1/14/2008				1/14/2008			
Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	6-9		MDL	RL	14-16		MDL	RL	0-1		MDL	RL	1.2-4		MDL	RL	6-8		MDL	RL	13-15		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	<21	U	0.39	21	<25	U	0.46	25	2.3	J	0.44	24	<22	U	0.41	22	0.9	J	0.43	23	<23	U	0.43	23
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Heptadecanol	1454-85-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Hexadecanol	36653-82-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Octadecanol	112-92-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, 4-(1,1-dimethylpropyl)-	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Stearic Acid	57-11-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	80		0.1	0.1	69		0.1	0.1	71		0.1	0.1	78		0.1	0.1	74		0.1	0.1	74		0.1	0.1
Total Organic Carbon (%)																														
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB9A 1/10/2008 0-1		MDL	RL	57SB9AB 1/10/2008 10-12		MDL	RL	57SB10A 1/8/2008 0-1		MDL	RL	57SB10B 1/8/2008 10-12		MDL	RL	57SB10C 1/8/2008 34-36		MDL	RL	57SB11A 1/9/2008 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	18,000	,J,s	2.1	10	26,000	,J,s	2.1	10	19,000		2.1	10	30,000		2.1	10	17,000		210	1,000	21,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.4		0.042	0.2	0.071	J	0.042	0.2	0.34		0.042	0.2	0.23		0.042	0.2	0.057	J	0.042	0.2	0.19	J	0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	*2.1*	,L,m	0.071	0.2	*1.5*	,L,m	0.071	0.2	*1.2*	,L,m	0.071	0.2	*5.4*	,L,m	0.071	0.2	*2.7*	,L,m	0.071	0.2	*0.77*	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	95		0.17	1	48		0.17	1	91		0.17	1	100		0.17	1	21		0.17	1	57	,J,f	0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.86	J	0.021	1	1.1		0.021	1	0.42	J	0.021	1	1.6		0.021	1	2		0.021	1	0.4	J	0.021	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.45	0.16	J,B,p	0.11	2	<2	U	0.11	2	0.62	J	0.11	2	<2	U	0.11	2	0.13	J	0.11	2	<2	U	0.11	2
Calcium	7440-70-2	--	--	--	--	--	2,300		4.2	50	68		4.2	50	780		4.2	50	150		4.2	50	520		4.2	50	1,200		4.2	50
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.048	23		0.72	5	26		0.72	5	21		0.72	5	40		0.72	5	21		0.72	5	26		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	5.8		0.37	2	3.3		0.37	2	3.1		0.37	2	33		0.37	2	11		0.37	2	1.5	J	0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	21	B,L,m	0.044	0.2	12	B,L,m	0.044	0.2	7.9	,J,s	0.044	0.2	19	,J,s	0.044	0.2	22	,J,s	0.044	0.2	7.7	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	19,000		0.48	10	36,000		0.48	10	7,100		0.48	10	47,000		4.8	100	34,000		240	5,000	8,300		0.48	10
Lead[2]	7439-92-1	--	26.8	400	750	--	20		0.022	0.2	14		0.022	0.2	16		0.022	0.2	10		0.022	0.2	3.4		0.022	0.2	11		0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	1,700		5	50	1,100		5	50	970		5	50	1,600		5	50	1,300		5	50	1,000		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	630		0.16	1	140		0.16	1	350	,K,m	0.16	1	*3,900*	,K,m	0.16	1	190	,K,m	0.16	1	60	,K,m	0.16	1
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.76		0.0075	0.05	0.034	J	0.0075	0.05	0.046	J	0.0075	0.05	0.05		0.0075	0.05	0.024	J	0.0075	0.05	0.067		0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	6.9	,J,s	0.036	0.1	8.9	,J,s	0.036	0.1	6.2	,J,s	0.036	0.1	15	,J,s	0.036	0.1	18	,J,s	0.036	0.1	6.7	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	740		5.3	50	1,100		5.3	50	820		5.3	50	1,500		5.3	50	2,300		5.3	50	740		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.35	,L,m	0.089	0.3	0.26	J,L,m	0.089	0.3	0.17	J,L,m	0.089	0.3	0.33	,L,m	0.089	0.3	0.3	J,L,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.054	J	0.013	0.1	0.037	J	0.013	0.1	0.065	J	0.013	0.1	0.066	J	0.013	0.1	0.045	J	0.013	0.1	0.039	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	50	J,B,p	13	100	59	J,B,p	13	100	63	J,B,p	13	100	130		13	100	65	J,B,p	13	100	78	J,B,p	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.21		0.0049	0.1	0.2		0.0049	0.1	0.24		0.0049	0.1	0.22		0.0049	0.1	0.055	J	0.0049	0.1	0.22		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	21	,L,m	0.034	0.1	25	,L,m	0.034	0.1	20	,K,m	0.034	0.1	33	,K,m	0.034	0.1	16	,K,m	0.034	0.1	26	,K,m	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	38		1	5	38		1	5	34	,K,m	1	5	37	,K,m	1	5	31	,K,m	1	5	27	,K,m	1	5
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	NT				NT				NT				NT				NT				NT			
Endosulfan II[4]	33213-65-9	N	--	4.7E+04	6.1E+05	--	NT				NT				NT				NT				NT				NT			
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				NT				NT				NT				NT				NT			
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	NT				NT				NT				NT				NT				NT			
Aroclor 1254[5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	NT				NT				NT				NT				NT				NT			
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	NT				NT				NT				NT				NT				NT			
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<2,900	U	19	2900	<25	U	3	25	<24	U	2.9	24	<28	U	3.4	28	<26	U	3.1	26	9.2	J,L,h	2.9	24
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	140	J	70	870	12	J,J,c	5.3	25	39	,J,c	5.1	24	20	J,J,c	6	28	<26	U	5.5	26	64	,L,h	5	24
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<58	U	6.9	58	<6.3	U	0.16	6.3	<6.1	U	0.16	6.1	<7.1	U	0.18	7.1	<6.5	U	0.17	6.5	<6	U,UL,h	0.15	6
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	<58	U	11	58	<6.3	U	0.31	6.3	<6.1	U	0.3	6.1	<7.1	U	0.35	7.1	<6.5	U	0.32	6.5	<6	U,UL,h	0.3	6
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	<290	U	17	290	<6.3	U	0.33	6.3	<6.1	U	0.32	6.1	<7.1	U	0.37	7.1	<6.5	U	0.34	6.5	<6	U,UL,h	0.31	6
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<58	U	3.6	58	<6.3	U	0.18	6.3	<6.1	U	0.18	6.1	<7.1	U	0.21	7.1	0.23	J	0.19	6.5	<6	U,UL,h	0.17	6
Chloromethane	74-87-3	--	--	--	--	9.3E+02	19	J	3.5	58	<6.3	U	0.3	6.3	<6.1	U	0.29	6.1	<7.1	U	0.35	7.1	<6.5	U	0.32	6.5	<6	U,UL,h	0.29	6
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<58	U	7.7	58	<6.3	U	0.16	6.3	<6.1	U	0.15	6.1	<7.1	U	0.18	7.1	<6.5	U	0.16	6.5	<6	U,UL,h	0.15	6
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	<290	U	9.7	290	2.2	J	1	25	4.7	J	1	24	<28	U	1.2	28	<26	U	1.1	26	4.6	J,L,h	0.99	24
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	19	J,B,z	9.3	290	<25	U	4.9	25	<24	U	4.8	24	<28	U	5.6	28	<26	U	5.1	26	<24	U,UL,h	4.7	24
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	<58	U	8.7	58	<6.3	U	0.55	6.3	<6.1	U	0.54	6.1	<7.1	U	0.63	7.1	<6.5	U	0.57	6.5	<6	U,UL,h	0.53	6
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<58	U	4.2	58	<6.3	U	0.5	6.3	<6.1	U	0.49	6.1	<7.1	U	0.57	7.1	<6.5	U	0.52	6.5	<6	U,UL,h	0.48	6
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<58	U	9.9	58	<6.3	U	0.7	6.3	<6.1	U	0.68	6.1	<7.1	U	0.8	7.1	<6.5	U	0.73	6.5	<6	U,UL,h	0.67	6
Xylenes (total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<170	U	21	170	<6.3	U	0.73	6.3	<6.1	U	0.71	6.1	<7.1	U	0.83	7.1	<6.5	U	0.76	6.5	<6	U,UL,h	0.7	6
VOC TICs (ug/kg)																														
Hexanal	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
TCL SVOCs (ug/kg)																														
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	NT				NT				NT				NT				NT				NT			
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	NT				NT				NT				NT				NT				NT			
4-Chloro-3-Methylphenol[6]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				NT				NT				NT				NT				NT			
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	NT				NT				NT				NT				NT				NT			
Acenaphthylene[7]	208-96-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	NT				NT				NT				NT				NT				NT			
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				NT				NT				NT				NT				NT			
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	NT				NT				NT				NT				NT				NT			
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				NT				NT				NT				NT				NT			
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	NT				NT				NT				NT				NT				NT			
Dibenzofuran	132-64-9	N	--	7.8E+03	1.0E+05	--	NT				NT				NT				NT				NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	NT				NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Phenol	108-95-2	N	--	2.3E+06	3.1E+07	6.7E+04	NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB9A 1/10/2008 0-1		MDL	RL	57SB9AB 1/10/2008 10-12		MDL	RL	57SB10A 1/8/2008 0-1		MDL	RL	57SB10B 1/8/2008 10-12		MDL	RL	57SB10C 1/8/2008 34-36		MDL	RL	57SB11A 1/9/2008 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Heptadecanol	1454-85-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Hexadecanol	36653-82-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Octadecanol	112-92-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, 4-(1,1-dimethylpropyl)-	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Stearic Acid	57-11-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	86		0.1	0.1	80		0.1	0.1	83		0.1	0.1	70		0.1	0.1	77		0.1	0.1	84		0.1	0.1
Total Organic Carbon (%)																														
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			

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Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB11A-DUP(DUP-2) 1/9/2008 0-1		MDL	RL	57SB11B 1/9/2008 10-12		MDL	RL	57SB11C 1/9/2008 34-36		MDL	RL	57SB12A 1/9/2008 0-1		MDL	RL	57SB12B 1/9/2008 10-12		MDL	RL	57SB12C 1/9/2008 34-36		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	28,000		2.1	10	22,000		2.1	10	25,000		2.1	10	24,000		210	1,000	23,000		2.1	10	23,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.42		0.042	0.2	0.15	J	0.042	0.2	0.22		0.042	0.2	0.54		0.042	0.2	0.096	J	0.042	0.2	0.25		0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	*1.3*	,L,m	0.071	0.2	*1.1*	,L,m	0.071	0.2	*2.6*	,L,m	0.071	0.2	*3.4*	,L,m	0.071	0.2	*0.82*	,L,m	0.071	0.2	*6.1*	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	96	,J,f	0.17	1	68		0.17	1	66		0.17	1	51		0.17	1	59		0.17	1	81		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.59	J	0.021	1	0.49	J	0.021	1	2.2		0.021	1	0.65	J	0.021	1	0.82	J	0.021	1	2.4		0.021	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.45	0.18	J,B,p	0.11	2	<2	U	0.11	2	0.13	J,B,p	0.11	2	<2	U	0.11	2	<2	U	0.11	2	0.4	J,B,p	0.11	2
Calcium	7440-70-2	--	--	--	--	--	1,600		4.2	50	66		4.2	50	300		4.2	50	850		4.2	50	140		4.2	50	300		4.2	50
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42,048	31		0.72	5	18		0.72	5	*52*		0.72	5	33		0.72	5	15		0.72	5	33		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	2.1		0.37	2	5.4		0.37	2	12		0.37	2	7		0.37	2	7.3		0.37	2	16		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	10	,J,s	0.044	0.2	9.7	,J,s	0.044	0.2	29	,J,s	0.044	0.2	8.9	,J,s	0.044	0.2	10	,J,s	0.044	0.2	33	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	12,000		0.48	10	11,000		0.48	10	42,000		0.48	10	27,000		240	5,000	29,000		0.48	10	32,000		0.48	10
Lead[2]	7439-92-1	--	26.8	400	750	--	15		0.022	0.2	16		0.022	0.2	16		0.022	0.2	18		0.022	0.2	11		0.022	0.2	12		0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	1,400		5	50	610		5	50	4,700		5	50	960		5	50	810		5	50	6,600		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	110	,K,m	0.16	1	79	,K,m	0.16	1	580	,K,m	0.16	1	240	,K,m	0.16	1	780	,K,m	0.16	1	*1,400*	,K,m	0.16	1
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.07		0.0075	0.05	0.087		0.0075	0.05	<0.05	U	0.0075	0.05	0.17		0.0075	0.05	0.032	J	0.0075	0.05	0.019	J	0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	7.8	,J,s	0.036	0.1	6.2	,J,s	0.036	0.1	23	,J,s	0.036	0.1	5.5	,J,s	0.036	0.1	6.8	,J,s	0.036	0.1	33	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,100		5.3	50	650		5.3	50	3,200		5.3	50	890		5.3	50	1,000		5.3	50	3,700		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	<0.3	U,UL,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.071	J	0.013	0.1	0.054	J	0.013	0.1	0.077	J	0.013	0.1	0.033	J	0.013	0.1	0.014	J	0.013	0.1	0.079	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	80	J,B,p	13	100	81	J	13	100	84	J	13	100	67	J,B,p	13	100	56	J,B,p	13	100	69	J,B,p	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.28		0.0049	0.1	0.23		0.0049	0.1	0.26		0.0049	0.1	0.25		0.0049	0.1	0.14		0.0049	0.1	0.24		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	29	,K,m	0.034	0.1	19	,K,m	0.034	0.1	46	,K,m	0.034	0.1	28	,K,m	0.034	0.1	17	,K,m	0.034	0.1	29	,K,m	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	41	,K,m	1	5	31	,K,m	1	5	47	,K,m	1	5	40	,K,m	1	5	32	,K,m	1	5	58	,K,m	1	5
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	NT				NT				NT				NT				NT				NT			
Endosulfan II[4]	33213-65-9	N	--	4.7E+04	6.1E+05	--	NT				NT				NT				NT				NT				NT			
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				NT				NT				NT				NT				NT			
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	NT				NT				NT				NT				NT				NT			
Aroclor 1254[5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	NT				NT				NT				NT				NT				NT			
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	NT				NT				NT				NT				NT				NT			
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<24	U,UL,h	2.9	24	<24	U,UL,h	2.9	24	<26	U	3.2	26	6.4	J,J,d	2.9	24	<24	U	2.9	24	19	J	3.1	26
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	87	,L,h	5.1	24	<24	U,UL,h	5.1	24	<26	U,UJ,c	5.6	26	70	,J,c	5	24	13	J,J,c	5	24	160	,J,c	5.5	26
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	0.4	J,L,h	0.15	6	<6	U,UL,h	0.15	6	<6.6	U	0.17	6.6	<6	U	0.15	6	<5.9	U	0.15	5.9	<6.5	U	0.17	6.5
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	<6	U,UL,h	0.3	6	<6	U,UL,h	0.3	6	<6.6	U	0.33	6.6	<6	U	0.3	6	<5.9	U	0.29	5.9	<6.5	U	0.32	6.5
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	<6	U,UL,h	0.32	6	<6	U,UL,h	0.31	6	<6.6	U	0.35	6.6	<6	U	0.31	6	<5.9	U	0.31	5.9	0.61	J	0.34	6.5
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<6	U,UL,h	0.18	6	<6	U,UL,h	0.18	6	<6.6	U	0.19	6.6	<6	U	0.18	6	<5.9	U	0.17	5.9	*1.6*	J	0.19	6.5
Chloromethane	74-87-3	--	--	--	--	9.3E+02	<6	U,UL,h	0.29	6	<6	U,UL,h	0.29	6	<6.6	U	0.32	6.6	<6	U	0.29	6	<5.9	U	0.29	5.9	<6.5	U	0.31	6.5
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<6	U,UL,h	0.15	6	<6	U,UL,h	0.15	6	<6.6	U	0.17	6.6	<6	U	0.15	6	<5.9	U	0.15	5.9	<6.5	U	0.16	6.5
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	3.5	J,L,h	1	24	<24	U,UL,h	1	24	<26	U	1.1	26	16	J,J,m	0.99	24	<24	U	0.99	24	8.2	J	1.1	26
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<24	U,UL,h	4.7	24	<24	U,UL,h	4.7	24	<26	U	5.2	26	<24	U	4.7	24	<24	U	4.7	24	<26	U	5.1	26
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	<6	U,UL,h	0.53	6	<6	U,UL,h	0.53	6	1.8	J	0.58	6.6	<6	U	0.53	6	<5.9	U	0.52	5.9	<6.5	U	0.57	6.5
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<6	U,UL,h	0.48	6	<6	U,UL,h	0.48	6	<6.6	U	0.53	6.6	<6	U	0.48	6	<5.9	U	0.48	5.9	<6.5	U	0.52	6.5
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<6	U,UL,h	0.67	6	<6	U,UL,h	0.67	6	<6.6	U	0.74	6.6	<6	U	0.67	6	<5.9	U	0.67	5.9	<6.5	U	0.73	6.5
Xylenes (total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<6	U,UL,h	0.7	6	<6	U,UL,h	0.7	6	<6.6	U	0.77	6.6	<6	U	0.7	6	<5.9	U	0.69	5.9	<6.5	U	0.76	6.5
VOC TICs (ug/kg)																														
Hexanal	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
TCL SVOCs (ug/kg)																														
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	NT				NT				NT				NT				NT				NT			
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	NT				NT				NT				NT				NT				NT			
4-Chloro-3-Methylphenol[6]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				NT				NT				NT				NT				NT			
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	NT				NT				NT				NT				NT				NT			
Acenaphthylene[7]	208-96-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	NT				NT				NT				NT				NT				NT			
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				NT				NT				NT				NT				NT			
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	NT				NT				NT				NT				NT				NT			
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				NT				NT				NT				NT				NT			
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	NT				NT				NT				NT				NT				NT			
Dibenzofuran	132-64-9	N	--	7.8E+03	1.0E+05	--	NT				NT				NT				NT				NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	NT				NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Phenol	108-95-2	N	--	2.3E+06	3.1E+07	6.7E+04	NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB11A-DUP(DUP-2) 1/9/2008 0-1		MDL	RL	57SB11B 1/9/2008 10-12		MDL	RL	57SB11C 1/9/2008 34-36		MDL	RL	57SB12A 1/9/2008 0-1		MDL	RL	57SB12B 1/9/2008 10-12		MDL	RL	57SB12C 1/9/2008 34-36		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Heptadecanol	1454-85-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Hexadecanol	36653-82-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Octadecanol	112-92-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, 4-(1,1-dimethylpropyl)-	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Stearic Acid	57-11-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	83		0.1	0.1	84		0.1	0.1	76		0.1	0.1	84		0.1	0.1	84		0.1	0.1	77		0.1	0.1
Total Organic Carbon (%)																														
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				0.23		0.047	0.1	NT				NT			

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Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB13A 1/9/2008 0-1		MDL	RL	57SB13A-DUP(DUP-3) 1/9/2008 0-1		MDL	RL	57SB13B 1/9/2008 10-12		MDL	RL	57SB13C 1/9/2008 34-36		MDL	RL	57SB14A 1/10/2008 0-1		MDL	RL	57SB14B 1/10/2008 10-12		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	17,000		2.1	10	19,000		2.1	10	24,000		2.1	10	30,000		2.1	10	12,000	,J,s	210	1,000	28,000	,J,s	2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.47		0.042	0.2	0.46		0.042	0.2	0.27		0.042	0.2	0.57		0.042	0.2	0.93		0.042	0.2	0.11	J	0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***6.6***	,L,m	0.071	0.2	***7.1***	,L,m	0.071	0.2	***1.9***	,L,m	0.071	0.2	***6.1***	,L,m	0.071	0.2	***1.6***	,L,m	0.071	0.2	***1.2***	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	110		0.17	1	130		0.17	1	83		0.17	1	64		0.17	1	110		0.17	1	47		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	2		0.021	1	1.8		0.021	1	1.2		0.021	1	2.8		0.021	1	0.8	J	0.021	1	1.1		0.021	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.45	<2	U	0.11	2	<2	U	0.11	2	<2	U	0.11	2	0.3	J,B,p	0.11	2	0.25	J,B,p	0.11	2	<2	U	0.11	2
Calcium	7440-70-2	--	--	--	--	--	520		4.2	50	590		4.2	50	140		4.2	50	480		4.2	50	500		4.2	50	69		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42,048	33		0.72	5	31		0.72	5	25		0.72	5	41		0.72	5	19		0.72	5	23		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	9.9		0.37	2	10		0.37	2	11		0.37	2	12		0.37	2	5.1		0.37	2	6.9		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	7.2	,J,s	0.044	0.2	6.9	,J,s	0.044	0.2	12	,J,s	0.044	0.2	23	,J,s	0.044	0.2	5.2	B,L,m	0.044	0.2	11	B,L,m	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	44,000		0.48	10	41,000		0.48	10	38,000		0.48	10	37,000		0.48	10	14,000		95	2,000	33,000		0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	22		0.022	0.2	21		0.022	0.2	14		0.022	0.2	11		0.022	0.2	15		0.022	0.2	13		0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	730		5	50	810		5	50	700		5	50	6,100		5	50	650		5	50	1,000		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	***2,100***	,K,m	0.16	1	***2,400***	,K,m	0.16	1	***1,300***	,K,m	0.16	1	290	,K,m	0.16	1	930		1.6	10	260		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.042	J	0.0075	0.05	0.039	J	0.0075	0.05	0.042	J	0.0075	0.05	0.084		0.0075	0.05	0.033	J	0.0075	0.05	0.025	J	0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	8.5	,J,s	0.036	0.1	8.6	,J,s	0.036	0.1	8.5	,J,s	0.036	0.1	28	,J,s	0.036	0.1	5.6	,J,s	0.036	0.1	9.6	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	570		5.3	50	620		5.3	50	910		5.3	50	3,800		5.3	50	550		5.3	50	1,100		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.35	,L,m	0.089	0.3	0.5	,L,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	0.5	,L,m	0.089	0.3	0.27	J,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.051	J	0.013	0.1	0.051	J	0.013	0.1	0.026	J	0.013	0.1	0.072	J	0.013	0.1	0.043	J	0.013	0.1	0.042	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	39	J,B,p	13	100	41	J,B,p	13	100	50	J,B,p	13	100	99	J	13	100	38	J,B,p	13	100	50	J,B,p	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.26		0.0049	0.1	0.25		0.0049	0.1	0.21		0.0049	0.1	0.28		0.0049	0.1	0.17		0.0049	0.1	0.18		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	25	,K,m	0.034	0.1	26	,K,m	0.034	0.1	23	,K,m	0.034	0.1	34	,K,m	0.034	0.1	16	,L,m	0.034	0.1	23	,L,m	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	42	,K,m	1	5	44	,K,m	1	5	37	,K,m	1	5	54	,K,m	1	5	35		1	5	41		1	5
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	NT				NT				NT				NT				NT				NT			
Endosulfan II [4]	33213-65-9	N	--	4.7E+04	6.1E+05	--	NT				NT				NT				NT				NT				NT			
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				NT				NT				NT				NT				NT			
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	NT				NT				NT				NT				NT				NT			
Aroclor 1254 [5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	NT				NT				NT				NT				NT				NT			
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	NT				NT				NT				NT				NT				NT			
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	15	J	2.9	24	17	J	2.9	24	<25	U	3	25	<28	U	3.4	28	22	J	2.8	23	<25	U	3	25
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	150		5.1	24	160		5.1	24	<25	U	5.2	25	39		5.9	28	260	E,J,q	4.9	23	27		5.3	25
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<6	U	0.15	6	<6	U	0.15	6	<6.2	U	0.16	6.2	<6.9	U	0.18	6.9	<5.8	U	0.15	5.8	<6.3	U	0.16	6.3
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	<6	U	0.3	6	<6	U	0.3	6	<6.2	U	0.31	6.2	<6.9	U	0.34	6.9	<5.8	U	0.29	5.8	<6.3	U	0.31	6.3
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	<6	U	0.32	6	<6	U	0.32	6	<6.2	U	0.33	6.2	<6.9	U	0.36	6.9	0.36	J,J,l	0.3	5.8	<6.3	U	0.33	6.3
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<6	U	0.18	6	<6	U	0.18	6	<6.2	U	0.18	6.2	<6.9	U	0.2	6.9	<5.8	U	0.17	5.8	<6.3	U	0.19	6.3
Chloromethane	74-87-3	--	--	--	--	9.3E+02	<6	U	0.29	6	<6	U	0.29	6	<6.2	U	0.3	6.2	<6.9	U	0.34	6.9	<5.8	U	0.28	5.8	<6.3	U	0.31	6.3
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<6	U	0.15	6	<6	U	0.15	6	<6.2	U	0.15	6.2	<6.9	U	0.17	6.9	<5.8	U	0.14	5.8	<6.3	U	0.16	6.3
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	6.9	J	1	24	9.9	J	1	24	<25	U	1	25	1.9	J	1.2	28	22	J,J,m	0.96	23	3.5	J	1	25
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<24	U	4.8	24	<24	U	4.8	24	<25	U	4.9	25	<28	U	5.5	28	4.8	J,B,y	4.6	23	<25	U	5	25
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	<6	U	0.53	6	<6	U	0.53	6	<6.2	U	0.55	6.2	<6.9	U	0.61	6.9	<5.8	U	0.51	5.8	<6.3	U	0.56	6.3
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<6	U	0.48	6	<6	U	0.48	6	<6.2	U	0.5	6.2	<6.9	U	0.56	6.9	<5.8	U	0.47	5.8	<6.3	U	0.51	6.3
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<6	U	0.68	6	<6	U	0.68	6	<6.2	U	0.69	6.2	<6.9	U	0.78	6.9	<5.8	U	0.65	5.8	<6.3	U	0.71	6.3
Xylenes (total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<6	U	0.7	6	<6	U	0.7	6	<6.2	U	0.72	6.2	<6.9	U	0.81	6.9	<5.8	U	0.68	5.8	<6.3	U	0.74	6.3
VOC TICs (ug/kg)																														
Hexanal	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
TCL SVOCs (ug/kg)																														
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	NT				NT				NT				NT				NT				NT			
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	NT				NT				NT				NT				NT				NT			
4-Chloro-3-Methylphenol [6]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				NT				NT				NT				NT				NT			
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	NT				NT				NT				NT				NT				NT			
Acenaphthylene [7]	208-96-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	NT				NT				NT				NT				NT				NT			
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene [7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				NT				NT				NT				NT				NT			
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	NT				NT				NT				NT				NT				NT			
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				NT				NT				NT				NT				NT			
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	NT				NT				NT				NT				NT				NT			
Dibenzofuran	132-64-9	N	--	7.8E+03	1.0E+05	--	NT				NT				NT				NT				NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	NT				NT				NT				NT				NT				NT			
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Phenol	108-95-2	N	--	2.3E+06	3.1E+07	6.7E+04	NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB13A 1/9/2008 0-1		MDL	RL	57SB13A-DUP(DUP-3) 1/9/2008 0-1		MDL	RL	57SB13B 1/9/2008 10-12		MDL	RL	57SB13C 1/9/2008 34-36		MDL	RL	57SB14A 1/10/2008 0-1		MDL	RL	57SB14B 1/10/2008 10-12		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Heptadecanol	1454-85-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Hexadecanol	36653-82-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Octadecanol	112-92-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, 4-(1,1-dimethylpropyl)-	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Stearic Acid	57-11-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	83		0.1	0.1	83		0.1	0.1	81		0.1	0.1	72		0.1	0.1	86		0.1	0.1	79		0.1	0.1
Total Organic Carbon (%)																														
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			

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Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB14C 1/10/2008 34-36		MDL	RL	57SB15A 1/8/2008 0-1		MDL	RL	57SB15A-DUP(DUP-1) 1/8/2008 0-1		MDL	RL	57SB15B 1/8/2008 10-12		MDL	RL	57SB15C 1/8/2008 34-36		MDL	RL	57SB16A 1/8/2008 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	30,000	,J,s	2.1	10	15,000		2.1	10	14,000		2.1	10	25,000		2.1	10	23,000		2.1	10	22,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.21		0.042	0.2	1.2		0.042	0.2	1.4		0.042	0.2	0.12	J	0.042	0.2	0.23		0.042	0.2	0.62		0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	*5.1*	,L,m	0.071	0.2	2	,L,m	0.071	0.2	2	,L,m	0.071	0.2	2	,L,m	0.14	0.4	*3.1*	,L,m	0.14	0.4	*3.4*	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	57		0.17	1	89		0.17	1	96		0.17	1	86		0.17	1	46		0.17	1	210		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	3		0.021	1	0.77	J	0.021	1	0.75	J	0.021	1	1.2		0.021	1	1.6		0.021	1	1.3		0.021	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.45	0.29	J,B,p	0.11	2	0.63	J	0.11	2	0.98	J	0.11	2	<2	U	0.11	2	<2	U	0.11	2	0.42	J	0.11	2
Calcium	7440-70-2	--	--	--	--	--	190		4.2	50	1,200		4.2	50	1,800		4.2	50	61		4.2	50	640		4.2	50	2,900		4.2	50
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.048	40		0.72	5	29		0.72	5	27		0.72	5	39		0.72	5	31		0.72	5	24		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	18		0.37	2	4.9		0.37	2	4.9		0.37	2	33		0.37	2	12		0.37	2	6.7		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	25	B,L,m	0.044	0.2	8	,J,s	0.044	0.2	8.9	,J,s	0.044	0.2	14	,J,s	0.088	0.4	24	,J,s	0.088	0.4	12	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	36,000		0.48	10	16,000		0.48	10	13,000		0.48	10	53,000		4.8	100	39,000		0.48	10	15,000		0.48	10
Lead[2]	7439-92-1	--	26.8	400	750	--	11		0.022	0.2	25		0.022	0.2	37		0.022	0.2	12		0.022	0.2	10		0.022	0.2	35		0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	8,500		5	50	970		5	50	1,300		5	50	900		5	50	1,500		5	50	1,800		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	550		0.16	1	410	,K,m	0.16	1	600	,K,m	0.16	1	*1,500*	,K,m	0.16	1	340	,K,m	0.16	1	*1,600*	,K,m	0.16	1
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.056		0.0075	0.05	0.06		0.0075	0.05	0.08		0.0075	0.05	0.068		0.0075	0.05	0.048	J	0.0075	0.05	0.1		0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	39	,J,s	0.036	0.1	5.8	,J,s	0.036	0.1	6	,J,s	0.036	0.1	11	,J,s	0.071	0.2	17	,J,s	0.071	0.2	11	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	3,000		5.3	50	670		5.3	50	590		5.3	50	1,000		5.3	50	1,700		5.3	50	1,000		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.59	,L,m	0.089	0.3	0.34	J,L,m	0.089	0.3	0.39	,L,m	0.089	0.3	0.21	J,L,m	0.18	0.6	0.53	J,L,m	0.18	0.6	0.75	,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.089	J	0.013	0.1	0.049	J	0.013	0.1	0.06	J	0.013	0.1	0.041	J	0.013	0.1	0.065	J	0.013	0.1	0.1		0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	73	J,B,p	13	100	49	J,B,p	13	100	51	J,B,p	13	100	59	J,B,p	13	100	85	J,B,p	13	100	61	J,B,p	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.22		0.0049	0.1	0.18		0.0049	0.1	0.19		0.0049	0.1	0.31		0.0049	0.1	0.14		0.0049	0.1	0.28		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	31	,L,m	0.034	0.1	23	,K,m	0.034	0.1	19	,K,m	0.034	0.1	63	,K,m	0.069	0.2	38	,K,m	0.034	0.1	21	,K,m	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	55		1	5	38	,K,m	1	5	45	,K,m	1	5	30	,K,m	1	5	41	,K,m	1	5	59	,K,m	1	5
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	NT				NT				NT				NT				NT				NT			
Endosulfan II[4]	33213-65-9	N	--	4.7E+04	6.1E+05	--	NT				NT				NT				NT				NT				NT			
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				NT				NT				NT				NT				NT			
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	NT				NT				NT				NT				NT				NT			
Aroclor 1254[5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	NT				NT				NT				NT				NT				NT			
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	NT				NT				NT				NT				NT				NT			
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<3,500	U	23	3,500	11	J	2.8	23	15	J	2.8	23	<25	U	3.1	25	17	J	3.5	29	47	,J,s	3	25
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	140	J	83	1,000	94	,J,c	4.9	23	110	,J,c	4.9	23	24	J,J,c	5.4	25	87	,J,c	6	29	380	E,J,q	5.3	25
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<69	U	8.2	69	<5.8	U	0.15	5.8	<5.8	U	0.15	5.8	<6.3	U	0.16	6.3	<7.1	U	0.18	7.1	<6.3	U,UJ,s	0.16	6.3
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	<69	U	13	69	<5.8	U	0.29	5.8	<5.8	U	0.29	5.8	<6.3	U	0.31	6.3	<7.1	U	0.35	7.1	<6.3	U,UJ,s	0.31	6.3
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	<350	U	20	350	<5.8	U	0.3	5.8	0.36	J,J,c	0.31	5.8	<6.3	U	0.33	6.3	0.44	J,J,c	0.38	7.1	0.68	J,J,s	0.33	6.3
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<69	U	4.3	69	<5.8	U	0.17	5.8	<5.8	U	0.17	5.8	<6.3	U	0.19	6.3	0.36	J	0.21	7.1	<6.3	U,UJ,s	0.18	6.3
Chloromethane	74-87-3	--	--	--	--	9.3E+02	21	J	4.2	69	<5.8	U	0.28	5.8	<5.8	U	0.28	5.8	<6.3	U	0.31	6.3	<7.1	U	0.35	7.1	<6.3	U,UJ,s	0.3	6.3
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<69	U	9.2	69	<5.8	U	0.14	5.8	<5.8	U	0.15	5.8	<6.3	U	0.16	6.3	<7.1	U	0.18	7.1	<6.3	U,UJ,s	0.16	6.3
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	<350	U	12	350	4.2	J	0.96	23	5.5	J	0.97	23	<25	U	1.1	25	4.4	J	1.2	29	9.3	J,J,s	1	25
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	***28***	J,B,z	11	350	<23	U	4.6	23	<23	U	4.6	23	<25	U	5	25	<29	U	5.6	29	<25	U,UJ,s	4.9	25
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	<69	U	10	69	<5.8	U	0.51	5.8	<5.8	U	0.52	5.8	<6.3	U	0.56	6.3	<7.1	U	0.63	7.1	<6.3	U,UJ,s	0.55	6.3
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<69	U	5	69	<5.8	U	0.46	5.8	<5.8	U	0.47	5.8	<6.3	U	0.51	6.3	<7.1	U	0.57	7.1	1	J,J,s	0.5	6.3
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<69	U	12	69	<5.8	U	0.65	5.8	<5.8	U	0.66	5.8	<6.3	U	0.71	6.3	<7.1	U	0.8	7.1	<6.3	U,UJ,s	0.7	6.3
Xylenes (total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<210	U	25	210	<5.8	U	0.68	5.8	<5.8	U	0.68	5.8	<6.3	U	0.74	6.3	<7.1	U	0.83	7.1	<6.3	U,UJ,s	0.73	6.3
VOC TICs (ug/kg)																														
Hexanal	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
TCL SVOCs (ug/kg)																														
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	NT				NT				NT				NT				NT				NT			
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	NT				NT				NT				NT				NT				NT			
4-Chloro-3-Methylphenol[6]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				NT				NT				NT				NT				NT			
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	NT				NT				NT				NT				NT				NT			
Acenaphthylene[7]	208-96-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	NT				NT				NT				NT				NT				NT			
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				NT				NT				NT				NT				NT			
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	NT				NT				NT				NT				NT				NT			
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				NT				NT				NT				NT				NT			
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	NT				NT				NT				NT				NT				NT			
Dibenzofuran	132-64-9	N	--	7.8E+03	1.0E+05	--	NT				NT				NT				NT				NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	NT				NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Phenol	108-95-2	N	--	2.3E+06	3.1E+07	6.7E+04	NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB14C 1/10/2008 34-36		MDL	RL	57SB15A 1/8/2008 0-1		MDL	RL	57SB15A-DUP(DUP-1) 1/8/2008 0-1		MDL	RL	57SB15B 1/8/2008 10-12		MDL	RL	57SB15C 1/8/2008 34-36		MDL	RL	57SB16A 1/8/2008 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Heptadecanol	1454-85-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Hexadecanol	36653-82-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Octadecanol	112-92-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, 4-(1,1-dimethylpropyl)-	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Stearic Acid	57-11-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	72		0.1	0.1	87		0.1	0.1	86		0.1	0.1	79		0.1	0.1	70		0.1	0.1	80		0.1	0.1
Total Organic Carbon (%)																														
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB16B 1/8/2008 10-12		MDL	RL	57SB16C 1/8/2008 49-51		MDL	RL	57SB17A 1/7/2008 0-1		MDL	RL	57SB17B 1/7/2008 10-12		MDL	RL	57SB17C 1/7/2008 57-59		MDL	RL	57SB18A 1/9/2008 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	31,000		2.1	10	35,000		2.1	10	12,000		2.1	10	20,000		2.1	10	24,000		2.1	10	28,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.31		0.042	0.2	0.31		0.042	0.2	0.26		0.042	0.2	0.15	J	0.042	0.2	0.17	J	0.042	0.2	***87***		0.21	1
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	**2.2**	,L,m	0.071	0.2	***7.2***	,L,m	0.071	0.2	**2.2**	,L,m	0.071	0.2	***0.79***	,L,m	0.071	0.2	***3.4***	,L,m	0.14	0.4	***3.6***	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	61		0.17	1	180		0.17	1	150		0.17	1	52		0.17	1	64		0.17	1	99		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.68	J	0.021	1	2.2		0.021	1	0.97	J	0.021	1	0.36	J	0.021	1	1.3		0.021	1	1.3		0.021	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.45	<2	U	0.11	2	0.41	J	0.11	2	0.27	J	0.11	2	<2	U	0.11	2	<2	U	0.11	2	16		0.11	2
Calcium	7440-70-2	--	--	--	--	--	960		4.2	50	550		4.2	50	1,200		4.2	50	140		4.2	50	520		4.2	50	1,900		4.2	50
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.048	27		0.72	5	***51***		0.72	5	17		0.72	5	20		0.72	5	34		0.72	5	***150***		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	3.4		0.37	2	16		0.37	2	4.3		0.37	2	2.4		0.37	2	8.8		0.37	2	8.6		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	12	,J,s	0.044	0.2	21	,J,s	0.044	0.2	6.9	,J,s	0.044	0.2	8.1	,J,s	0.044	0.2	14	,J,s	0.088	0.4	19	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	22,000		0.48	10	51,000		4.8	100	13,000		0.48	10	12,000		0.48	10	43,000		0.48	10	39,000		0.48	10
Lead[2]	7439-92-1	--	26.8	400	750	--	15		0.022	0.2	14		0.022	0.2	18		0.022	0.2	17		0.022	0.2	11		0.022	0.2	96		0.11	1
Magnesium	7439-95-4	--	--	--	--	--	1,200		5	50	8,800		5	50	860		5	50	540		5	50	1,600		5	50	1,500		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	130	,K,m	0.16	1	***2,300***	,K,m	0.16	1	***1,100***	,K,m	0.16	1	40	,K,m	0.16	1	230	,K,m	0.16	1	***980***	,K,m	0.16	1
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.047	J	0.0075	0.05	0.031	J	0.0075	0.05	0.038	J	0.0075	0.05	0.081		0.0075	0.05	0.038	J	0.0075	0.05	0.1		0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	10	,J,s	0.036	0.1	35	,J,s	0.036	0.1	6.8	,J,s	0.036	0.1	6.8	,J,s	0.036	0.1	12	,J,s	0.071	0.2	10	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,200		5.3	50	4,300		5.3	50	570		5.3	50	670		5.3	50	1,300		5.3	50	1,200		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.24	J,L,m	0.089	0.3	0.35	,L,m	0.089	0.3	0.61	,L,m	0.089	0.3	0.092	J,L,m	0.089	0.3	0.22	J,L,m	0.18	0.6	<0.3	U,UL,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.036	J	0.013	0.1	0.13		0.013	0.1	0.046	J	0.013	0.1	0.039	J	0.013	0.1	0.042	J	0.013	0.1	0.074	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	81	J,B,p	13	100	99	J	13	100	35	J,B,p	13	100	62	J,B,p	13	100	68	J,B,p	13	100	130		13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.18		0.0049	0.1	0.39		0.0049	0.1	0.18		0.0049	0.1	0.23		0.0049	0.1	0.2		0.0049	0.1	0.28		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	28	,K,m	0.034	0.1	41	,K,m	0.034	0.1	16	,K,m	0.034	0.1	20	,K,m	0.034	0.1	67	,K,m	0.069	0.2	130	,K,m	0.17	0.5
Zinc	7440-66-6	N	202	2,346	30,660	13,622	32	,K,m	1	5	65	,K,m	1	5	36	,K,m	1	5	28	,K,m	1	5	42	,K,m	1	5	480	,K,m	1	5
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	NT				NT				NT				NT				NT				NT			
Endosulfan II[4]	33213-65-9	N	--	4.7E+04	6.1E+05	--	NT				NT				NT				NT				NT				NT			
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				NT				NT				NT				NT				NT			
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	NT				NT				NT				NT				NT				NT			
Aroclor 1254[5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	NT				NT				NT				NT				NT				NT			
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	NT				NT				NT				NT				NT				NT			
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<26	U	3.2	26	<26	U	3.2	26	31		2.8	23	<23	U	2.8	23	<26	U	3.1	26	<3,200	U	21	3,200
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	87	,J,c	5.5	26	58	,J,c	5.6	26	320	E,J,q	4.9	23	7.3	J,J,c	5	23	<26	U,UJ,c	5.4	26	150	J	76	950
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<6.5	U	0.17	6.5	<6.6	U	0.17	6.6	<5.8	U	0.15	5.8	<5.9	U	0.15	5.9	<6.4	U	0.16	6.4	<64	U	7.5	64
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	<6.5	U	0.32	6.5	<6.6	U	0.33	6.6	<5.8	U	0.29	5.8	<5.9	U	0.29	5.9	<6.4	U	0.32	6.4	<64	U	12	64
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	<6.5	U	0.34	6.5	0.39	J,J,c	0.35	6.6	0.36	J,J,c	0.31	5.8	<5.9	U	0.31	5.9	<6.4	U	0.34	6.4	<320	U	18	320
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<6.5	U	0.19	6.5	0.38	J	0.19	6.6	<5.8	U	0.17	5.8	<5.9	U	0.17	5.9	5.1	J	0.19	6.4	<64	U	3.9	64
Chloromethane	74-87-3	--	--	--	--	9.3E+02	<6.5	U	0.32	6.5	<6.6	U	0.32	6.6	<5.8	U	0.28	5.8	<5.9	U	0.29	5.9	<6.4	U	0.31	6.4	18	J	3.8	64
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<6.5	U	0.16	6.5	<6.6	U	0.16	6.6	<5.8	U	0.15	5.8	<5.9	U	0.15	5.9	<6.4	U	0.16	6.4	<64	U	8.4	64
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	4.8	J	1.1	26	3.8	J	1.1	26	11	J	0.97	23	<23	U	0.98	23	<26	U	1.1	26	95	J	11	320
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<26	U	5.2	26	<26	U	5.2	26	<23	U	4.6	23	<23	U	4.6	23	<26	U	5.1	26	**24**	J,B,z	10	320
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	<6.5	U	0.58	6.5	<6.6	U	0.58	6.6	<5.8	U	0.51	5.8	<5.9	U	0.52	5.9	<6.4	U	0.57	6.4	<64	U	9.5	64
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<6.5	U	0.52	6.5	<6.6	U	0.53	6.6	<5.8	U	0.47	5.8	<5.9	U	0.47	5.9	<6.4	U	0.52	6.4	<64	U	4.6	64
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<6.5	U	0.73	6.5	<6.6	U	0.74	6.6	<5.8	U	0.65	5.8	<5.9	U	0.66	5.9	<6.4	U	0.72	6.4	<64	U	11	64
Xylenes (total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<6.5	U	0.76	6.5	<6.6	U	0.77	6.6	<5.8	U	0.68	5.8	<5.9	U	0.69	5.9	<6.4	U	0.75	6.4	<190	U	23	190
VOC TICs (ug/kg)																														
Hexanal	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
TCL SVOCs (ug/kg)																														
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	NT				NT				NT				NT				NT				NT			
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	NT				NT				NT				NT				NT				NT			
4-Chloro-3-Methylphenol[6]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				NT				NT				NT				NT				NT			
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	NT				NT				NT				NT				NT				NT			
Acenaphthylene[7]	208-96-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	NT				NT				NT				NT				NT				NT			
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				NT				NT				NT				NT				NT			
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	NT				NT				NT				NT				NT				NT			
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				NT				NT				NT				NT				NT			
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	NT				NT				NT				NT				NT				NT			
Dibenzofuran	132-64-9	N	--	7.8E+03	1.0E+05	--	NT				NT				NT				NT				NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	NT				NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Phenol	108-95-2	N	--	2.3E+06	3.1E+07	6.7E+04	NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB16B 1/8/2008 10-12		MDL	RL	57SB16C 1/8/2008 49-51		MDL	RL	57SB17A 1/7/2008 0-1		MDL	RL	57SB17B 1/7/2008 10-12		MDL	RL	57SB17C 1/7/2008 57-59		MDL	RL	57SB18A 1/9/2008 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Heptadecanol	1454-85-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Hexadecanol	36653-82-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Octadecanol	112-92-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phenol, 4-(1,1-dimethylpropyl)-	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Stearic Acid	57-11-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	77		0.1	0.1	76		0.1	0.1	86		0.1	0.1	85		0.1	0.1	78		0.1	0.1	79		0.1	0.1
Total Organic Carbon (%)																														
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB18B 1/9/2008 10-12		MDL	RL	57SB18C 1/9/2008 26-28		MDL	RL	57SB19A 1/9/2008 0-1		MDL	RL	57SB19B 1/9/2008 10-12		MDL	RL	57SB19C 1/9/2008 26-28		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																										
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	22,000		2.1	10	29,000		2.1	10	30,000		2.1	10	20,000		2.1	10	26,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.27		0.042	0.2	2.7		0.042	0.2	*33*		0.042	0.2	0.61		0.042	0.2	2.2		0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	*0.88*	,L,m	0.071	0.2	*5*	,L,m	0.071	0.2	*3.8*	,L,m	0.071	0.2	*3.2*	,L,m	0.071	0.2	*6.2*	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	73		0.17	1	63		0.17	1	83		0.17	1	67		0.17	1	50		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	1.1		0.021	1	1.9		0.021	1	1.3		0.021	1	0.87	J	0.021	1	2.6		0.021	1
Cadmium	7440-43-9	N	0.69	3.911	51.1	27.45	<2	U	0.11	2	1.2	J	0.11	2	5		0.11	2	<2	U	0.11	2	0.39	J,B,p	0.11	2
Calcium	7440-70-2	--	--	--	--	--	390		4.2	50	110		4.2	50	1,600		4.2	50	72		4.2	50	230		4.2	50
Chromium[1]	7440-47-3	N	65.3	23.46	306.6	42.048	27		0.72	5	*44*		0.72	5	*67*		0.72	5	24		0.72	5	25		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	16		0.37	2	8.2		0.37	2	8.8		0.37	2	10		0.37	2	19		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	12	,J,s	0.044	0.2	22	,J,s	0.044	0.2	17	,J,s	0.044	0.2	11	,J,s	0.044	0.2	20	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	34,000		0.48	10	32,000		0.48	10	40,000		0.48	10	23,000		0.48	10	32,000		0.48	10
Lead[2]	7439-92-1	--	26.8	400	750	--	11		0.022	0.2	16		0.022	0.2	49		0.022	0.2	12		0.022	0.2	12		0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	1,700		5	50	3,300		5	50	1,300		5	50	1,200		5	50	8,600		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	690	,K,m	0.16	1	190	,K,m	0.16	1	930	,K,m	0.16	1	370	,K,m	0.16	1	*1,000*	,K,m	0.16	1
Mercury[3]	7439-97-6	--	0.13	2.35	30.66	--	0.034	J	0.0075	0.05	0.055		0.0075	0.05	0.11		0.0075	0.05	0.03	J	0.0075	0.05	0.066		0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	10	,J,s	0.036	0.1	21	,J,s	0.036	0.1	10	,J,s	0.036	0.1	10	,J,s	0.036	0.1	30	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,700		5.3	50	2,300		5.3	50	1,300		5.3	50	1,300		5.3	50	3,700		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	<0.3	U,UL,m	0.089	0.3	0.2	J,L,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	0.29	J,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.018	J	0.013	0.1	0.071	J	0.013	0.1	0.049	J	0.013	0.1	0.015	J	0.013	0.1	0.074	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	68	J,B,p	13	100	320		13	100	76	J,B,p	13	100	90	J	13	100	150		13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.638	0.16		0.0049	0.1	0.22		0.0049	0.1	0.33		0.0049	0.1	0.14		0.0049	0.1	0.26		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	24	,K,m	0.034	0.1	39	,K,m	0.034	0.1	58	,K,m	0.069	0.2	25	,K,m	0.034	0.1	25	,K,m	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	46	,K,m	1	5	69	,K,m	1	5	180	,K,m	1	5	33	,K,m	1	5	43	,K,m	1	5
Pesticides/PCBs (ug/kg)																										
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	NT				NT				NT				NT				NT			
Endosulfan II[4]	33213-65-9	N	--	4.7E+04	6.1E+05	--	NT				NT				NT				NT				NT			
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				NT				NT				NT				NT			
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	NT				NT				NT				NT				NT			
Aroclor 1254[5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	NT				NT				NT				NT				NT			
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	NT				NT				NT				NT				NT			
TCL VOCs (ug/kg)																										
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	10	J	3.1	25	30		3.5	29	14	J	2.7	23	6.4	J	2.9	24	7.6	J	3.3	27
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	40	,J,c	5.4	25	120	,J,c	6.1	29	190		4.8	23	9.6	J	5.1	24	32		5.8	27
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<6.4	U	0.16	6.4	0.34	J	0.18	7.2	<5.7	U	0.14	5.7	<6	U	0.15	6	<6.8	U	0.18	6.8
Bromodichloromethane	75-27-4	C	--	1.0E+04	4.6E+04	1.1E+00	<6.4	U	0.32	6.4	<7.2	U	0.35	7.2	<5.7	U	0.28	5.7	<6	U	0.3	6	<6.8	U	0.34	6.8
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	<6.4	U	0.34	6.4	<7.2	U	0.38	7.2	<5.7	U	0.3	5.7	<6	U	0.32	6	<6.8	U	0.36	6.8
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<6.4	U	0.19	6.4	<7.2	U	0.21	7.2	<5.7	U	0.17	5.7	<6	U	0.18	6	<6.8	U	0.2	6.8
Chloromethane	74-87-3	--	--	--	--	9.3E+02	<6.4	U	0.31	6.4	<7.2	U	0.35	7.2	<5.7	U	0.28	5.7	<6	U	0.29	6	<6.8	U	0.33	6.8
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<6.4	U	0.16	6.4	<7.2	U	0.18	7.2	<5.7	U	0.14	5.7	<6	U	0.15	6	<6.8	U	0.17	6.8
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	3.7	J	1.1	25	4.5	J	1.2	29	26		0.94	23	1.8	J	1	24	1.8	J	1.1	27
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<25	U	5	25	<29	U	5.6	29	<23	U	4.5	23	4.9	J,B,y	4.8	24	8.4	J	5.4	27
Tetrachloroethene	127-18-4	C	--	1.2E+03	5.3E+03	4.7E+00	<6.4	U	0.56	6.4	<7.2	U	0.63	7.2	<5.7	U	0.5	5.7	<6	U	0.53	6	<6.8	U	0.61	6.8
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<6.4	U	0.51	6.4	<7.2	U	0.57	7.2	<5.7	U	0.45	5.7	<6	U	0.49	6	<6.8	U	0.55	6.8
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<6.4	U	0.72	6.4	<7.2	U	0.8	7.2	<5.7	U	0.63	5.7	<6	U	0.68	6	<6.8	U	0.77	6.8
Xylenes (total)	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<6.4	U	0.75	6.4	<7.2	U	0.84	7.2	<5.7	U	0.66	5.7	<6	U	0.71	6	<6.8	U	0.8	6.8
VOC TICs (ug/kg)																										
Hexanal	--	--	--	--	--	--	NT				NT				NT				NT				NT			
TCL SVOCs (ug/kg)																										
1,1'-Biphenyl	92-52-4	N	--	3.9E+05	5.1E+06	9.6E+04	NT				NT				NT				NT				NT			
2-Methylnaphthalene	91-57-6	N	--	3.1E+04	4.1E+05	4.4E+03	NT				NT				NT				NT				NT			
4-Chloro-3-Methylphenol[6]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				NT				NT				NT				NT			
Acenaphthene	83-32-9	N	--	4.7E+05	6.1E+06	1.0E+05	NT				NT				NT				NT				NT			
Acenaphthylene[7]	208-96-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT			
Acetophenone	98-86-2	N	--	7.8E+05	1.0E+07	3.2E+03	NT				NT				NT				NT				NT			
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				NT				NT				NT				NT			
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	NT				NT				NT				NT				NT			
Caprolactam	105-60-2	N	--	3.9E+06	5.1E+07	--	NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				NT				NT				NT				NT			
Dibenz(a,h)anthracene	53-70-3	C	--	2.2E+01	3.9E+02	4.6E+02	NT				NT				NT				NT				NT			
Dibenzofuran	132-64-9	N	--	7.8E+03	1.0E+05	--	NT				NT				NT				NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT			
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT			
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT			
Phenol	108-95-2	N	--	2.3E+06	3.1E+07	6.7E+04	NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	57SB18B 1/9/2008 10-12		MDL	RL	57SB18C 1/9/2008 26-28		MDL	RL	57SB19A 1/9/2008 0-1		MDL	RL	57SB19B 1/9/2008 10-12		MDL	RL	57SB19C 1/9/2008 26-28		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT			
SVOC TICs (ug/kg)																										
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NT				NT				NT				NT			
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	--	--	--	--	--	NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				NT				NT				NT				NT			
1-Heptadecanol	1454-85-9	--	--	--	--	--	NT				NT				NT				NT				NT			
1-Hexadecanol	36653-82-4	--	--	--	--	--	NT				NT				NT				NT				NT			
1-Octadecanol	112-92-5	--	--	--	--	--	NT				NT				NT				NT				NT			
1-Pentadecanol	629-76-5	--	--	--	--	--	NT				NT				NT				NT				NT			
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	--	--	--	--	--	NT				NT				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				NT				NT				NT				NT			
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	--	--	--	--	--	NT				NT				NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NT				NT				NT				NT			
Bis(2-ethylhexyl)maleate	142-16-5	--	--	--	--	--	NT				NT				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NT				NT				NT				NT				NT			
Oxirane, hexadecyl-	7390-81-0	--	--	--	--	--	NT				NT				NT				NT				NT			
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	--	--	--	--	--	NT				NT				NT				NT				NT			
Phenol, 4-(1,1-dimethylpropyl)-	--	--	--	--	--	--	NT				NT				NT				NT				NT			
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	--	--	--	--	--	NT				NT				NT				NT				NT			
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	--	--	--	--	--	NT				NT				NT				NT				NT			
Stearic Acid	57-11-4	--	--	--	--	--	NT				NT				NT				NT				NT			
PAHs (ug/kg)																										
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT			
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT			
Benzo(g,h,i)perylene[7]	191-24-2	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT			
Phenanthrene[7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT			
Cyanide (mg/kg)																										
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT			
Percent Solids (%)																										
Percent Solids	--	--	--	--	--	--	78		0.1	0.1	70		0.1	0.1	88		0.1	0.1	83		0.1	0.1	73		0.1	0.1
Total Organic Carbon (%)																										
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				NT				NT			

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound

MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested
NR = Not Reported
NI = Not Identified

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20
[A] = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001a)
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Endosulfan soil RBC value used

[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol soil RBC value used
[7] = Pyrene RBC value was used

= Concentration Exceeds Adjusted Soil Residential RBC

= Concentration Exceeds Adjusted Soil Industrial RBC

underline = Concentration Exceeds Site Background Values

bold italic = Concentration Exceeds SSL DAF20

Laboratory Qualifiers
- B — Analyte found in associated blank as well as in the sample.
- J — Estimated value.
- E — Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.
- U — The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.

Validation Qualifiers
- B — Not detected substantially above the level reported in laboratory or field blanks.
- N — Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
- J — Analyte present. Reported value may not be accurate or precise.
- K — Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L — Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- U — Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
- UJ — Not detected, quantitation limit may be inaccurate or imprecise.
- UL — Not detected, quantitation limit is probably higher.

Reason Codes

GC/MS Organics
- c — Calibration failure; poor (RRF) or unstable (%D) respons
- l — MS/MSD recovery failure
- q — Concentration exceeded the linear range
- s — Surrogate failure
- t — Tentatively identified Compound
- x — Field and/or equipment blank contamination
- y — Trip blank contamination
- z — Method blank and/or storage blank contamination

Inorganics and Conventionals
- f — Field duplicate imprecision
- j — LCS recovery failure
- m — MS/MSD recovery failure
- p — Preparation blank contamination
- s — Serial dilution failure

GC and HPLC Organics
- c — Calibration failure; poor or unstable (%D) response
- g — Dual column confirmation imprecision
- l — MS/MSD recovery failure
- q — linearity (%RSD or r) failure in initial calibration
- s — No confirmation column
- x — Trip blank contamination
- y — Trip blank contamination
- z — Method blank and/or storage blank contamination

Note: 1. Source of Data Qualifier Codes: United States Environmental Protection Agency (USEPA) Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, April 1993.
2. Source of Data Qualifier Codes: United States Environmental Protection Agency (USEPA) Region III Modifications to National Functional Guidelines for Organic Data Review Multimedia, Multi-Concentration (OLMO1.0-OLMO1.9), September 1994.

Table 4-2
Summary of Risk Screening Results for Soil Within Pond Area
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL [A]	# of Detections	# of Samples
TAL Metals (mg/kg)														
Aluminum	7429-90-5	40,041	7,821	N	102,200	N	--	12,000	38,000	0	0	--	21	21
Antimony	7440-36-0	--	3.13	N	40.88	N	13.2	0.045	340	**9**	**2**	**6**	21	21
Arsenic	7440-38-2	15.8	0.426	C	1.91	C	0.026	0.85	5.1	0	0	0	21	21
Barium	7440-39-3	209	1,564	N	20,440	N	6,015	25	230	0	0	0	21	21
Beryllium	7440-41-7	1.02	15.64	N	204.4	N	1,154	0.45	2.6	0	0	0	21	21
Cadmium	7440-43-9	0.69	3.911	N	51.1	N	27.45	0.12	120	**3**	**1**	**2**	12	21
Calcium	7440-70-2	--	--	--	--	--	--	57	3,500	--	--	--	21	21
Chromium [1]	7440-47-3	65.3	23.46	N	306.6	N	42.048	18	1,500	**2**	**2**	**2**	21	21
Cobalt	7440-48-4	72.3	--	--	--	--	--	4.05	51	--	--	--	21	21
Copper	7440-50-8	53.5	312.9	N	4088	N	10,518	1.4	110	0	0	0	21	21
Iron	7439-89-6	50,962	5,475	N	71,540	N	--	24,000	87,000	**10**	**3**	--	21	21
Lead [2]	7439-92-1	26.8	400	--	750	--	--	0.86	680	**1**	0	--	21	21
Magnesium	7439-95-4	--	--	--	--	--	--	510	2,900	--	--	--	21	21
Manganese	7439-96-5	2,543	156.43	N	2,044	N	951.92	170	7,700	**7**	**7**	**7**	21	21
Mercury [3]	7439-97-6	0.13	2.35	--	30.66	--	--	0.012	0.17	0	0	--	20	21
Nickel	7440-02-0	62.8	156.43	N	2,044	N	--	4.9	18	0	0	--	21	21
Potassium	7440-09-7	--	--	--	--	--	--	720	1,900	--	--	--	21	21
Selenium	7782-49-2	--	39.11	N	511	N	18.98	0.0698	0.89	0	0	0	14	21
Silver	7440-22-4	--	39.11	N	511	N	31.03	0.014	0.2	0	0	0	21	21
Sodium	7440-23-5	--	--	--	--	--	--	94.5	1,100	--	--	--	21	21
Thallium	7440-28-0	2.11	0.5475	N	7.154	N	3.638	0.041	0.77	0	0	0	21	21
Vanadium	7440-62-2	108	7.821	N	102.2	N	730.1	11	1,200	**2**	**2**	**1**	21	21
Zinc	7440-66-6	202	2,346	N	30,660	N	13,622	12	3,700	**1**	0	0	21	21
Pesticides/PCBs (ug/kg)														
Dieldrin	60-57-1	--	4.0E+01	C	1.8E+02	C	2.2E+00	1.6	13	0	0	**3**	5	20
Endosulfan II [4]	33213-65-9	--	4.7E+04	N	6.1E+05	N	--	140	140	0	0	--	1	20
Endrin	72-20-8	--	2.3E+03	N	3.1E+04	N	5.4E+03	2.7	6.2	0	0	0	2	20
Heptachlor epoxide	1024-57-3	--	7.0E+01	C	3.1E+02	C	2.5E+01	3.44	9.6	0	0	0	2	20
Aroclor 1254 [5]	11097-69-1	--	1.6E+02	N	1.4E+03	C	1.1E+03	12	2,000	**7**	**1**	**1**	11	20
Aroclor 1260	11096-82-5	--	3.2E+02	C	1.4E+03	C	--	60	2,000	**2**	**1**	--	6	20
TCL VOCs (ug/kg)														
2-Butanone	78-93-3	--	4.7E+06	N	6.1E+07	N	2.9E+04	10.1	30	0	0	0	4	21
Acetone	67-64-1	--	7.0E+06	N	9.2E+07	N	2.2E+04	8.2	230	0	0	0	21	21
Benzene	71-43-2	--	1.2E+04	C	5.2E+04	C	1.9E+00	0.19	0.25	0	0	0	2	21
Bromodichloromethane	75-27-4	--	1.0E+04	C	4.6E+04	C	1.1E+00	ND	ND	0	0	0	0	21
Carbon disulfide	75-15-0	--	7.8E+05	N	1.0E+07	N	1.9E+04	0.54	5.2	0	0	0	12	21
Chloroform	67-66-3	--	7.8E+04	N	1.0E+06	N	9.1E-01	ND	ND	0	0	0	0	21
Chloromethane	74-87-3	--	--	--	--	--	9.3E+02	ND	ND	--	--	0	0	21
Ethylbenzene	100-41-4	--	7.8E+05	N	1.0E+07	N	1.5E+04	ND	ND	0	0	0	0	21
Methyl acetate	79-20-9	--	7.8E+06	N	1.0E+08	N	2.5E+04	2	33	0	0	0	16	21
Methylene chloride	75-09-2	--	8.5E+04	C	3.8E+05	C	1.9E+01	4.425	4.425	0	0	0	1	21
Tetrachloroethene	127-18-4	--	1.2E+03	C	5.3E+03	C	4.7E+00	0.59	0.59	0	0	0	1	21
Toluene	108-88-3	--	6.3E+05	N	8.2E+06	N	2.7E+04	ND	ND	0	0	0	0	21
Trichloroethene	79-01-6	--	1.6E+03	C	7.2E+03	C	2.6E-01	3.74	3.74	0	0	**1**	1	21
Xylenes (total)	1330-20-7	--	1.6E+06	N	2.0E+07	N	3.0E+03	6.2	6.2	0	0	0	1	21
TCL SVOCs (ug/kg)														
1,1'-Biphenyl	92-52-4	--	3.9E+05	N	5.1E+06	N	9.6E+04	0.603	1.4	0	0	0	5	21
2-Methylnaphthalene	91-57-6	--	3.1E+04	N	4.1E+05	N	4.4E+03	0.81	8.1	0	0	0	11	21
4-Chloro-3-Methylphenol [6]	59-50-7	--	3.9E+02	N	5.1E+03	N	--	17	18	0	0	--	2	21
Acenaphthene	83-32-9	--	4.7E+05	N	6.1E+06	N	1.0E+05	0.56	12	0	0	0	8	21
Acenaphthylene [7]	208-96-8	--	2.3E+05	N	3.1E+06	N	--	ND	ND	0	0	--	0	21
Acetophenone	98-86-2	--	7.8E+05	N	1.0E+07	N	3.2E+03	ND	ND	0	0	0	0	21
Anthracene	120-12-7	--	2.3E+06	N	3.1E+07	N	4.7E+05	20	20	0	0	0	1	21
Benzo(a)anthracene	56-55-3	--	2.2E+02	C	3.9E+03	C	4.8E+02	0.86	42	0	0	0	8	21
Benzo(a)pyrene	50-32-8	--	2.2E+01	C	3.9E+02	C	1.2E+02	1.8	31	**1**	0	0	4	21
Benzo(b)fluoranthene	205-99-2	--	2.2E+02	C	3.9E+03	C	1.5E+03	1.9	51	0	0	0	4	21
Benzo(g,h,i)perylene [7]	191-24-2	--	2.3E+05	N	3.1E+06	N	--	8	15	0	0	--	2	21
Benzo(k)fluoranthene	207-08-9	--	2.2E+03	C	3.9E+04	C	1.5E+04	7.1	19	0	0	0	2	21
Bis(2-ethylhexyl)phthalate	117-81-7	--	4.6E+04	C	2.0E+05	C	2.9E+06	17	560	0	0	0	21	21
Butyl Benzyl Phthalate	85-68-7	--	1.6E+06	N	2.0E+07	N	1.7E+07	2.95	14	0	0	0	7	21

Table 4-2
Summary of Risk Screening Results for Soil Within Pond Area
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL [A]	# of Detections	# of Samples
Caprolactam	105-60-2	--	3.9E+06	N	5.1E+07	N	--	ND	ND	0	0	--	0	21
Chrysene	218-01-9	--	2.2E+04	C	3.9E+05	C	4.8E+04	0.81	40	0	0	0	7	21
Di-n-butylphthalate	84-74-2	--	7.8E+05	N	1.0E+07	N	5.0E+06	9	76	0	0	0	21	21
Dibenz(a,h)anthracene	53-70-3	--	2.2E+01	C	3.9E+02	C	4.6E+02	2.7	3.5	0	0	0	2	21
Dibenzofuran	132-64-9	--	7.8E+03	N	1.0E+05	N	--	5.8	5.8	0	0	--	1	21
Diethylphthalate	84-66-2	--	6.3E+06	N	8.2E+07	N	4.5E+05	0.55	11	0	0	0	14	21
Fluoranthene	206-44-0	--	3.1E+05	N	4.1E+06	N	6.3E+06	12	99	0	0	0	2	21
Fluorene	86-73-7	--	3.1E+05	N	4.1E+06	N	1.4E+05	2.343	10	0	0	0	6	21
Indeno(1,2,3-cd)pyrene	193-39-5	--	2.2E+02	C	3.9E+03	C	4.2E+03	2.7	19	0	0	0	2	21
Naphthalene	91-20-3	--	1.6E+05	N	2.0E+06	N	1.5E+02	0.293	7	0	0	0	18	21
Phenanthrene [7]	85-01-8	--	2.3E+05	N	3.1E+06	N	--	97	97	0	0	--	1	21
Phenol	108-95-2	--	2.3E+06	N	3.1E+07	N	6.7E+04	0.883	2.3	0	0	0	4	21
Pyrene	129-00-0	--	2.3E+05	N	3.1E+06	N	6.8E+05	0.43	81	0	0	0	8	21
Cyanide (mg/kg)														
Cyanide	57-12-5	--	1.6E+02	N	2.0E+03	N	1.5E+02	0.05	0.05	0	0	0	1	3

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
ug/kg = Microgram per kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
ND = Not Detected
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
R-RBC = Adjusted Residential RBC
I-RBC = Adjusted Industrial RBC
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20

[A] = For inorganics, number of samples that exceed background (if available) and screening level
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Endosulfan soil RBC value used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol soil RBC value used
[7] = Pyrene RBC value was used

Table 4-3
Summary of Risk Screening Results for Soil in Terracotta Pipe Area
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL [A]	# of Detections	# of Samples
TAL Metals (mg/kg)														
Aluminum	7429-90-5	40,041	7,821	N	102,200	N	--	11,900	38,900	0	0	--	10	10
Antimony	7440-36-0	--	3.13	N	40.88	N	13.2	0.071	14	**2**	0	**1**	9	10
Arsenic	7440-38-2	15.8	0.426	C	1.91	C	0.026	1.1	7.1	0	0	0	10	10
Barium	7440-39-3	209	1,564	N	20,440	N	6,015	39	99	0	0	0	10	10
Beryllium	7440-41-7	1.02	15.64	N	204.4	N	1,154	0.44	3.2	0	0	0	10	10
Cadmium	7440-43-9	0.69	3.911	N	51.1	N	27.45	0.16	12	**3**	0	0	8	10
Calcium	7440-70-2	--	--	--	--	--	--	68	4,440	--	--	--	8	10
Chromium [1]	7440-47-3	65.3	23.46	N	306.6	N	42.048	9.3	160	**3**	0	**3**	10	10
Cobalt	7440-48-4	72.3	--	--	--	--	--	3.3	26	--	--	--	10	10
Copper	7440-50-8	53.5	312.9	N	4088	N	10,518	4.9	28	0	0	0	10	10
Iron	7439-89-6	50,962	5,475	N	71,540	N	--	13,400	41,300	0	0	--	10	10
Lead [2]	7439-92-1	26.8	400	--	750	--	--	2.6	50	0	0	--	10	10
Magnesium	7439-95-4	--	--	--	--	--	--	487	22,300	--	--	--	10	10
Manganese	7439-96-5	2,543	156.43	N	2,044	N	951.92	140	1,090	0	0	0	10	10
Mercury [3]	7439-97-6	0.13	2.35	--	30.66	--	--	0.013	0.76	0	0	--	9	10
Nickel	7440-02-0	62.8	156.43	N	2,044	N	--	6	75	0	0	--	10	10
Potassium	7440-09-7	--	--	--	--	--	--	528	4,570	--	--	--	10	10
Selenium	7782-49-2	--	39.11	N	511	N	18.98	0.22	0.75	0	0	0	9	10
Silver	7440-22-4	--	39.11	N	511	N	31.03	0.028	0.12	0	0	0	10	10
Sodium	7440-23-5	--	--	--	--	--	--	33	343	--	--	--	10	10
Thallium	7440-28-0	2.11	0.5475	N	7.154	N	3.638	0.11	0.29	0	0	0	10	10
Vanadium	7440-62-2	108	7.821	N	102.2	N	730.1	18	130	**1**	**1**	0	10	10
Zinc	7440-66-6	202	2,346	N	30,660	N	13,622	9.3	280	0	0	0	10	10
Pesticides/PCBs (ug/kg)														
Dieldrin	60-57-1	--	4.0E+01	C	1.8E+02	C	2.2E+00	NT	NT	0	0	0	0	0
Endosulfan II [4]	33213-65-9	--	4.7E+04	N	6.1E+05	N	--	NT	NT	0	0	--	0	0
Endrin	72-20-8	--	2.3E+03	N	3.1E+04	N	5.4E+03	NT	NT	0	0	0	0	0
Heptachlor epoxide	1024-57-3	--	7.0E+01	C	3.1E+02	C	2.5E+01	NT	NT	0	0	0	0	0
Aroclor 1254 [5]	11097-69-1	--	1.6E+02	N	1.4E+03	C	1.1E+03	NT	NT	0	0	0	0	0
Aroclor 1260	11096-82-5	--	3.2E+02	C	1.4E+03	C	--	NT	NT	0	0	--	0	0
TCL VOCs (ug/kg)														
2-Butanone	78-93-3	--	4.7E+06	N	6.1E+07	N	2.9E+04	21	30	0	0	0	7	10
Acetone	67-64-1	--	7.0E+06	N	9.2E+07	N	2.2E+04	12	160	0	0	0	10	10
Benzene	71-43-2	--	1.2E+04	C	5.2E+04	C	1.9E+00	ND	ND	0	0	0	0	10
Bromodichloromethane	75-27-4	--	1.0E+04	C	4.6E+04	C	1.1E+00	1.2	1.2	0	0	**1**	1	10
Carbon disulfide	75-15-0	--	7.8E+05	N	1.0E+07	N	1.9E+04	0.65	0.65	0	0	0	1	10
Chloroform	67-66-3	--	7.8E+04	N	1.0E+06	N	9.1E-01	1.17	24	0	0	**4**	4	10
Chloromethane	74-87-3	--	--	--	--	--	9.3E+02	19	19	--	--	0	1	10
Ethylbenzene	100-41-4	--	7.8E+05	N	1.0E+07	N	1.5E+04	ND	ND	0	0	0	0	10
Methyl acetate	79-20-9	--	7.8E+06	N	1.0E+08	N	2.5E+04	2.2	7.6	0	0	0	3	10
Methylene chloride	75-09-2	--	8.5E+04	C	3.8E+05	C	1.9E+01	3.6	19	0	0	0	7	10
Tetrachloroethene	127-18-4	--	1.2E+03	C	5.3E+03	C	4.7E+00	ND	ND	0	0	0	0	10
Toluene	108-88-3	--	6.3E+05	N	8.2E+06	N	2.7E+04	ND	ND	0	0	0	0	10
Trichloroethene	79-01-6	--	1.6E+03	C	7.2E+03	C	2.6E-01	ND	ND	0	0	0	0	10
Xylenes (total)	1330-20-7	--	1.6E+06	N	2.0E+07	N	3.0E+03	ND	ND	0	0	0	0	10
TCL SVOCs (ug/kg)														
1,1'-Biphenyl	92-52-4	--	3.9E+05	N	5.1E+06	N	9.6E+04	ND	ND	0	0	0	0	6
2-Methylnaphthalene	91-57-6	--	3.1E+04	N	4.1E+05	N	4.4E+03	ND	ND	0	0	0	0	6
4-Chloro-3-Methylphenol [6]	59-50-7	--	3.9E+02	N	5.1E+03	N	--	16	44	0	0	--	5	6
Acenaphthene	83-32-9	--	4.7E+05	N	6.1E+06	N	1.0E+05	ND	ND	0	0	0	0	6
Acenaphthylene [7]	208-96-8	--	2.3E+05	N	3.1E+06	N	--	2	2	0	0	--	1	6
Acetophenone	98-86-2	--	7.8E+05	N	1.0E+07	N	3.2E+03	ND	ND	0	0	0	0	6
Anthracene	120-12-7	--	2.3E+06	N	3.1E+07	N	4.7E+05	ND	ND	0	0	0	0	6
Benzo(a)anthracene	56-55-3	--	2.2E+02	C	3.9E+03	C	4.8E+02	ND	ND	0	0	0	0	6
Benzo(a)pyrene	50-32-8	--	2.2E+01	C	3.9E+02	C	1.2E+02	12	30	**1**	0	0	2	6
Benzo(b)fluoranthene	205-99-2	--	2.2E+02	C	3.9E+03	C	1.5E+03	23	55	0	0	0	2	6
Benzo(g,h,i)perylene [7]	191-24-2	--	2.3E+05	N	3.1E+06	N	--	ND	ND	0	0	--	0	6
Benzo(k)fluoranthene	207-08-9	--	2.2E+03	C	3.9E+04	C	1.5E+04	ND	ND	0	0	0	0	6
Bis(2-ethylhexyl)phthalate	117-81-7	--	4.6E+04	C	2.0E+05	C	2.9E+06	20	63	0	0	0	6	6
Butyl Benzyl Phthalate	85-68-7	--	1.6E+06	N	2.0E+07	N	1.7E+07	10	44	0	0	0	3	6

Table 4-3
Summary of Risk Screening Results for Soil in Terracotta Pipe Area
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL [A]	# of Detections	# of Samples
Caprolactam	105-60-2	--	3.9E+06	N	5.1E+07	N	--	11	36	0	0	--	3	6
Chrysene	218-01-9	--	2.2E+04	C	3.9E+05	C	4.8E+04	17	17	0	0	0	1	6
Di-n-butylphthalate	84-74-2	--	7.8E+05	N	1.0E+07	N	5.0E+06	38	430	0	0	0	6	6
Dibenz(a,h)anthracene	53-70-3	--	2.2E+01	C	3.9E+02	C	4.6E+02	ND	ND	0	0	0	0	6
Dibenzofuran	132-64-9	--	7.8E+03	N	1.0E+05	N	--	ND	ND	0	0	--	0	6
Diethylphthalate	84-66-2	--	6.3E+06	N	8.2E+07	N	4.5E+05	5	12	0	0	0	6	6
Fluoranthene	206-44-0	--	3.1E+05	N	4.1E+06	N	6.3E+06	26	30	0	0	0	2	6
Fluorene	86-73-7	--	3.1E+05	N	4.1E+06	N	1.4E+05	ND	ND	0	0	0	0	6
Indeno(1,2,3-cd)pyrene	193-39-5	--	2.2E+02	C	3.9E+03	C	4.2E+03	7	42	0	0	0	2	6
Naphthalene	91-20-3	--	1.6E+05	N	2.0E+06	N	1.5E+02	ND	ND	0	0	0	0	6
Phenanthrene [7]	85-01-8	--	2.3E+05	N	3.1E+06	N	--	13	18	0	0	--	2	6
Phenol	108-95-2	--	2.3E+06	N	3.1E+07	N	6.7E+04	ND	ND	0	0	0	0	6
Pyrene	129-00-0	--	2.3E+05	N	3.1E+06	N	6.8E+05	29	38	0	0	0	2	6
Cyanide (mg/kg)														
Cyanide	57-12-5	--	1.6E+02	N	2.0E+03	N	1.5E+02	0.08	0.1	0	0	0	3	6

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
ug/kg = Microgram per kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
ND = Not Detected
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
R-RBC = Adjusted Residential RBC
I-RBC = Adjusted Industrial RBC
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20

[A] = For inorganics, number of samples that exceed background (if available) and screening level
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Endosulfan soil RBC value used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol soil RBC value used
[7] = Pyrene RBC value was used

Table 4-4
Summary of Risk Screening Results for Soil in Lower Area Surrounding Pond/Drainage Swale
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL [A]	# of Detections	# of Samples
TAL Metals (mg/kg)														
Aluminum	7429-90-5	40,041	7,821	N	102,200	N	--	17,000	37,400	0	0	--	18	18
Antimony	7440-36-0	--	3.13	N	40.88	N	13.2	0.057	103	**3**	**2**	**3**	17	18
Arsenic	7440-38-2	15.8	0.426	C	1.91	C	0.026	0.82	12	0	0	0	18	18
Barium	7440-39-3	209	1,564	N	20,440	N	6,015	21	130.5	0	0	0	18	18
Beryllium	7440-41-7	1.02	15.64	N	204.4	N	1,154	0.42	2.6	0	0	0	18	18
Cadmium	7440-43-9	0.69	3.911	N	51.1	N	27.45	0.1175	34	**3**	0	**1**	12	18
Calcium	7440-70-2	--	--	--	--	--	--	66	2,255	--	--	--	17	18
Chromium [1]	7440-47-3	65.3	23.46	N	306.6	N	42.048	15	361	**3**	**1**	**3**	18	18
Cobalt	7440-48-4	72.3	--	--	--	--	--	1.8	41.5	--	--	--	18	18
Copper	7440-50-8	53.5	312.9	N	4088	N	10,518	7.9	38	0	0	0	18	18
Iron	7439-89-6	50,962	5,475	N	71,540	N	--	7,100	53,400	**1**	0	--	18	18
Lead [2]	7439-92-1	26.8	400	--	750	--	--	3.4	221.5	0	0	--	18	18
Magnesium	7439-95-4	--	--	--	--	--	--	610	35,000	--	--	--	18	18
Manganese	7439-96-5	2,543	156.43	N	2,044	N	951.92	79	3,900	**1**	**1**	**1**	18	18
Mercury [3]	7439-97-6	0.13	2.35	--	30.66	--	--	0.019	0.17	0	0	--	16	18
Nickel	7440-02-0	62.8	156.43	N	2,044	N	--	5.5	50	0	0	--	18	18
Potassium	7440-09-7	--	--	--	--	--	--	650	5,900	--	--	--	18	18
Selenium	7782-49-2	--	39.11	N	511	N	18.98	0.17	0.88	0	0	0	8	18
Silver	7440-22-4	--	39.11	N	511	N	31.03	0.014	0.15	0	0	0	18	18
Sodium	7440-23-5	--	--	--	--	--	--	56	339	--	--	--	18	18
Thallium	7440-28-0	2.11	0.5475	N	7.154	N	3.638	0.055	0.33	0	0	0	18	18
Vanadium	7440-62-2	108	7.821	N	102.2	N	730.1	16	130	**1**	**1**	0	18	18
Zinc	7440-66-6	202	2,346	N	30,660	N	13,622	31	1,132.5	0	0	0	18	18
Pesticides/PCBs (ug/kg)														
Dieldrin	60-57-1	--	4.0E+01	C	1.8E+02	C	2.2E+00	NT	NT	0	0	0	0	0
Endosulfan II [4]	33213-65-9	--	4.7E+04	N	6.1E+05	N	--	NT	NT	0	0	--	0	0
Endrin	72-20-8	--	2.3E+03	N	3.1E+04	N	5.4E+03	NT	NT	0	0	0	0	0
Heptachlor epoxide	1024-57-3	--	7.0E+01	C	3.1E+02	C	2.5E+01	NT	NT	0	0	0	0	0
Aroclor 1254 [5]	11097-69-1	--	1.6E+02	N	1.4E+03	C	1.1E+03	NT	NT	0	0	0	0	0
Aroclor 1260	11096-82-5	--	3.2E+02	C	1.4E+03	C	--	NT	NT	0	0	--	0	0
TCL VOCs (ug/kg)														
2-Butanone	78-93-3	--	4.7E+06	N	6.1E+07	N	2.9E+04	5.325	30	0	0	0	11	18
Acetone	67-64-1	--	7.0E+06	N	9.2E+07	N	2.2E+04	9.6	190	0	0	0	15	18
Benzene	71-43-2	--	1.2E+04	C	5.2E+04	C	1.9E+00	0.2375	0.34	0	0	0	2	18
Bromodichloromethane	75-27-4	--	1.0E+04	C	4.6E+04	C	1.1E+00	ND	ND	0	0	0	0	18
Carbon disulfide	75-15-0	--	7.8E+05	N	1.0E+07	N	1.9E+04	0.61	0.61	0	0	0	1	18
Chloroform	67-66-3	--	7.8E+04	N	1.0E+06	N	9.1E-01	0.23	1.6	0	0	**2**	3	18
Chloromethane	74-87-3	--	--	--	--	--	9.3E+02	18	18	--	--	0	1	18
Ethylbenzene	100-41-4	--	7.8E+05	N	1.0E+07	N	1.5E+04	0.4695	0.4695	0	0	0	1	18
Methyl acetate	79-20-9	--	7.8E+06	N	1.0E+08	N	2.5E+04	1.8	95	0	0	0	10	18
Methylene chloride	75-09-2	--	8.5E+04	C	3.8E+05	C	1.9E+01	4.9	24	0	0	**1**	6	18
Tetrachloroethene	127-18-4	--	1.2E+03	C	5.3E+03	C	4.7E+00	1.8	1.8	0	0	0	1	18
Toluene	108-88-3	--	6.3E+05	N	8.2E+06	N	2.7E+04	1.95	1.95	0	0	0	1	18
Trichloroethene	79-01-6	--	1.6E+03	C	7.2E+03	C	2.6E-01	1.75	1.75	0	0	**1**	1	18
Xylenes (total)	1330-20-7	--	1.6E+06	N	2.0E+07	N	3.0E+03	ND	ND	0	0	0	0	18
TCL SVOCs (ug/kg)														
1,1'-Biphenyl	92-52-4	--	3.9E+05	N	5.1E+06	N	9.6E+04	ND	ND	0	0	0	0	3
2-Methylnaphthalene	91-57-6	--	3.1E+04	N	4.1E+05	N	4.4E+03	9	9	0	0	0	1	3
4-Chloro-3-Methylphenol [6]	59-50-7	--	3.9E+02	N	5.1E+03	N	--	16	42	0	0	--	2	3
Acenaphthene	83-32-9	--	4.7E+05	N	6.1E+06	N	1.0E+05	ND	ND	0	0	0	0	3
Acenaphthylene [7]	208-96-8	--	2.3E+05	N	3.1E+06	N	--	6.5	6.5	0	0	--	1	3
Acetophenone	98-86-2	--	7.8E+05	N	1.0E+07	N	3.2E+03	55.5	55.5	0	0	0	1	3
Anthracene	120-12-7	--	2.3E+06	N	3.1E+07	N	4.7E+05	6.0025	6.0025	0	0	0	1	3
Benzo(a)anthracene	56-55-3	--	2.2E+02	C	3.9E+03	C	4.8E+02	ND	ND	0	0	0	0	3
Benzo(a)pyrene	50-32-8	--	2.2E+01	C	3.9E+02	C	1.2E+02	16	16	0	0	0	1	3
Benzo(b)fluoranthene	205-99-2	--	2.2E+02	C	3.9E+03	C	1.5E+03	27.5	27.5	0	0	0	1	3
Benzo(g,h,i)perylene [7]	191-24-2	--	2.3E+05	N	3.1E+06	N	--	10.33	10.33	0	0	--	1	3
Benzo(k)fluoranthene	207-08-9	--	2.2E+03	C	3.9E+04	C	1.5E+04	ND	ND	0	0	0	0	3
Bis(2-ethylhexyl)phthalate	117-81-7	--	4.6E+04	C	2.0E+05	C	2.9E+06	52	271	0	0	0	3	3
Butyl Benzyl Phthalate	85-68-7	--	1.6E+06	N	2.0E+07	N	1.7E+07	ND	ND	0	0	0	0	3

Table 4-4
Summary of Risk Screening Results for Soil in Lower Area Surrounding Pond/Drainage Swale
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL [A]	# of Detections	# of Samples
Caprolactam	105-60-2	--	3.9E+06	N	5.1E+07	N	--	34	34	0	0	--	1	3
Chrysene	218-01-9	--	2.2E+04	C	3.9E+05	C	4.8E+04	22.5	22.5	0	0	0	1	3
Di-n-butylphthalate	84-74-2	--	7.8E+05	N	1.0E+07	N	5.0E+06	38	295	0	0	0	3	3
Dibenz(a,h)anthracene	53-70-3	--	2.2E+01	C	3.9E+02	C	4.6E+02	ND	ND	0	0	0	0	3
Dibenzofuran	132-64-9	--	7.8E+03	N	1.0E+05	N	--	ND	ND	0	0	--	0	3
Diethylphthalate	84-66-2	--	6.3E+06	N	8.2E+07	N	4.5E+05	7	20	0	0	0	2	3
Fluoranthene	206-44-0	--	3.1E+05	N	4.1E+06	N	6.3E+06	42.5	42.5	0	0	0	1	3
Fluorene	86-73-7	--	3.1E+05	N	4.1E+06	N	1.4E+05	2.045	2.045	0	0	0	1	3
Indeno(1,2,3-cd)pyrene	193-39-5	--	2.2E+02	C	3.9E+03	C	4.2E+03	9.5	9.5	0	0	0	1	3
Naphthalene	91-20-3	--	1.6E+05	N	2.0E+06	N	1.5E+02	5	5	0	0	0	1	3
Phenanthrene [7]	85-01-8	--	2.3E+05	N	3.1E+06	N	--	38.5	38.5	0	0	--	1	3
Phenol	108-95-2	--	2.3E+06	N	3.1E+07	N	6.7E+04	ND	ND	0	0	0	0	3
Pyrene	129-00-0	--	2.3E+05	N	3.1E+06	N	6.8E+05	42	42	0	0	0	1	3
Cyanide (mg/kg)														
Cyanide	57-12-5	--	1.6E+02	N	2.0E+03	N	1.5E+02	0.08	0.165	0	0	0	2	3

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
ug/kg = Microgram per kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
ND = Not Detected
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
R-RBC = Adjusted Residential RBC
I-RBC = Adjusted Industrial RBC
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20

[A] = For inorganics, number of samples that exceed background (if available) and screening level
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Endosulfan soil RBC value used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol soil RBC value used
[7] = Pyrene RBC value was used

Table 4-5
Summary of Risk Screening Results for Soil in Upper Area Surrounding Pond
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL [A]	# of Detections	# of Samples
TAL Metals (mg/kg)														
Aluminum	7429-90-5	40,041	7,821	N	102,200	N	--	12,000	35,000	0	0	--	15	15
Antimony	7440-36-0	--	3.13	N	40.88	N	13.2	0.11	1.3	0	0	0	15	15
Arsenic	7440-38-2	15.8	0.426	C	1.91	C	0.026	0.79	7.2	0	0	0	15	15
Barium	7440-39-3	209	1,564	N	20,440	N	6,015	46	210	0	0	0	15	15
Beryllium	7440-41-7	1.02	15.64	N	204.4	N	1,154	0.36	3	0	0	0	15	15
Cadmium	7440-43-9	0.69	3.911	N	51.1	N	27.45	0.25	0.805	0	0	0	7	15
Calcium	7440-70-2	--	--	--	--	--	--	61	2,900	--	--	--	15	15
Chromium [1]	7440-47-3	65.3	23.46	N	306.6	N	42.048	17	51	0	0	0	15	15
Cobalt	7440-48-4	72.3	--	--	--	--	--	2.4	33	--	--	--	15	15
Copper	7440-50-8	53.5	312.9	N	4088	N	10,518	5.2	25	0	0	0	15	15
Iron	7439-89-6	50,962	5,475	N	71,540	N	--	12,000	53,000	**2**	0	--	15	15
Lead [2]	7439-92-1	26.8	400	--	750	--	--	10	35	0	0	--	15	15
Magnesium	7439-95-4	--	--	--	--	--	--	540	8,800	--	--	--	15	15
Manganese	7439-96-5	2,543	156.43	N	2,044	N	951.92	40	2,300	0	0	0	15	15
Mercury [3]	7439-97-6	0.13	2.35	--	30.66	--	--	0.025	0.1	0	0	--	15	15
Nickel	7440-02-0	62.8	156.43	N	2,044	N	--	5.6	39	0	0	--	15	15
Potassium	7440-09-7	--	--	--	--	--	--	550	4,300	--	--	--	15	15
Selenium	7782-49-2	--	39.11	N	511	N	18.98	0.092	0.75	0	0	0	13	15
Silver	7440-22-4	--	39.11	N	511	N	31.03	0.026	0.13	0	0	0	15	15
Sodium	7440-23-5	--	--	--	--	--	--	35	99	--	--	--	15	15
Thallium	7440-28-0	2.11	0.5475	N	7.154	N	3.638	0.14	0.39	0	0	0	15	15
Vanadium	7440-62-2	108	7.821	N	102.2	N	730.1	16	67	0	0	0	15	15
Zinc	7440-66-6	202	2,346	N	30,660	N	13,622	28	65	0	0	0	15	15
Pesticides/PCBs (ug/kg)														
Dieldrin	60-57-1	--	4.0E+01	C	1.8E+02	C	2.2E+00	NT	NT	0	0	0	0	0
Endosulfan II [4]	33213-65-9	--	4.7E+04	N	6.1E+05	N	--	NT	NT	0	0	--	0	0
Endrin	72-20-8	--	2.3E+03	N	3.1E+04	N	5.4E+03	NT	NT	0	0	0	0	0
Heptachlor epoxide	1024-57-3	--	7.0E+01	C	3.1E+02	C	2.5E+01	NT	NT	0	0	0	0	0
Aroclor 1254 [5]	11097-69-1	--	1.6E+02	N	1.4E+03	C	1.1E+03	NT	NT	0	0	0	0	0
Aroclor 1260	11096-82-5	--	3.2E+02	C	1.4E+03	C	--	NT	NT	0	0	--	0	0
TCL VOCs (ug/kg)														
2-Butanone	78-93-3	--	4.7E+06	N	6.1E+07	N	2.9E+04	13	47	0	0	0	6	15
Acetone	67-64-1	--	7.0E+06	N	9.2E+07	N	2.2E+04	7.3	380	0	0	0	13	15
Benzene	71-43-2	--	1.2E+04	C	5.2E+04	C	1.9E+00	ND	ND	0	0	0	0	15
Bromodichloromethane	75-27-4	--	1.0E+04	C	4.6E+04	C	1.1E+00	ND	ND	0	0	0	0	15
Carbon disulfide	75-15-0	--	7.8E+05	N	1.0E+07	N	1.9E+04	0.255	0.68	0	0	0	6	15
Chloroform	67-66-3	--	7.8E+04	N	1.0E+06	N	9.1E-01	0.36	5.1	0	0	**1**	3	15
Chloromethane	74-87-3	--	--	--	--	--	9.3E+02	21	21	--	--	0	1	15
Ethylbenzene	100-41-4	--	7.8E+05	N	1.0E+07	N	1.5E+04	ND	ND	0	0	0	0	15
Methyl acetate	79-20-9	--	7.8E+06	N	1.0E+08	N	2.5E+04	1.9	22	0	0	0	10	15
Methylene chloride	75-09-2	--	8.5E+04	C	3.8E+05	C	1.9E+01	4.8	28	0	0	**1**	2	15
Tetrachloroethene	127-18-4	--	1.2E+03	C	5.3E+03	C	4.7E+00	ND	ND	0	0	0	0	15
Toluene	108-88-3	--	6.3E+05	N	8.2E+06	N	2.7E+04	1	1	0	0	0	1	15
Trichloroethene	79-01-6	--	1.6E+03	C	7.2E+03	C	2.6E-01	ND	ND	0	0	0	0	15
Xylenes (total)	1330-20-7	--	1.6E+06	N	2.0E+07	N	3.0E+03	ND	ND	0	0	0	0	15
TCL SVOCs (ug/kg)														
1,1'-Biphenyl	92-52-4	--	3.9E+05	N	5.1E+06	N	9.6E+04	NT	NT	0	0	0	0	0
2-Methylnaphthalene	91-57-6	--	3.1E+04	N	4.1E+05	N	4.4E+03	NT	NT	0	0	0	0	0
4-Chloro-3-Methylphenol [6]	59-50-7	--	3.9E+02	N	5.1E+03	N	--	NT	NT	0	0	--	0	0
Acenaphthene	83-32-9	--	4.7E+05	N	6.1E+06	N	1.0E+05	NT	NT	0	0	0	0	0
Acenaphthylene [7]	208-96-8	--	2.3E+05	N	3.1E+06	N	--	NT	NT	0	0	--	0	0
Acetophenone	98-86-2	--	7.8E+05	N	1.0E+07	N	3.2E+03	NT	NT	0	0	0	0	0
Anthracene	120-12-7	--	2.3E+06	N	3.1E+07	N	4.7E+05	NT	NT	0	0	0	0	0
Benzo(a)anthracene	56-55-3	--	2.2E+02	C	3.9E+03	C	4.8E+02	NT	NT	0	0	0	0	0
Benzo(a)pyrene	50-32-8	--	2.2E+01	C	3.9E+02	C	1.2E+02	NT	NT	0	0	0	0	0
Benzo(b)fluoranthene	205-99-2	--	2.2E+02	C	3.9E+03	C	1.5E+03	NT	NT	0	0	0	0	0
Benzo(g,h,i)perylene [7]	191-24-2	--	2.3E+05	N	3.1E+06	N	--	NT	NT	0	0	--	0	0
Benzo(k)fluoranthene	207-08-9	--	2.2E+03	C	3.9E+04	C	1.5E+04	NT	NT	0	0	0	0	0
Bis(2-ethylhexyl)phthalate	117-81-7	--	4.6E+04	C	2.0E+05	C	2.9E+06	NT	NT	0	0	0	0	0
Butyl Benzyl Phthalate	85-68-7	--	1.6E+06	N	2.0E+07	N	1.7E+07	NT	NT	0	0	0	0	0

Table 4-5
Summary of Risk Screening Results for Soil in Upper Area Surrounding Pond
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL [A]	# of Detections	# of Samples
Caprolactam	105-60-2	--	3.9E+06	N	5.1E+07	N	--	NT	NT	0	0	--	0	0
Chrysene	218-01-9	--	2.2E+04	C	3.9E+05	C	4.8E+04	NT	NT	0	0	0	0	0
Di-n-butylphthalate	84-74-2	--	7.8E+05	N	1.0E+07	N	5.0E+06	NT	NT	0	0	0	0	0
Dibenz(a,h)anthracene	53-70-3	--	2.2E+01	C	3.9E+02	C	4.6E+02	NT	NT	0	0	0	0	0
Dibenzofuran	132-64-9	--	7.8E+03	N	1.0E+05	N	--	NT	NT	0	0	--	0	0
Diethylphthalate	84-66-2	--	6.3E+06	N	8.2E+07	N	4.5E+05	NT	NT	0	0	0	0	0
Fluoranthene	206-44-0	--	3.1E+05	N	4.1E+06	N	6.3E+06	NT	NT	0	0	0	0	0
Fluorene	86-73-7	--	3.1E+05	N	4.1E+06	N	1.4E+05	NT	NT	0	0	0	0	0
Indeno(1,2,3-cd)pyrene	193-39-5	--	2.2E+02	C	3.9E+03	C	4.2E+03	NT	NT	0	0	0	0	0
Naphthalene	91-20-3	--	1.6E+05	N	2.0E+06	N	1.5E+02	NT	NT	0	0	0	0	0
Phenanthrene [7]	85-01-8	--	2.3E+05	N	3.1E+06	N	--	NT	NT	0	0	--	0	0
Phenol	108-95-2	--	2.3E+06	N	3.1E+07	N	6.7E+04	NT	NT	0	0	0	0	0
Pyrene	129-00-0	--	2.3E+05	N	3.1E+06	N	6.8E+05	NT	NT	0	0	0	0	0
Cyanide (mg/kg)														
Cyanide	57-12-5	--	1.6E+02	N	2.0E+03	N	1.5E+02	NT	NT	0	0	0	0	0

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
ug/kg = Microgram per kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
ND = Not Detected
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
R-RBC = Adjusted Residential RBC
I-RBC = Adjusted Industrial RBC
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20

[A] = For inorganics, number of samples that exceed background (if available) and screening level
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Endosulfan soil RBC value used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol soil RBC value used
[7] = Pyrene RBC value was used

Table 4-6
Summary of Risk Screening Results for Total Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL[A]	# of Detections	# of Samples
TAL Metals (mg/kg)														
Aluminum	7429-90-5	40,041	7,821	N	102,200	N	--	11,900	38,900	0	0	--	64	64
Antimony	7440-36-0	--	3.13	N	40.88	N	13.2	0.045	340	**14**	**4**	**10**	62	64
Arsenic	7440-38-2	15.8	0.426	C	1.91	C	0.026	0.79	12	0	0	0	64	64
Barium	7440-39-3	209	1,564	N	20,440	N	6,015	21	230	0	0	0	64	64
Beryllium	7440-41-7	1.02	15.64	N	204.4	N	1,154	0.36	3.2	0	0	0	64	64
Cadmium	7440-43-9	0.69	3.911	N	51.1	N	27.45	0.1175	120	**9**	**1**	**3**	39	64
Calcium	7440-70-2	--	--	--	--	--	--	57	4,440	--	--	--	61	64
Chromium [1]	7440-47-3	65.3	23.46	N	306.6	N	42.048	9.3	1,500	**8**	**3**	**8**	64	64
Cobalt	7440-48-4	72.3	--	--	--	--	--	1.8	51	--	--	--	64	64
Copper	7440-50-8	53.5	312.9	N	4088	N	10,518	1.4	110	0	0	0	64	64
Iron	7439-89-6	50,962	5,475	N	71,540	N	--	7,100	87,000	**13**	**3**	--	64	64
Lead [2]	7439-92-1	26.8	400	--	750	--	--	0.86	680	**1**	0	--	64	64
Magnesium	7439-95-4	--	--	--	--	--	--	487	35,000	--	--	--	64	64
Manganese	7439-96-5	2,543	156.43	N	2,044	N	951.92	40	7,700	**8**	**8**	**8**	64	64
Mercury [3]	7439-97-6	0.13	2.35	--	30.66	--	--	0.012	0.76	0	0	--	60	64
Nickel	7440-02-0	62.8	156.43	N	2,044	N	--	4.9	75	0	0	--	64	64
Potassium	7440-09-7	--	--	--	--	--	--	528	5,900	--	--	--	64	64
Selenium	7782-49-2	--	39.11	N	511	N	18.98	0.0698	0.89	0	0	0	44	64
Silver	7440-22-4	--	39.11	N	511	N	31.03	0.014	0.2	0	0	0	64	64
Sodium	7440-23-5	--	--	--	--	--	--	33	1,100	--	--	--	64	64
Thallium	7440-28-0	2.11	0.5475	N	7.154	N	3.638	0.041	0.77	0	0	0	64	64
Vanadium	7440-62-2	108	7.821	N	102.2	N	730.1	11	1,200	**4**	**4**	**1**	64	64
Zinc	7440-66-6	202	2,346	N	30,660	N	13,622	9.3	3,700	**1**	0	0	64	64
Pesticides/PCBs (ug/kg)														
Dieldrin	60-57-1	--	4.0E+01	C	1.8E+02	C	2.2E+00	1.6	13	0	0	**3**	5	20
Endosulfan II [4]	33213-65-9	--	4.7E+04	N	6.1E+05	N	--	140	140	0	0	--	1	20
Endrin	72-20-8	--	2.3E+03	N	3.1E+04	N	5.4E+03	2.7	6.2	0	0	0	2	20
Heptachlor epoxide	1024-57-3	--	7.0E+01	C	3.1E+02	C	2.5E+01	3.44	9.6	0	0	0	2	20
Aroclor 1254 [5]	11097-69-1	--	1.6E+02	N	1.4E+03	C	1.1E+03	12	2,000	**7**	**1**	**1**	11	20
Aroclor 1260	11096-82-5	--	3.2E+02	C	1.4E+03	C	--	60	2,000	**2**	**1**	--	6	20
TCL VOCs (ug/kg)														
2-Butanone	78-93-3	--	4.7E+06	N	6.1E+07	N	2.9E+04	5.325	47	0	0	0	28	64
Acetone	67-64-1	--	7.0E+06	N	9.2E+07	N	2.2E+04	7.3	380	0	0	0	59	64
Benzene	71-43-2	--	1.2E+04	C	5.2E+04	C	1.9E+00	0.19	0.34	0	0	0	4	64
Bromodichloromethane	75-27-4	--	1.0E+04	C	4.6E+04	C	1.1E+00	1.2	1.2	0	0	**1**	1	64
Carbon disulfide	75-15-0	--	7.8E+05	N	1.0E+07	N	1.9E+04	0.255	5.2	0	0	0	20	64
Chloroform	67-66-3	--	7.8E+04	N	1.0E+06	N	9.1E-01	0.23	24	0	0	**7**	10	64
Chloromethane	74-87-3	--	--	--	--	--	9.3E+02	18	21	--	--	0	3	64
Ethylbenzene	100-41-4	--	7.8E+05	N	1.0E+07	N	1.5E+04	0.4695	0.4695	0	0	0	1	64
Methyl acetate	79-20-9	--	7.8E+06	N	1.0E+08	N	2.5E+04	1.8	95	0	0	0	39	64
Methylene chloride	75-09-2	--	8.5E+04	C	3.8E+05	C	1.9E+01	3.6	28	0	0	**2**	16	64
Tetrachloroethene	127-18-4	--	1.2E+03	C	5.3E+03	C	4.7E+00	0.59	1.8	0	0	0	2	64
Toluene	108-88-3	--	6.3E+05	N	8.2E+06	N	2.7E+04	1	1.95	0	0	0	2	64
Trichloroethene	79-01-6	--	1.6E+03	C	7.2E+03	C	2.6E-01	1.75	3.74	0	0	**2**	2	64
Xylenes (total)	1330-20-7	--	1.6E+06	N	2.0E+07	N	3.0E+03	6.2	6.2	0	0	0	1	64
TCL SVOCs (ug/kg)														
1,1'-Biphenyl	92-52-4	--	3.9E+05	N	5.1E+06	N	9.6E+04	0.6025	1.4	0	0	0	5	30
2-Methylnaphthalene	91-57-6	--	3.1E+04	N	4.1E+05	N	4.4E+03	0.81	9	0	0	0	12	30
4-Chloro-3-Methylphenol [6]	59-50-7	--	3.9E+02	N	5.1E+03	N	--	16	44	0	0	--	9	30
Acenaphthene	83-32-9	--	4.7E+05	N	6.1E+06	N	1.0E+05	0.56	12	0	0	0	8	30
Acenaphthylene [7]	208-96-8	--	2.3E+05	N	3.1E+06	N	--	2	6.5	0	0	--	2	30
Acetophenone	98-86-2	--	7.8E+05	N	1.0E+07	N	3.2E+03	55.5	55.5	0	0	0	1	30
Anthracene	120-12-7	--	2.3E+06	N	3.1E+07	N	4.7E+05	6.0025	20	0	0	0	2	30
Benzo(a)anthracene	56-55-3	--	2.2E+02	C	3.9E+03	C	4.8E+02	0.86	42	0	0	0	8	30
Benzo(a)pyrene	50-32-8	--	2.2E+01	C	3.9E+02	C	1.2E+02	1.8	31	**2**	0	0	7	30
Benzo(b)fluoranthene	205-99-2	--	2.2E+02	C	3.9E+03	C	1.5E+03	1.9	55	0	0	0	7	30
Benzo(g,h,i)perylene [7]	191-24-2	--	2.3E+05	N	3.1E+06	N	--	8	15	0	0	--	3	30
Benzo(k)fluoranthene	207-08-9	--	2.2E+03	C	3.9E+04	C	1.5E+04	7.1	19	0	0	0	2	30
Bis(2-ethylhexyl)phthalate	117-81-7	--	4.6E+04	C	2.0E+05	C	2.9E+06	17	560	0	0	0	30	30
Butyl Benzyl Phthalate	85-68-7	--	1.6E+06	N	2.0E+07	N	1.7E+07	2.95	44	0	0	0	10	30

Table 4-6
Summary of Risk Screening Results for Total Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL[A]	# of Detections	# of Samples
Caprolactam	105-60-2	--	3.9E+06	N	5.1E+07	N	--	11	36	0	0	--	4	30
Chrysene	218-01-9	--	2.2E+04	C	3.9E+05	C	4.8E+04	0.81	40	0	0	0	9	30
Di-n-butylphthalate	84-74-2	--	7.8E+05	N	1.0E+07	N	5.0E+06	9	430	0	0	0	30	30
Dibenz(a,h)anthracene	53-70-3	--	2.2E+01	C	3.9E+02	C	4.6E+02	2.7	3.5	0	0	0	2	30
Dibenzofuran	132-64-9	--	7.8E+03	N	1.0E+05	N	--	5.8	5.8	0	0	--	1	30
Diethylphthalate	84-66-2	--	6.3E+06	N	8.2E+07	N	4.5E+05	0.55	20	0	0	0	22	30
Fluoranthene	206-44-0	--	3.1E+05	N	4.1E+06	N	6.3E+06	12	99	0	0	0	5	30
Fluorene	86-73-7	--	3.1E+05	N	4.1E+06	N	1.4E+05	2.045	10	0	0	0	7	30
Indeno(1,2,3-cd)pyrene	193-39-5	--	2.2E+02	C	3.9E+03	C	4.2E+03	2.7	42	0	0	0	5	30
Naphthalene	91-20-3	--	1.6E+05	N	2.0E+06	N	1.5E+02	0.293	7	0	0	0	19	30
Phenanthrene[7]	85-01-8	--	2.3E+05	N	3.1E+06	N	--	13	97	0	0	--	4	30
Phenol	108-95-2	--	2.3E+06	N	3.1E+07	N	6.7E+04	0.883	2.3	0	0	0	4	30
Pyrene	129-00-0	--	2.3E+05	N	3.1E+06	N	6.8E+05	0.43	81	0	0	0	11	30
Cyanide (mg/kg)														
Cyanide	57-12-5	--	1.6E+02	N	2.0E+03	N	1.5E+02	0.05	0.165	0	0	0	6	12

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
ug/kg = Microgram per kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
ND = Not Detected
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
R-RBC = Adjusted Residential RBC
I-RBC = Adjusted Industrial RBC
SSL DAF20 = Soil Screening Levels at a Dilution Attenuation Factor of 20

[A] = For inorganics, number of samples that exceed background (if available) and screening level
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Endosulfan soil RBC value used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol soil RBC value used
[7] = Pyrene RBC value was used

Table 4-7
Summary of Detected Chemicals in Groundwater Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS	C/N	Adjusted Tap Water RBC	MCL	57MW2 2/13/2008		MDL	RL	57MW2-DUP(DUP-7) 2/13/2008		MDL	RL	57MW3 2/13/2008		MDL	RL
					Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Perchlorate (ug/L)																
Perchlorate	14797-73-0	N	2.555	--	<0.2	U	0.08	0.2	<0.2	U	0.08	0.2	0.16	J	0.08	0.2
TAL Metals (ug/L)																
Aluminum, Total	7429-90-5	N	3,650	--	73	J,J,f	44	200	460	,J,f	44	200	1,400		44	200
Antimony, Dissolved	7440-36-0	N	1.46	6	5.5		0.44	3	5.1		0.44	3	0.48	J,B,o	0.44	3
Antimony, Total	7440-36-0	N	1.46	6	4.8		0.44	3	4.1		0.44	3	<3	U	0.44	3
Arsenic, Dissolved	7440-38-2	C	0.0446	10	2.3	J	0.74	3	2	J	0.74	3	0.94	J	0.74	3
Arsenic, Total	7440-38-2	C	0.0446	10	2.6	J	0.74	3	2.7	J	0.74	3	1.1	J	0.74	3
Barium, Dissolved	7440-39-3	N	730	2,000	8.1		0.52	2	7.8		0.52	2	11		0.52	2
Barium, Total	7440-39-3	N	730	2,000	8.5		0.52	2	12		0.52	2	17		0.52	2
Cadmium, Dissolved	7440-43-9	N	1.825	5	0.15	J	0.062	0.2	0.13	J	0.062	0.2	<0.2	U	0.062	0.2
Cadmium, Total	7440-43-9	N	1.825	5	0.18	J	0.062	0.2	0.2	J	0.062	0.2	<0.2	U	0.062	0.2
Calcium, Dissolved	7440-70-2	--	--	--	30,000		40	500	30,000		40	500	25,000		40	500
Calcium, Total	7440-70-2	--	--	--	31,000		40	500	36,000		40	500	44,000		40	500
Chromium, Dissolved [1]	7440-47-3	C	10.95	100	2.9		0.31	2	2.5	,B,p	0.31	2	6.6		0.31	2
Chromium, Total [1]	7440-47-3	C	10.95	100	3.7		0.31	2	5.2		0.31	2	17		0.31	2
Cobalt, Dissolved	7440-48-4	--	--	--	0.97	J	0.096	1	0.87	J	0.096	1	1.6		0.096	1
Cobalt, Total	7440-48-4	--	--	--	0.98	J	0.096	1	1.5		0.096	1	2.2		0.096	1
Copper, Dissolved	7440-50-8	N	146	1,300	4.1		0.33	1	1.9		0.33	1	2.2		0.33	1
Copper, Total	7440-50-8	N	146	1,300	1.5	,J,f	0.33	1	8.1	,J,f	0.33	1	3.1		0.33	1
Iron, Dissolved	7439-89-6	N	2,555	--	8.8	J,J,f	5.7	20	74	,J,f	5.7	20	10	J	5.7	20
Iron, Total	7439-89-6	N	2,555	--	150	,J,f	5.7	20	630	,J,f	5.7	20	2,200		5.7	20
Lead, Total [2]	7439-92-1	--	15	--	<1	U	0.33	1	0.71	J	0.33	1	0.71	J	0.33	1
Magnesium, Dissolved	7439-95-4	--	--	--	11,000		38	500	11,000		38	500	12,000		38	500
Magnesium, Total	7439-95-4	--	--	--	12,000		38	500	14,000		38	500	23,000		38	500
Manganese, Dissolved	7439-96-5	N	73	--	190		0.43	3	160		0.43	3	8.6		0.43	3
Manganese, Total	7439-96-5	N	73	--	210	,L,m	0.43	3	250	,L,m	0.43	3	37	,L,m	0.43	3
Nickel, Dissolved	7440-02-0	N	73	--	5.7		0.28	2	4.8		0.28	2	6.7		0.28	2
Nickel, Total	7440-02-0	N	73	--	5.7		0.28	2	6.6		0.28	2	10		0.28	2
Potassium, Dissolved	7440-09-7	--	--	--	2,300		54	200	2,200		54	200	2,400		54	200
Potassium, Total	7440-09-7	--	--	--	2,400		54	200	2,700		54	200	3,000		54	200
Sodium, Dissolved	7440-23-5	--	--	--	19,000		84	500	19,000		84	500	21,000		84	500
Sodium, Total	7440-23-5	--	--	--	19,000		84	500	19,000		84	500	22,000		84	500
Vanadium, Dissolved	7440-62-2	N	3.65	--	2.5	J	0.83	5	2.5	J	0.83	5	0.89	J	0.83	5
Vanadium, Total	7440-62-2	N	3.65	--	3.1	J	0.83	5	3.7	J	0.83	5	3.3	J	0.83	5
Zinc, Dissolved	7440-66-6	N	1,095	--	6.4	J,B,p	0.84	10	4.2	J,B,p	0.84	10	5.1	J,B,p	0.84	10
Zinc, Total	7440-66-6	N	1,095	--	25	,B,x	0.84	10	10	,B,x	0.84	10	10	,B,x	0.84	10
Pesticides (ug/L)																
Endosulfan II [3]	33213-65-9	N	21.9	--	<0.1	U	0.0018	0.1	0.0028	J	0.0018	0.1	<0.1	U	0.0018	0.1
TCL VOCs (ug/L)																
1,3-Dichlorobenzene	541-73-1	N	1.825	--	<1	U	0.12	1	<1	U	0.12	1	0.18	J	0.12	1
Acetone	67-64-1	N	547.5	--	<20	U	1.2	20	<20	U	1.2	20	9.1	J,B,z	1.2	20
Chloroform	67-66-3	C	0.155	80	0.4	J	0.061	1	0.38	J	0.061	1	57		0.061	1
Toluene	108-88-3	N	227.1	1,000	0.14	J,B,y	0.072	1	0.38	J,B,y	0.072	1	0.64	J,B,y	0.072	1
TCL SVOCs (ug/L)																
2-Methylnaphthalene	91-57-6	N	2.433	--	<5	U	0.015	5	<5	U	0.015	5	0.019	J	0.015	5
Acetophenone	98-86-2	N	60.83	--	<5	U	0.043	5	<5	U	0.043	5	0.057	J,B,x	0.043	5
Benzaldehyde	100-52-7	N	365	--	<5	U	0.051	5	0.057	J,B,x	0.051	5	0.085	J,B,x	0.051	5
Butyl Benzyl Phthalate	85-68-7	N	730	--	0.029	J,B,x	0.029	5	0.15	J,B,x	0.029	5	<5	U	0.029	5
Diethylphthalate	84-66-2	N	2,920	--	0.038	J,B,x	0.034	5	0.038	J,B,x	0.034	5	0.085	J,B,x	0.034	5
Di-n-butylphthalate	84-74-2	N	365	--	<5	U	0.38	5	2.9	J,B,x	0.38	5	2.1	J,B,x	0.38	5
Isophorone	78-59-1	C	70.5	--	0.086	J,B,z	0.031	5	0.057	J,B,z	0.031	5	0.075	J,B,z	0.031	5
Naphthalene [4]	91-20-3	N	0.651	--	<0.5	U	0.023	0.5	0.038	J,B,x	0.023	0.5	0.038	J,B,x	0.023	0.5

Table 4-7
Summary of Detected Chemicals in Groundwater Analytical Samples
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS	C/N	Adjusted Tap Water RBC	MCL	57MW2 2/13/2008		MDL	RL	57MW2-DUP(DUP-7) 2/13/2008		MDL	RL	57MW3 2/13/2008		MDL	RL
					Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Field Parameters																
Dissolved Oxygen (mg/L)	--	--	--	--	0.0				0.0				5.55			
Oxidation Reduction Potential (mV)	--	--	--	--	37				37				108			
pH (SU)	--	--	--	--	7				7				7.38			
Conductivity (mS)	--	--	--	--	0.361				0.361				0.39			
Temperature (°C)	--	--	--	--	17.83				17.83				10.28			
Turbidity (NTU)	--	--	--	--	15.02				15.02				78.4			

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested
mg/L = Milligram Per Liter
mV = millivolt
SU = Standard Units
mS = milliSiemen
°C = degrees Celcius
NTU = Nephelometric Turbidity

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2007)
N = Noncarcinogenic per EPA RBC Table (October 2007)
MCL = Maximum Contaminant Level

[1] = Chromium VI RBC used for screening
[2] = USEPA Action Level used for screening
[3] = Endosulfan RBC used for screening
[4] = Pyrene RBC used for screening

=Exceeds MCL

=Exceeds Adjusted T-RBC

Data Qualifiers:
B = Not detected substantially above the level reported in laboratory or field blanks.
J = Analyte present. Reported value may not be accurate or precise.
L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.
U = Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
f = Field duplicate imprecision
m = MS/MSD recovery failure.
o = Calibration blank contamination
p = Preparation blank contamination
x = Field and/or equipment blank contamination
y = Trip blank contamination
z = Method blank and/or storage blank contamination

Table 4-8
Summary of Risk Screening Results for Groundwater
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Adjusted T-TBC	C/N	MCL	Minimum Detected Concentration	Maximum Detected Concentration	# Samples that Exceed Adj. T-RBC	# Samples that Exceed MCL	# of Detections	# of Samples
Perchlorate (ug/L)										
Perchlorate	14797-73-0	2.555	N	--	0.16	0.16	0	--	1	2
TAL Metals (ug/L)										
Aluminum	7429-90-5	3,650	N	--	266.5	1,400	0	--	2	2
Antimony, Dissolved	7440-36-0	1.46	N	6	0.48	5.3	**1**	0	2	2
Antimony	7440-36-0	1.46	N	6	4.45	4.45	**1**	0	1	2
Arsenic, Dissolved	7440-38-2	0.0446	C	10	0.94	2.15	**2**	0	2	2
Arsenic	7440-38-2	0.0446	C	10	1.1	2.65	**2**	0	2	2
Barium, Dissolved	7440-39-3	730	N	2,000	7.95	11	0	0	2	2
Barium	7440-39-3	730	N	2,000	10.25	17	0	0	2	2
Cadmium, Dissolved	7440-43-9	2	N	5	0.14	0.14	0	0	1	2
Cadmium	7440-43-9	1.83	N	5	0.19	0.19	0	0	1	2
Calcium, Dissolved	7440-70-2	--	--	--	25,000	30,000	--	--	2	2
Calcium	7440-70-2	--	--	--	33,500	44,000	--	--	2	2
Chromium, Dissolved [1]	7440-47-3	10.95	C	100	2.7	6.6	0	0	2	2
Chromium [1]	7440-47-3	10.95	C	100	4.45	17	**1**	0	2	2
Cobalt, Dissolved	7440-48-4	--	--	--	0.92	1.6	--	--	2	2
Cobalt	7440-48-4	--	--	--	1.24	2.2	--	--	2	2
Copper, Dissolved	7440-50-8	146	N	1,300	2.2	3	0	0	2	2
Copper	7440-50-8	146	N	1,300	3.1	4.8	0	0	2	2
Iron, Dissolved	7439-89-6	2,555	N	--	10	41.4	0	--	2	2
Iron	7439-89-6	2,555	N	--	390	2,200	0	--	2	2
Lead [2]	7439-92-1	15	--	--	0.4375	0.71	0	--	2	2
Magnesium, Dissolved	7439-95-4	--	--	--	11,000	12,000	--	--	2	2
Magnesium	7439-95-4	--	--	--	13,000	23,000	--	--	2	2
Manganese, Dissolved	7439-96-5	73	N	--	8.6	175	**1**	--	2	2
Manganese	7439-96-5	73	N	--	37	230	**1**	--	2	2
Nickel, Dissolved	7440-02-0	73	N	--	5.25	6.7	0	--	2	2
Nickel	7440-02-0	73	N	--	6.15	10	0	--	2	2
Potassium, Dissolved	7440-09-7	--	--	--	2,250	2,400	--	--	2	2
Potassium	7440-09-7	--	--	--	2,550	3,000	--	--	2	2
Sodium, Dissolved	7440-23-5	--	--	--	19,000	21,000	--	--	2	2
Sodium	7440-23-5	--	--	--	19,000	22,000	--	--	2	2
Vanadium, Dissolved	7440-62-2	3.65	N	--	0.89	2.5	0	--	2	2
Vanadium	7440-62-2	3.65	N	--	3.3	3.4	0	--	2	2
Zinc, Dissolved	7440-66-6	1,095	N	--	5.1	5.3	0	--	2	2
Zinc	7440-66-6	1,095	N	--	10	17.5	0	--	2	2
Pesticides (ug/L)										
Endosulfan II [3]	33213-65-9	21.9	N	--	0.00185	0.00185	0	--	1	2
TCL VOCs (ug/L)										
1,3-Dichlorobenzene	541-73-1	1.825	N	--	0.18	0.18	0	--	1	2
Acetone	67-64-1	547.5	N	--	9.1	9.1	0	--	1	2
Chloroform	67-66-3	0.155	C	80	0.39	57	**2**	0	2	2
Toluene	108-88-3	227.1	N	1,000	0.26	0.64	0	0	2	2

Table 4-8
Summary of Risk Screening Results for Groundwater
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	CAS #	Adjusted T-TBC	C/N	MCL	Minimum Detected Concentration	Maximum Detected Concentration	# Samples that Exceed Adj. T-RBC	# Samples that Exceed MCL	# of Detections	# of Samples
TCL SVOCs (ug/L)										
2-Methylnaphthalene	91-57-6	2.433	N	--	0.019	0.019	0	--	1	2
Acetophenone	98-86-2	60.83	N	--	0.057	0.057	0	--	1	2
Benzaldehyde	100-52-7	365	N	--	0.0413	0.085	0	--	2	2
Butyl Benzyl Phthalate	85-68-7	730	N	--	0.0895	0.0895	0	--	1	2
Diethylphthalate	84-66-2	2,920	N	--	0.038	0.085	0	--	2	2
Di-n-butylphthalate	84-74-2	365	N	--	1.545	2.1	0	--	2	2
Isophorone	78-59-1	70.5	C	--	0.0715	0.075	0	--	2	2
Naphthalene[4]	91-20-3	0.651	N	--	0.0248	0.038	0	--	2	2

Notes:
CAS = Chemical Abstract Service
TAL = Target Analyte List
ug/L = Microgram Per Liter
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
T-RBC = Adjusted Tap Water RBC
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
MCL = Maximum Contaminant Level
[1] = Chromium VI RBC value was used
[2] = USEPA Action Level used for screening
[3] = Endosulfan RBC used for screening
[4] = Pyrene RBC used for screening

5.0 CONTAMINANT FATE AND TRANSPORT

This section discusses the fate and transport of site-related COPCs identified in the nature and extent assessment. Primary fate and transport mechanisms occurring at the site are discussed. The objective of the fate and transport analysis is to identify the primary mechanisms affecting the distribution and migration of COPCs and their ultimate fate. COPCs identified at the site are summarized in the following table.

Site COPCs/COPECs for Nature and Extent Assessment

Soil – Human Health	SSL DAF20	Groundwater	Ecological
Antimony	Antimony	Antimony	Aluminum
Cadmium	Cadmium	Arsenic	Antimony
Chromium	Chromium	Manganese	Cadmium
Iron	Manganese	Chloroform	Chromium
Lead	Vanadium		Iron
Manganese	Dieldrin		Lead
Vanadium	Aroclor 1254		Mercury
Zinc	Chloroform		Zinc
Aroclor 1254	Methylene Chloride		
Aroclor 1260			
Benzo(a)pyrene			

The potential for transport of chemicals in environmental media is largely controlled by the physiochemical properties of the chemicals and the matrix through which they travel or migrate. Table 5-1a describes the physiochemical properties of chemicals that affect their fate in environmental media. Table 5-1b describes the fate processes affecting metals including: ion exchange, chemical speciation, and ORP. Table 5-1c describes the fate processes affecting organic chemicals including: sorption, volatilization, hydrolysis, and abiotic and biotic degradation. Chemicals can be transported with little attenuation or retardation due to these fate processes or they can be delayed or transformed so that minimal migration occurs. The physical and chemical properties of organic COPCs detected in soil and/or groundwater are summarized in Table 5-2.

Primary fate and transport mechanisms for COPCs potentially present at the site include the following:

- Volatilization of chemicals from soil and groundwater;
- Erosion of particulate-bound chemicals from soil;
- Degradation of chemicals in soil and groundwater;
- Leaching of chemicals from soil with infiltrating water; and
- Transport of chemicals with groundwater flow.

Fate and transport processes for site media are discussed in the following sections.

5.1 FATE AND TRANSPORT - SOIL

Fate and transport processes for soil are discussed in the following sections including volatilization, erosion and mass transport, and degradation of chemicals in soil, and leaching of chemical from soil with infiltrating water.

5.1.1 Volatilization

Volatilization can significantly affect the distribution of a chemical in the environment. This process will result in the mass and concentration of a chemical in soil and/or groundwater as the chemical volatilizes to soil gas and ultimately discharges to the atmosphere. Volatilization reactions are most significant in

surface soil that is in direct (or near-direct) contact with the atmosphere. These reactions may also occur in groundwater with VOCs. Chemical volatility is typically quantified by a chemical's Henry's constant, which may be calculated from the chemical's vapor pressure, molecular weight, and solubility. The lower the Henry's constant, the less volatile the chemical. Values of Henry's constant for soil COPCs are summarized in Table 5-2.

Two VOCs were identified as COPCs for the soil-to-groundwater migration pathway based on detections in one or more samples above default SSLs. Low concentrations of these COPCs have been detected in surface soil and therefore, volatilization is not expected to be a significant influence on the fate of these compounds in soil. Other COPCs at the site are characterized by low Henry's constants (i.e., < 0.01) and are not VOCs, and therefore, volatilization is not expected to be a significant influence on the fate of these compounds at the site.

5.1.2 Erosion Processes in Soil

Erosion processes can substantially affect the distribution of soil-bound particulates in the environment and thus influence the distribution of constituents in soil. High winds can scour fine particles from the soil surface and redistribute these particles downwind. Mass transport from surface water runoff during heavy precipitation events can also scour fine soil particles from surface soil, eventually depositing the particles during sedimentation downstream. These erosion processes often represent the primary mechanism for transport of otherwise immobile chemicals such as PCBs.

Surface water drainage occurs away from enclosed pond area via a grass covered drainage swale as shown on Figure 2-4. Potential overland runoff and deposition of metals in surface soil within drainage ditch was indicated by concentrations of antimony and chromium substantially above their background point estimate and above their adjusted I-RBC. Cadmium concentrations were also above their background estimate and adjusted R-RBC in the drainage ditch. Metals concentrations in surface soil decreased with distance away from the pond and with depth (Figure 4-1).

PCB detections above adjusted RBCs were limited to areas within the enclosed pond, where surface water runoff and transport of these chemicals is prevented by an asphalt berm encircling the pond (Figure 4-2).

5.1.3 Degradation of Chemicals in Soil

Many organic chemicals that are found in the environment are subject to naturally occurring biotic (biologically based) and abiotic (non-biologically based) transformation reactions. These reactions result in degradation of the chemical. Biodegradation reactions can occur under aerobic (in the presence of oxygen) and anaerobic (in the absence of oxygen) conditions. During biodegradation, naturally occurring microorganisms in the subsurface transform a chemical to another state as a direct or indirect consequence of their metabolic processes. In many cases, biodegradation reactions break down organic chemicals to less toxic forms.

Several naturally occurring abiotic reactions can significantly affect the fate of chemicals in the environment. Common abiotic reactions include photodegradation and hydrolysis. Photodegradation is the process of decomposition of a chemical upon exposure to radiant energy such as the action of light, and is most significant to chemicals in surface soil that are in direct contact with sunlight. Hydrolysis is the degradation reaction of the chemical with components of water (e.g., hydroxyl and hydronium ions) and is therefore most important in saturated environments.

5.1.3.1 VOCs

VOCs were detected at low concentrations in soil at the site. COPCs identified for the soil-to-groundwater migration pathway were halogenated compounds (chloroform and methylene chloride).

Chloroform

Chloroform is released into the environment from its manufacture and use; its formation in the chlorination of drinking water, municipal and industrial waste water, and swimming pool and spa water; and from other water treatment processes involving chlorination. Under anaerobic conditions, some bacteria can dehalogenate carbon tetrachloride to release chloroform. Carbon tetrachloride has not been detected in soil samples. Chloroform has been used as a carrier or solvent for some pesticides (HSDB 1996). Chloroform has been detected in soil at a concentration below its adjusted RBCs but above its default SSL DAF20 and in groundwater samples at concentrations above its T-RBC.

Methylene Chloride (Dichloromethane)

Methylene chloride can undergo biodegradation in soil to formaldehyde. It can also be formed as part of a bacteria and reductive dechlorination pathway from carbon tetrachloride to chloroform (intermediate) to methylene chloride (end-product) (UM 2007). Carbon tetrachloride has not been detected in soil samples; however, chloroform has been detected in soil at a concentration below its adjusted RBCs but above its default SSL DAF20.

5.1.3.2 Metals

Metal COPCs/COPECs, such as aluminum, antimony, cadmium, chromium, iron, lead, manganese, mercury, vanadium, and zinc will not be significantly influenced by degradation processes in soil.

5.1.3.3 PCBs

PCBs are very persistent in the environment and are extremely resistant to oxidation and hydrolysis. PCBs are resistant to chemical degradation by oxidation or hydrolysis (HSDB 2007). Aroclors are PCB mixtures of more than 90 different congeners of chlorobiphenyl. Detected Aroclors at the site have a high degree of chlorination (54% for 1254 and 60% for 1260), which contain higher proportions of the more heavily chlorinated congeners. The persistence of PCBs generally increases with an increase in the degree of chlorination. Aroclor 1254 and 1260 are generally resistant to biodegradation in soil, with limited degradation involving anaerobic reactions, which result in reductive dechlorination to lower chlorinated PCBs; however, this degradation does not necessarily lead to a reduction in toxicity (HSDB 2007). Some biodegradation of lower chlorinated PCBs can occur under aerobic conditions through biotic degradation by microorganisms. Lower chlorinated PCBs tend degrade more readily than higher chlorinated PCBs.

5.1.3.4 PAHs

PAH compound benzo(a)pyrene has been identified as a COPC in soil at the site. Microbial metabolism is the primary process for degradation of PAHs in soil. Hydrolysis, oxidation reduction, and photodegradation are not considered important processes for the degradation of PAHs in soil. Benzo(a)pyrene is a high molecular weight PAH and will tend to have a lower rate and degree of degradation than middle to lower molecular weight PAHs. The rate and extent of biodegradation of PAHs in soil is also influenced by soil properties such as organic content, structure, particle size, pH, temperature, and oxygen content, and the characteristics of microbial populations in the soil. The presence of metals in soil that are toxic to microorganisms will impede degradation (ATSDR 1995). Degradation of benzo(a)pyrene in soil at the site is not expected to be an important fate and transport process given the low concentrations detected (1.6 to 31 µg/kg).

5.1.4 Leaching of Chemicals from Soil to Groundwater

Chemicals in soil have the potential to migrate to greater depths with infiltrating water. As precipitation infiltrates, chemicals may be leached from the soil and carried to greater depths and potentially to groundwater. Factors affecting leaching are discussed below followed by specific assessments for COPCs identified in Section 4.1.3 for the soil-to-groundwater migration pathway based on comparisons to default DAF20 SSLs. The degree to which a chemical is leached is strongly influenced by the

chemical's tendency to partition to the solid or aqueous phases, which is largely a function of the chemical's solubility and particle affinity.

Water Solubility

Water solubility of a chemical is the mass of chemical that will dissolve in a unit volume of water at a specific temperature. Chemicals with a high solubility can often be readily dissolved in water and therefore are susceptible to being mobilized from the soil matrix with infiltrating water and migrating downward to groundwater. Chemicals with a low solubility tend to partition to soil.

The solubility of organic chemicals is typically a function of the hydrophobic nature of the chemical. Many organic chemicals are non-polar and therefore do not dissolve readily into water, which is a polar solution. Several of the COPCs identified in soil at the site, such as PCBs, have low water solubility. Water solubility data for COPCs are summarized in Table 5-2.

Adsorption

The aqueous concentration of chemicals in soil systems can also be substantially influenced by adsorption reaction to the soil matrix. Adsorption is the ability of a substance to bind to the surface of soil particles from reactions that occur between the chemical and the soil particle surface. Organic compounds are frequently non-polar, and therefore, tend to interact with organic matter commonly associated with the soil matrix. The tendency for a chemical to be adsorbed to the organic fraction of soil (or sediment) can be measured by the chemical's organic carbon partition coefficient (K_{oc}). The lower the K_{oc} values the more leaching potential from soil to water as summarized below. Organic compounds with a K_{oc} less than 100 liters per kilogram (L/kg), such as chloroform, have a high potential to leach from soil or sediment to water. Progressively higher values of K_{oc} greater than 500 L/kg indicate lower leaching potential. Organic compounds with K_{oc} values in the range of 1E+04 to 1E+06 L/kg, such as PCBs and high molecular weight PAHs are generally immobile or nearly immobile in soil. Values of K_{oc} for COPCs are summarized in Table 5-2.

Site-specific distribution coefficients (K_d) can be estimated for each organic COPC, as the product of the K_{oc} of the chemical and the fraction of the organic carbon (f_{oc}) in the soil matrix. The distribution coefficient is a measure of the ratio of chemical mass that partitions to the solid and liquid phases under equilibrium conditions. The fraction of organic carbon in site soil is estimated as 0.2% based on physical data collected at the site. Calculated K_d values are presented in Table 5-2. The relatively mobility of site COPCs for the soil-to-groundwater migration pathway have been estimated in the following table based on solubility, K_{oc} and K_d values.

Relative Mobility of COPCs in Soil for the Soil-to-Groundwater Migration Pathway

Immobile	Slight	Low	Moderate	High	Very High
Aroclor 1254 Lead	Antimony Cadmium Chromium Iron Mercury Vanadium	Dieldrin	Manganese	Methylene Chloride	Chloroform

COPCs classified as immobile, slightly mobile, or low are unlikely to leach from soil to groundwater at levels of potential concern. Other factors that will influence the degree of leaching for COPCs with a higher mobility include: source area size, concentrations detected, and soil type and permeability.

5.1.4.1 Metals

Antimony, cadmium, chromium, manganese, and vanadium were detected in one or more samples at concentrations above their SSL DAF20s and facility-wide background point estimates. Metals detected above facility background without soil-to-groundwater SSLs included: iron, lead, and mercury.

Antimony

The binding of antimony to soil is determined by the nature of the soil and the form of antimony deposited on the soil. Antimony adsorbs strongly to colloidal material in soil and it sorption is correlated with content of iron, manganese, and aluminum in the soil with which it co-precipitates as hydroxylated oxides. Studies indicate the leachability of antimony is low (ATSDR 1992). Conditions at the site are conducive the immobilization of antimony due to the presence of low permeability clay soil and the presence of appreciable levels of iron, manganese, and aluminum in soil. Site data indicate that appreciable leaching of antimony in soil from pond, terracotta pipe, and drainage swale areas is limited to shallow depths (less than 13 ft bgs) relative to groundwater (35 to 50 ft). Dissolved levels of antimony detected in groundwater were below the unadjusted T-RBC and MCL.

Cadmium

In soils, pH, oxidation-reduction reactions, and formation of complexes are important factors affecting the mobility of cadmium. Cadmium can participate in exchange reactions on the negatively charged surface of clay minerals. In acid soils, the reaction is reversible. However, adsorption increases with pH and may become irreversible. Cadmium in soil may leach into water, especially under acidic conditions (ASTDR 1999b). The lower pH soil at the site may allow for some leaching of cadmium in soil but potential leaching will be impeded by low permeability clay soil present at the site. Site data do not indicate appreciable leaching of cadmium to soil below the pond's asphalt liner or to subsurface soil outside of the pond. Cadmium was not identified as a COPC in groundwater, with detected concentrations below the adjusted T-RBC.

Chromium

The fate of chromium in soil is dependent on the speciation of chromium, which is a function of oxidation reduction potential and pH of the soil. Chromium is typically found in the III valence state, which has very low solubility and low reactivity resulting in low mobility in the environment. The lower pH soil at the site may allow for some leaching of chromium in soil but potential leaching will be impeded by low permeability clay soil present at the site. Site data do not indicate appreciable leaching of chromium to soil below the pond's asphalt liner or to subsurface soil outside of the pond at depths greater than 8 to 10 ft bgs. Dissolved chromium was not identified as a COPC in groundwater, with detected concentrations below the adjusted T-RBC.

Iron

Iron naturally occurs at appreciable levels in soil at RFAAP with a background point estimate of 50,862 mg/kg. Adsorption of iron to soil is dependent on pH and organic matter, with an increase in either of these parameters resulting in increased adsorption. Mobility is also influenced by oxidation reduction potential, with iron becoming more mobile under reducing conditions than oxidizing conditions (HSDB 2007). Soil pH values of 5 or less in subsurface soil at the site may increase the mobility of iron, while the presence of 30+ ft of low permeability clay at the site and appreciable organic matter (2.6 to 3.6%) will likely reduce this potential mobility. Site data indicated that iron concentrations above the background point estimate are limited to the pond area and one sample immediately outside the pond area, with some apparent leaching of iron below the pond's asphalt liner at levels above background. At one boring location in the pond, the depth of apparent leaching above background levels is greater than 15 ft bgs, while at other locations within the pond area it is less than 13 ft bgs. Appreciable leaching of iron

from soil to groundwater is not apparent from the groundwater sample results, where low-levels of dissolved iron levels have been detected below the adjusted T-RBC.

Lead

Most lead is retained strongly in soil and very little leaches to groundwater. The presence of a thick low permeability clay layer at the site will further limit mobility of lead in soil. Elevated lead concentrations above 400 mg/kg were limited to one sample collected within the pond above the asphalt liner. Samples collected immediately below the asphalt liner did not indicate appreciable leaching of lead to subsurface soil at levels significantly above background. Dissolved lead was not detected in site groundwater.

Manganese

The degree of sorption of manganese to soil depends on its oxidation state. Soluble manganese +2 compounds are relatively mobile and may potentially leach from soil to groundwater, while manganese +3 compounds are immobile. The mobility of manganese in soil may increase with decreasing pH levels in soil below 5, while the presence organic matter and clay will impede mobility and leaching. Soil pH values of 5 or less in subsurface soil at the site may increase the mobility of manganese, while the presence of 30+ ft of low permeability clay at the site and appreciable organic matter (2.6 to 3.6%) will likely reduce this potential mobility. Site data indicated that manganese concentrations above the background point estimate and SSL DAF20 are limited to the pond area, with some apparent leaching of manganese below the pond's asphalt liner at levels above background. At one boring location in the pond, the depth of apparent leaching above background levels is greater than 15 ft bgs, while at other locations within the pond area it is less than 6 ft bgs. Some potential leaching of manganese from soil to groundwater is indicated by the sample result at 57MW2, where the dissolved manganese concentration is above the adjusted T-RBC but below the unadjusted T-RBC.

Mercury

Mercury has been detected in site soil at levels above the background point estimate of 0.13 mg/kg. Mercury compounds released to soil tend to be strongly adsorbed to soil and typically do not significantly leach. Adsorption of mercury increases with the percent of organic matter in the soil. In contrast to most other metals, acidification of soils does not increase the solubility of mercury compounds. Inorganic mercury compounds can be methylated by microorganisms that are indigenous to the soil environment. This process is mediated by various microbial populations under both aerobic and anaerobic conditions. Sulfur-reducing bacteria are responsible for most of the mercury methylation in the environment; however, yeast populations are also able to methylate mercury (HSDB 2007). Mercury is expected to have low mobility in site soil given its properties, and the presence of 30+ ft of low permeability clay and appreciable organic matter (2.6 to 3.6%). Mercury was not detected in site groundwater.

Vanadium

Vanadium naturally occurs at appreciable levels in soil at RFAAP with a background point estimate of 108 mg/kg. The mobility of vanadium in soils is affected by the pH of the soil, with higher mobility in neutral or alkaline soils and lower mobility in acidic soils. Vanadium has some mobility in soil under oxidizing, unsaturated conditions but is immobile under reducing saturated conditions (HSDB 2007). The acidic pH of soil at the site and thick sequence of low permeability clay will limit potential leaching of vanadium in subsurface soil. Site data indicates that vanadium concentrations above the SSL DAF20 are limited to one sample collected from the pond area above the asphalt liner, with samples collected below the asphalt liner having orders of magnitude lower concentrations below the background point estimate. Appreciable leaching of vanadium from soil to groundwater was not indicated by the groundwater sample results where detected concentrations of dissolved vanadium were below the adjusted T-RBC.

5.1.4.2 VOCs

COPCs identified for the soil-to-groundwater migration pathway were halogenated VOCs (methylene chloride and chloroform). These compounds have moderate to high solubilities, lower K_{oc} values, and moderate to high mobility in subsurface (Table 5-2).

Methylene Chloride

Methylene chloride was detected in 2 of 64 soil samples collected at low-level concentrations (24 and 28 µg/kg) above its SSL DAF20 of 19.04 µg/kg including one surface sample and one subsurface soil sample. This chemical is not considered at potential concern for the soil-to-groundwater migration pathway given the infrequent low-level detections, lack of identified source area, presence of 30+ ft of low permeability clay and depth to groundwater (35 to 50 ft bgs), and the lack of detections in site groundwater.

Chloroform

Chloroform was detected at low-level concentrations in soil (24 µg/kg or less) with 6 of 64 samples having a concentration above the SSL DAF20. Detected concentrations above the SSL DAF20 were limited to areas outside of the pond. As provided in Appendix C.6, Table C.6-1, a site-specific SSL of 491 µg/kg was developed for chloroform using site-specific physical soil data, DAF20, and target groundwater concentration equal to the EPA MCL of 80 µg/L for chloroform (total THMs). The site-specific SSL is approximately one order of magnitude higher than detected concentrations in soil at the site, and therefore, chloroform is not considered a concern for the soil-to-groundwater migration pathway given the low-levels detected and detected groundwater concentrations below the MCL.

5.1.4.3 SVOCs

SVOCs including PAHs have not been identified as COPCs for the soil-to-groundwater migration pathway based on comparisons to SSLs DAF20. SVOCs were not identified as COPCs in site groundwater.

5.1.4.4 Pesticides

Pesticides have low mobility in the subsurface due their lower solubility and higher K_{oc} values and therefore will tend to remain absorbed to soil (Table 5-2). Dieldrin was detected at concentrations above its SSL DAF20 in one soil samples collected from the pond area above the asphalt liner and two samples collected from subsurface soil below the asphalt liner. Appreciable leaching of dieldrin to subsurface soil below the pond was limited to depths less than 13 ft bgs. Dieldrin is not considered a potential concern for the soil-to-groundwater migration pathway given its low mobility in soil, limited apparent leaching relative to the depth of groundwater, the presence of 30+ ft of low permeability clay soil at the site, and the lack of detections of dieldrin in site groundwater.

5.1.4.5 PCBs

PCBs have a low solubility in water and high K_{oc} values, and will tend to be immobile in the environment and remain adsorbed to soil (Table 5-2). Aroclor 1254 was detected at a concentration above its SSL DAF20 in one sample collected from the pond above the asphalt liner. Appreciable leaching of this PCB to subsurface soil below the asphalt liner was not observed at concentrations above the SSL DAF20. PCBs are not considered a potential concern for the soil-to-groundwater migration pathway given their immobile nature, the lack of appreciable leaching to subsurface soil, the 30+ ft of low permeability of clay soil at the site, and the lack of detections in site groundwater.

5.2 FATE AND TRANSPORT - GROUNDWATER

Fate and transport processes for site-related COPCs in groundwater are discussed in the following sections. COPCs identified in groundwater include: antimony, arsenic, manganese, and chloroform.

5.2.1 Volatilization

Volatilization of a chemical from groundwater will result in a reduction of its mass and concentration as the chemical volatilizes to soil gas and ultimately discharges to the atmosphere. This process may also occur in groundwater with VOCs. Some volatilization of chloroform may occur in site groundwater under ambient conditions due to its higher Henry's constant and volatility, and therefore, may have some influence on the fate of this compound in the subsurface.

5.2.2 Degradation of Chemicals in Groundwater

Inorganic groundwater COPCs are not subject to transformation and degradation in groundwater.

5.2.2.1 Chloroform

Chloroform will tend to persist in groundwater under aerobic conditions, where dissolved oxygen levels are greater than 0.5%. Degradation of chloroform may occur in groundwater under anaerobic conditions if appropriate microbial bacteria are present (USGS 2006). In this case, chloroform (trichloromethane) would be transformed to dichloromethane (methylene chloride) by reductive dechlorination (dehalogenation). Groundwater conditions in the area of 57MW3 where chloroform concentrations were appear to be anaerobic based the lack of dissolved oxygen (0%) and lower ORP measurements (37 mV) in this well, and therefore may be favorable for some degradation of chloroform by reductive dechlorination.

5.2.3 Dispersion Processes in Groundwater

As contaminated water flows through a porous medium it will mix with non-contaminated water and as a result it will dilute (mechanical dispersion). Mixing that occurs along the direction of groundwater flow is called longitudinal dispersion and mixing that occurs perpendicular to the direction of groundwater is called lateral dispersion. Longitudinal dispersion is influenced by pore size, flow path length through the porous media, and the friction in the pore. Lateral dispersion occurs due to the splitting and branching of water as it flow paths through porous media.

Dispersion processes are likely an important process influencing the fate and transport of dissolved phase constituents in site groundwater given the variety of interconnections that can exist in bedrock ranging from very small fractures to larger karst cavities caused by dissolution of the rock. Dispersion can also occur through the matrix of the rock.

5.2.4 Adsorption and Retardation

The migration rate of chemicals in groundwater can be slowed relative to groundwater flow due to attenuation reactions such as adsorption, particularly when flowing through porous media. In porous media, the effect of adsorption reaction on chemical migration rates is typically quantified by using a retardation factor (R), which may be estimated from the chemical-specific K_d in liters per kilogram, soil bulk density (ρ_b) in kilograms per liter and porosity (n). However, the rates of retardation in fractured and karst bedrock aquifers are difficult to quantify and therefore, have not been estimated for site groundwater. Based on the chemical and physical properties of chloroform, lower rates of adsorption and retardation are expected for these constituents in site groundwater.

5.3 FATE AND TRANSPORT SUMMARY

The fate and transport assessment potentially identified surface runoff as the mechanism for the occurrence of elevated metals in surface soil within the grass covered drainage swale extending from the pond area toward the northwest. Detected concentrations of metals in surface soil decreased with distance from the pond. Mass transport and runoff of metal and PCB COPCs present within the pond to surrounding areas is prevented by the asphalt berm surrounding the pond.

Identified source areas where COPCs may potentially leach to subsurface soil include the pond area, soil at or below the depth of the terracotta pipe, and the grass covered drainage swale extending northwest of

the pond. The presence of asphalt liner beneath the pond and has inhibited the vertical migration of COPCs such as metals and PCBs to underlying subsurface soil. Appreciable leaching of PCBs below the pond's liner was not apparent from site data, while apparent leaching of metals at concentrations above their background point estimate, adjusted RBC, and SSL DAF 20 was generally limited to depths less than 13 ft bgs, except for manganese and iron in a single boring and sample. Both inside and outside of the pond, a thick sequence of low permeability clay (+30 ft) at the site has inhibited vertical leaching of COPCs to deeper subsurface soil.

Appreciable leaching of metals from soil to groundwater at the site was not indicated by the dissolved metals data for site groundwater, where detected concentrations were below T-RBCs or MCLs. A potential low-level residual source of chloroform detected in groundwater was identified in the area of terracotta pipe where low levels of chloroform were detected in soil. SSL modeling in Appendix C.6, Table C.6-2, indicates that the maximum detected soil concentration of 24 µg/kg would result in an estimated chloroform concentration of 3.9 µg/L in groundwater, which suggests that the remaining concentrations in soil would not represent a strong continuous source for future leaching of chloroform at levels that would potentially result in groundwater concentrations above the MCL.

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Table 5-1a
Chemical Properties Affecting Fate and Transport
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, VIrginia

Property	Description
Specific Gravity	Specific gravity is the ratio of the density of a chemical to the density of water and its tendency to float (specific gravity <1) or sink (specific gravity >1) in water. Chemicals that are immiscible in water can exist as non-aqueous phase liquids and are referred to as light non-aqueous phase liquid if their specific gravity is less than one, or dense non-aqueous phase liquid if their specific gravity is greater than one.
Water Solubility	Water solubility of a chemical is the mass of chemical that will dissolve in a unit volume of water at a specific temperature. Chemicals with a high solubility tend to remain dissolved in water rather than partition to soil or sediment are less likely to volatilize, and more likely to biodegrade. Chemicals with a low solubility tend to partition to soil or sediment, are more likely to volatilize and less likely to biodegrade.
Vapor Pressure	Vapor pressure of a chemical is how readily it will volatilize to the atmosphere. Volatilization from water is dependent upon vapor pressure and Henry's law constant. Vapor pressures in their pure state range from 0.001 to 760 millimeters mercury (mm Hg) for liquids to less than 1E-10 mm Hg for solids.
Henry's Law Constant	Henry's law constant of a chemical is a measure of how a chemical will partition between air and water at equilibrium. It is the ratio of the vapor pressure to the water solubility (atm-m^3/mole) and can be used to calculate the rate of volatilization of a chemical from water. Chemicals with a high Henry's law constant more readily volatilize from water.
Organic Carbon Partition Coefficient (K_{oc})	K_{oc} is a measure of the tendency for a chemical to be sorbed to the organic fraction of soil and sediment. The lower the K_{oc} values the more leaching potential from soil or sediment to water. Chemicals with a K_{oc} less than 100 milliliters per gram (mL/g) have a high potential to leach from soil or sediment to water, while K_{oc} values in the range of 100 to 500 mL/g indicate a moderate leaching potential.
Octanol-Water Partition Coefficient (Ko_w)	K_{ow} describes the partitioning of an organic chemical between a polar phase (water) and a relatively nonpolar phase (1-octanol). It is equated to the partitioning (sorption) in an aquifer of a chemical between the water and the porous media organic content. A chemical with a high K_{ow} is hydrophobic and may be relatively immobile in an aqueous system but may be mobilized in the presence of an organic solvent.

Table 5-1b
Fate Processes Affecting Metals
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Process	Description
Ion Exchange	Ion exchange is a specific category of adsorption due to an affinity of the solid surface for the chemical. Ion exchange occurs when the adsorbent charge deficiency can be neutralized more efficiently by ions in solution than by those ions currently adsorbed. As an example, if sodium ions (monovalent) have accumulated at the interface and suddently calcium ions (divalent) appear, the surface excess can be more efficiently neutralized by the calcium ions than by the sodium ions; thus, the sodium ions will desorb and the calcium ions will adsorb and an exchange of ions will occur. Clay minerals are frequently the dominant source of ion exchange in the subsurface. The surface charge of clays and many other mineral surfaces is a function of pH. At low pH (excess hydrogen ions), the surface can exhibit a positive net charge while at higher pH (excess hydroxyl ions) the surface can exhibit a negative charge (Knox et al 1993). The surface area of the exchange site significantly influences the level of adsorption; this parameter is typically discussed in terms of the cation exchange capacity (CEC) of the medium and is expressed in units of milliequivalents of exchanging cations per 100 grams of solids (meq/100 g). CEC values indicate the likely type of clay present; the higher the CEC value the greater the absorption potential.
Chemical Speciation	Most metals occur in more than one ionic form (species) in solid and aqueous media. These species form from hydrolysis, oxidation reduction reactions, and complexation reactions, which may have different valences and mobilities in soil water, groundwater, and surface water due to different affinities for adsorption and different solubilty controls. Simple ionic specifies frequently combine ligands to form ionic or neutral-charge aqueous complexes. Environmental conditions that affect speciation of metals include pH, redox potential, and organic ligands.
Oxidation Reduction Potential (ORP)	Redox refers to the transfer of electrons and resultant specifies change of ions or compounds. Oxidation is the loss of electrons and reduction is the gain of electrons. Redox can cause changes in the mobility of many metals, such as site COPCs iron, manganese, and arsenic. The ability of a redox reaction to occur is a function of the redox potential. Redox potential is typically defined in terms of the negative logarithm of the free-electron activity (pE). The redox potential can also be expressed in terms of volts (Eh). Low values of pE indicate high electron activity and favor electron-rich species (reduced). High values of pE indicate low electron activity and favor electron-poor species (oxidized) (Knox et al 1993).

Table 5-1c
Fate Processes Affecting Organics
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Process	Description
Sorption	Sorption includes the processes of adsorption and absorption. Adsorption is a mass transfer process where a substance is transferred from a phase to the surface of a medium (e.g. soil or sediment) where it is bounded by chemical or physical forces. Absorption is the partitioning between two phases (Knox et al. 1993). Sorption reactions are either sorbent or solvent-motivated. Sorbent-motived reactions occur when there is an attraction between the sorbent and the solute and the chemical accumulates at the surface due to the affinity of the surface for the chemical. Solvent-motivated reactions occur when the chemical is hydrophobic, such as nonionic organics, where the chemical will accumulate at an interface or partition into a nonionic phase (associate with the organic content of the medium). For nonionic organics, the fraction of organic content (foc) of the subsurface material is the dominant soil characteristic affecting sorption (Knox et al. 1993). Primary indicators of the partitioning of a chemical are the organic carbon water partition coefficient (Koc), soil/water distribution coefficient (Kd), the octanol water partitioning coeffient (Kow), and the calculated retardation factor.
Hydrolosis	Hydrolysis is the degradation process via chemical reactions (oxidation, reduction, hydrolysis) without the participation of organisms. Hydrolysis is a chemical decomposition process that uses water to split chemical bonds of substances. There are two types of hydrolysis, acid and enzymatic. Hydrolysis is limited to chemical that contain hydrolyzable groups and is effected by the contaminants hydrolysis half life.
Volatilization	Volatilization is the process by which a contaminant changes from a liquid phase to a gas phase. This process applies to organic comtaminants migrating from the soil or surface water. Volatile organic chemicals are a class of chemicals that easily evaporate or mix with the atmosphere. The potential volatilization of a chemical is affected by the compounds vapor pressure, solubility, organic carbon partitioning coefficient, and the temperature.
Abiotic Degradation	Abiotic degradation includes degradation processes in which organisms do not participate. Photolysis describes the abiotic degradation process via photochemical reactions such as photooxidation, photomineralisation without the participation of organisms. As described above, hydrolysis is an additional process of abiotic degradation.
Biotic Degradation	Biotic degradations the process in which chemical degradation of a contaminant is aided by soil organisms. Biotic degradation can be either aerobic or anaerobic. The rate of metabolism/cometabolism is affected by the contaminant's biochemical oxygen demand, chemical oxygen demand, degree of halogenation, etc. Reactions include but are not limited to oxidation/reduction and hydrolysis, as described above.

Table 5-2
Physical Constants for COPCs
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Molecular Weight (g/mol)	Henry's Law Constant ($atm\text{-}m^3/mol$)	Unitless Henry's Law Constant	Organic Carbon Partition Coef. (Koc) (L/kg)	Site-Specific Soil-Water Partition Coef. (Kd)	Log of Octanol-Water Partition Coef. (log Kow)	Octanol-Water Partition Coef. (Kow) (L/kg)	Water Solubility (mg/L)	Vapor Pressure (mm Hg)
Aroclor 1254	11097691	326.44	2.83E-04	1.16E-02	8.10E+05	1,620	6.79	6.17E+06	3.40E-03	6.53E-06
Aroclor 1260	11096825	395.33	3.34E-04	1.37E-02	2.07E+05	414	8.27	1.86E+08	2.84E-04	4.05E-05
Benzo[a]pyrene	50328	252.32	1.13E-06	4.63E-05	1.02E+06	2,040	6.13	1.35E+06	1.62E-03	5.49E-09
Dieldrin	60571	380.91	1.51E-05	6.19E-04	1.28E+04	26	6.2	1.58E+06	1.95E-01	3.00E-06
Chloroform	67663	119.38	3.66E-03	1.50E-01	3.50E+01	0.07	1.97	9.33E+01	7.95E+03	1.97E+02
Methylene Chloride	75092	84.93	2.19E-03	8.98E-02	1.20E+01	0.024	1.25	1.78E+01	1.30E+04	4.35E+02

Notes:
CAS = Chemical Abstract System
g/mol = Grams per mole
$atm\text{-}m^3/mol$ = Cubic meters atmosphere per mole
L/kg = Liters per kilogram
mg/L = Milligrams per liter
mm Hg = Millimeters Mercury

6.0 HUMAN HEALTH RISK ASSESSMENT

This HHRA evaluates the probability and magnitude of potential adverse effects on human health associated with exposure to site-related chemicals in soil and groundwater. Refer to Section 2.0 for additional information regarding the site background. The HHRA was conducted for the site consistent with guidance included in EPA's *Interim Final Risk Assessment Guidance for Superfund* (RAGS) and other current EPA/EPA Region III resources and guidance documents as noted on the RAGS Part D tables provided in Appendix E.1.

This HHRA consists of the following six sections:

- **Section 6.1: Data Summary and Selection of COPCs:** Relevant site data are gathered, examined, and discussed. Basic constituent statistics and screening levels are summarized. COPCs are identified by comparison to screening criteria as discussed in Section 6.1.2;
- **Section 6.2: Exposure Assessment:** Potentially exposed populations (e.g., receptors) and exposure routes are identified, and exposure point concentrations (EPCs) are calculated for COPCs. Standard exposure factors and health-protective assumptions are used to assess the magnitude, frequency, and duration of exposure for each exposure route and intakes are calculated;
- **Section 6.3: Toxicity Assessment:** Toxicity criteria for COPCs are gathered and presented;
- **Section 6.4: Risk Characterization:** Quantitative risks and hazards are estimated and summarized by combining toxicity criteria with intakes for each exposure route;
- **Section 6.5: Uncertainties Analysis:** Uncertainties, "including uncertainties in the physical setting definition for the site, in the models used, in the exposure parameters, and in the toxicity assessment" (USEPA 1989) are discussed; and
- **Section 6.6: Summary and Conclusions:** The results of the HHRA are summarized.

As previously stated, the tabulated risk assessment results are presented in accordance with USEPA guidance described in RAGS: Volume I - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments) (USEPA 2001b). RAGS D requires the risk assessment results to be presented in a series of standardized tables, which are presented in Appendix E.1.

6.1 DATA SUMMARY AND SELECTION OF COPCS

6.1.1 Data Summary

Table 6-1 identifies the samples used in the COPC screening for soil. Data from the groundwater samples collected from 57MW2 and 57MW3 were used in the COPC screening for groundwater. Refer to Section 4.0 for complete data tables for detected analytes for each media. Additional information regarding the data used in the HHRA is summarized below:

- Flagged data such as J-flagged data (estimated concentration) and B-flagged data (detected in an associated blank) are considered detections and are used without modification;
- Rejected results (R-flagged) are not used;
- Data from duplicate sample pairs are averaged and treated as one result. If an analyte is detected in one of the sample pair, one half the detection limit of the non-detect is averaged with the detected result and the result is considered detected; and
- Chemicals that were not detected in at least one sample were considered as uncertain analytes in the evaluation of risk. Other qualified analytical data were retained in the assessment.

Additional information regarding specific soil and groundwater samples used in the HHRA is provided in Sections 6.1.1.1 and 6.1.1.2.

6.1.1.1 Surface Soil and Total Soil

As presented in Table 6-1, soil samples collected during sampling events completed in 2003 for the SSP investigation and 2008 for the RFI were used for the COPC screenings. In addition in Table 6-1, the soil samples for the site study area have been divided into surface soil (0 to 1 ft bgs) and subsurface soil (1 to 15 ft bgs), which are the soil data groupings used for COPC screening and the HHRA. Total soil data grouping consists of combining surface and subsurface soil to address mixing of potential soil contamination during construction or land development activities. Soil samples collected a depth of greater than 15 ft bgs were excluded from the HHRA since it is unlikely soil below this depth would be disturbed and mixed with surface soil during excavation. Samples collected from borings 57SB13 through 57SB17 were also excluded from the HHRA since these borings were completed in the upper area surrounding the pond and the results of the nature and extent assessment did not indicate impacts from the SWMU. Also note that sample 57SB4A2 (originally SSP sample 57SB4B) is included in the surface soil grouping, although the sample was collected from approximately 1.5 ft bgs, since the sample is representative of the material in the pond above the asphalt liner. A total of 15 surface soil samples and 26 subsurface soil samples were used in the HHRA. Refer to Figure 6-1 for the study area incorporating the borings used for the HHRA.

6.1.1.2 Groundwater

Groundwater samples collected from 57MW2 and 57MW3 during the sampling event completed in 2008 for the RFI were used for the COPC screening.

6.1.2 Identification of COPCs

COPCs were identified for the sites by comparing the MDC to the following screening levels for each media: USEPA Region III R-RBCs and I-RBCs (surface soil and total soil) and USEPA T-RBCs (groundwater) as presented in the October 2007 USEPA Region III RBC and Alternate RBC Tables (USEPA 2007). The lowest screening criterion for each medium was used to identify the COPCs. In accordance with USEPA Region III guidance, RBCs for non-carcinogenic chemicals were adjusted downward to a HQ of 0.1 to ensure that chemicals with additive effects were not prematurely eliminated during screening.

For nutrients detected in soil (calcium, potassium, magnesium, and sodium) that have no available RBC, the MDC was compared to the recommended daily allowance (RDA)-derived soil ingestion screening criteria. Table 6-2 presents the equation, exposure parameters, and RDAs used, as well as the calculated screening criteria for the adult resident and child resident receptors. The lowest screening criterion for each nutrient (e.g., the screening criteria for the child resident) was selected as the screening criterion.

In addition, lead ALs of 400 mg/kg for residential receptors and 750 mg/kg for industrial receptors were used in the COPC identification given that toxicity criteria were not available for lead (USEPA 1994b).

Analytes detected at a maximum concentration greater than the corresponding adjusted RBC or screening values identified above (or those for which no screening criteria exists) were selected as COPCs. COPC screening tables for each SWMU are presented in Appendix E.1, Tables E.1-2.1 (COPC Determination - Surface Soil), E.1-2.2 (COPC Determination - Total Soil), E.1-2.3 (Non-Detect Screening - Soil), E.1-2.4 (COPC Determination - Groundwater), and E.1-2.5 (Groundwater Non-Detect Screening). A summary of the results of the human health COPC screenings for the site are presented in the table below.

Human Health COPCs Identified

Chemical	Surface Soil	Total Soil	Groundwater**
Aluminum	X	X	
Antimony	X	X	X
Arsenic	X	X	X
Cadmium	X	X	
Chromium	X	X	
Cobalt*	X	X	X
Iron	X	X	
Lead	X	X	
Manganese	X	X	X
Thallium		X	
Vanadium	X	X	
Zinc	X	X	
Aroclor 1254	X	X	
Aroclor 1260	X	X	
Chloromethane*	X	X	
Benzo(a)pyrene	X	X	
Chloroform			X

Note: * denotes COPC identified due to no screening value available
** dissolved metals

Also note that a chemical was not carried through the HHRA if the frequency of detection is low in the HHRA data set. For example at SWMU 57, chloromethane was detected in 2 of 41 soil samples collected at low levels; therefore, chloromethane is not carried through the risk assessment. Chloromethane was not detected in groundwater. No other COPCs were excluded from the risk assessment based on frequency of detection.

6.2 EXPOSURE ASSESSMENT

The objective of the exposure assessment is to estimate "the type and magnitude of exposures to chemicals of potential concern" (USEPA 1989). When combined with chemical-specific toxicity information (summarized in the toxicity assessment), these exposures produce estimations of potential cancer risks and non-cancer hazards.

6.2.1 Conceptual Site Model/Receptor Characterization

A refined conceptual site model (CSM) for SWMU 57 is presented on Figure 6-2. The site is a small, fabricated, inactive pond area enclosed by a chain link fence atop an asphalt-covered berm, which is located on a terrace in the HSA of RFAAP. Subsurface geology consists of alluvial deposits overlying carbonate bedrock of the Elbrook Formation. Groundwater is present near the interface of overburden and bedrock at depths of 35 to 50 ft bgs and within bedrock. Based on local topography and site groundwater data, groundwater flow is likely toward the north or northwest toward the New River.

Observations during the site reconnaissance and subsequent field investigation indicate the ephemeral presence of water within the pond varies from a few inches of water to dry, depending upon the amount of recent precipitation. The site is surrounded by a berm, which prevents storm water flow into or out of the pond. Groundwater potentially impacted by the study areas is not currently used as drinking water. Potentially affected media include surface soil, subsurface soil, and groundwater at the site. Residential

and recreational areas are located adjacent to the RFAAP. It is unlikely, however, that the land use within the MMA will change significantly in the foreseeable future. The MMA contains many buildings and facilities, and is likely to remain industrial in nature.

The SWMU is not currently active; therefore, maintenance workers (e.g., groundskeepers) are the most likely receptors under current site conditions. Due to installation security, it is unlikely that trespassers could gain access to the SWMU; however, risks associated with the maintenance worker are considered protective of the limited exposure experienced by the trespasser. Under future site conditions, maintenance workers continue to be receptors and although the development of the area is unlikely due to small size of the site, construction workers and commercial workers may be hypothetical receptors if the area is developed. RFAAP is likely to remain a military installation; therefore, a residential scenario is considered unlikely. However, the residential scenario was evaluated for the SWMU to assess clean closure requirements under RCRA.

6.2.2 Identification of Exposure Pathways

The potential receptors identified for the sites include current and future maintenance workers, hypothetical future commercial workers, hypothetical future construction workers, hypothetical future child resident, hypothetical future adult resident, and hypothetical future lifetime resident. Carcinogenic risk is assessed for the hypothetical lifetime resident to account for cumulative lifetime risk. The exposure duration for the lifetime resident scenario is assumed to be 30 years total; therefore, for carcinogens, exposures are combined for hypothetical child resident (6 years) and adult resident (24 years). In Appendix E.1, Table E.1-1 summarizes the selection of exposure pathways for the SWMU and receptor listing the rationale for the inclusion or exclusion of each pathway. A conceptual site diagram presenting the sources, release mechanisms, pathways, and receptors for the site are presented on Figure 6-3.

6.2.3 Calculation of EPCs

To calculate intakes, the mean concentration of each COPC is estimated and is referred to as the EPC. To account for uncertainty when estimating EPCs from sample data, the 95% upper confidence limit of the mean (95% UCL) is used instead of the mean itself (USEPA 1989). Methods used to calculate 95% UCLs are based on guidance provided in the following documents *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites* (USEPA 2002b) and *On the Computation of a 95% Upper Confidence Limit of the Unknown Population Mean Based Upon Data Sets with Below Detection Limit Observations* (USEPA 2006a).

In general, the method used to calculate a 95% UCL depends on: 1) the prevalence of non-detects, and 2) the data distribution (e.g., normal or lognormal). Non-detects introduce uncertainty in the data set because the true concentration may be between zero to just below the detection limit. Therefore, distributional assumptions are difficult to make for COPCs with a high rate of non-detects. ProUCL 4.0 is used to calculate EPCs for the sites with the exception of data sets with a low frequency of detection for which the MDC was used in the risk assessment. EPCs for soil COPCs are presented in Tables E.1-3.1 and E.1-3.2 of Appendix E.1. EPC calculations for the sites are included in Appendix D.1. EPCs were not calculated for groundwater; therefore, the MDC for COPCs identified for groundwater were used in the risk assessment.

6.2.4 Quantification of Exposure: Calculation of Daily Intakes

For each receptor and pathway, chronic daily intake (CDI, expressed as milligrams of COPC per kilogram body weight per day) for each COPC is estimated by combining the EPC with exposure parameters such as ingestion rate, frequency of contact, duration, and frequency of exposure. In addition, intake parameters are selected so the combination of intake variables results in an estimate of the reasonable maximum exposure for that pathway (USEPA 1989).

The particulate emission factors (PEF) used to calculate inhalation daily intakes were calculated in accordance with the *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (USEPA 2002c), as provided in Appendix E.1, Table E.1-4.4. Intake formulas, exposure parameters, and chemical-specific parameters are provided in Appendix E.1, Tables E.1-4.1 through E.1-4.8. The results of the CDI calculations are presented for each receptor in Appendix E.1, Tables E.1-7.1 through E.1-7.6.

6.3 TOXICITY ASSESSMENT

Toxicity criteria used to quantify non-carcinogenic hazards (reference doses – RfDs) and carcinogenic risks (e.g., cancer slope factors – CSFs) are presented in Appendix E.1, Tables E.1-5.1, E.1-5.2, E.1-6.1, and E.1-6-2.

6.4 RISK CHARACTERIZATION

Quantitative risks and hazards due to exposure to COPCs are estimated and summarized by combining toxicity criteria (presented in the Toxicity Assessment) with CDIs (calculated in the Exposure Assessment). Methods used to calculate risks and hazards are taken from USEPA (1989).

For exposures to potential carcinogens, the individual upper-bound excess lifetime cancer risk was calculated by multiplying the estimated CDI by the CSF. In order to assess the individual excess lifetime cancer risks associated with simultaneous exposure to COPCs, the risks derived from the individual chemicals are summed within each exposure pathway. For the residential scenario, carcinogenic risk was evaluated for the lifetime resident. In addition, carcinogenic risk for the residential scenario for carcinogens that act via a mutagenic mode of action (i.e., benzo(a)pyrene) as identified in the October 2007 Region III RBC table were evaluated utilizing default age-dependant adjustment factors in accordance with the Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA 2005).

Non-carcinogenic adverse health effects are calculated by dividing the CDI of each COPC by its (risk reference dose) RfD, forming a HQ. HQs greater than one (1) indicate the potential for adverse health effects. To estimate non-carcinogenic adverse health effects due to simultaneous exposure to several COPCs, HQs for individual COPCs are summed within each exposure pathway to form a Hazard Index (HI). As with HQs, HIs that are greater than 1 indicate potential adverse health effects. In such cases, COPCs are divided into categories based on the target organ affected (e.g., liver, kidney) and target organ-specific HIs are recalculated. Non-carcinogenic hazards were evaluated for child and adult residents independently.

Excess lifetime cancer risks derived in this report are compared to USEPA's target risk range for Superfund sites of 1E-06 to 1E-04 (USEPA 1989). In addition, USEPA's Office of Solid Waste and Emergency Response has issued a directive (USEPA 1991) clarifying the role of HHRA in the Superfund process. The directive states that, if the cumulative carcinogenic risk to a receptor (based on reasonable maximum exposure for both current and future land use) is less than 1E-04 and the non-carcinogenic HI is equal to or less than 1, action generally is not warranted unless adverse environmental effects are likely.

Calculation of risks and hazards due to exposure to COPCs are presented in Appendix E.1 in Tables E.1-7.1 – E.1-7.6. A refinement of the HIs based on target organs is conducted. As shown in Appendix E.1 in Tables E.1-9.1 – E.1-9.6, the refinement consists of calculating HIs based on a target organ-specific basis. In addition in Appendix E.1, Tables E.1-10.1 – E.1-10.3 summarize risks and hazards for risk/HI drivers (i.e., those COPCs contributing to a total risk greater than 1.E-04 or a total target organ hazard greater than 1).

Risks and hazards presented in Appendix E.1 in Tables E.1-9.1 – E.1-9.6 are summarized in the tables below. The total risk for each receptor is below or within USEPA's target risk range for Superfund sites (1E-06 to 1E-04, USEPA 1989) with the exception of the hypothetical future lifetime resident due primarily to chloroform in groundwater. The total HIs after target organ segregation for all receptors are

equal to or below the USEPA reference HI of 1E+00 with the exception of the hypothetical future construction worker (blood, central nervous system (CNS), and kidney) and the hypothetical future child resident (blood, CNS, GI (gastrointestinal) tract, kidney, liver, bone marrow, and fetus).

Summary of Risks and Hazards

Timeframe/Receptor	Risk	HI	Risk Drivers	Target Organ Segregation HI>1
Current/Future Maintenance Worker	2.E-06	0.8	None	None
Hypothetical Future Commercial Worker	1.E-05	1	None	None
Hypothetical Future Construction Worker	2.E-05	**27**	None	Blood (HI=3) – Soil (Sb – Ing/Derm (3)) CNS (HI=20) – Soil (Al – Inh (2.8), Mn – Inh (17)) Kidney (HI=2) – Soil (V – Ing/Derm (2))
Hypothetical Future Adult Resident	See Lifetime Resident	**4**	NA	None
Hypothetical Future Child Resident	See Lifetime Resident	**20**	NA	Blood (HI=7) – Soil (Sb – Ing/Derm (5), Fe – Ing/Derm (0.8)), Groundwater (Sb – Ing/Derm (0.9)) CNS (HI=3) – Soil (Al – Ing/Derm (0.3), Mn – Ing/Derm (2.4)), Groundwater (Mn – 0.7) GI Tract (HI=3) – Soil (Cr-Ing/Derm (2.3), Fe-Ing/Derm (0.8)) Kidney (HI=6) – Soil (V– Ing/Derm (5.3), Cd – Ing/Derm (0.4)) Liver (HI=4) - Soil (Fe – Ing/Derm (0.8), Cr – Ing/Derm (2.3)), Groundwater (Chloroform – Ing/Derm (0.4)) Bone Marrow (HI=2) – Soil (Cr – Ing/Derm (2.3)) Fetus (HI=2) – Soil (Cr – Ing/Derm (2.3))
Hypothetical Lifetime Resident	**4.E-04**	NA	Groundwater – Chloroform (4.E-04), Arsenic (5.E-05)	NA

Note: NA = Not Applicable HI = Hazard Index
CNS = Central Nervous System **Bold** = Exceeds USEPA Risk or Hazard Range
Al = Aluminum, As = Arsenic, Cd = Cadmium, Cr = Chromium, Fe = Iron, Mn = Manganese, Sb = Antimony, V = Vanadium.
Ing = Ingestion, Inh = Inhalation, Derm = Dermal

6.4.1 Lead Exposure Assessment

The MDC for lead in surface soil and total soil for SWMU 57 was above the residential lead screening level of 400 mg/kg, and therefore, the potential hazard associated with lead was evaluated using the Integrated Exposure Uptake Biokinetic (IEUBK) model for the child resident scenario (USEPA 2004a) and the EPA Adult Lead Model (USEPA 2003) for adult workers.

Site-specific lead exposures were evaluated for residential exposures at SWMU 57 using the IEUBK model. This calculation was based on the site-specific mean concentration of lead detected in total soil (45.63 mg/kg) and the maximum detected lead concentration in groundwater (0.71 micrograms per liter (µg/L). The results of the model are presented in Appendix E.2. The corresponding input parameters and distribution probability plot are also provided in the Appendix E.2. The results of the modeling presented in Appendix E.2 predict the probability of children expected to have blood levels of 10 microgram per deciliter (µg/dL) or greater. The lead risks are considered unacceptable if the child-blood lead level for more than 5% of children is estimated to equal or exceed the Center for Disease Control and Prevention (CDCP) concern threshold of 10 µg/dL.

USEPA developed a physiologically-based pharmacokinetic adult lead model (ALM) (version 05/19/2003) that can be applied to adult worker receptors. The ALM is currently the accepted and standard model to assess adult non-residential exposures to lead in soil and indoor dust. The model uses a simplified representation of lead biokinetics to predict quasi steady-state blood level concentrations among adults who have relatively steady patterns of site exposures. The methodology focuses on estimating fetal blood lead concentrations in female workers. All of the equations in the model are used to calculate target concentrations based on the probability of exceeding a blood lead level of 10 µg/dL for a fetus. Lead risks are considered unacceptable for a non-residential (worker) receptor if the fetal blood lead level for more than 5% of fetuses of adult female workers is estimated to equal or exceed the CDCP concern threshold of 10 µg/dL. The ALM is used to evaluate risks of lead exposure to the fetus of pregnant female industrial workers, construction workers, and other workers that are identified as relevant receptors at a site.

6.4.1.1 Lead Exposure Assessment

Default parameters were utilized for the ALM model with the following ingestion rates and exposure frequencies: maintenance worker – ingestion rate (100 mg/day) and exposure frequency (219 days), commercial worker – ingestion rate (50 mg/day) and exposure frequency (250 days), and construction worker – ingestion rate (330 mg/day) and exposure frequency (250 days). Default parameters were used for the IEUBK model. The arithmetic mean for lead in surface soil (97.97 mg/kg) was used in the model for the maintenance worker and the arithmetic mean for lead in total soil (45.63 mg/kg) was used in the models for the remaining potential receptors. The lead modeling predicts the probability of the receptors to have blood levels of 10 µg/dL or greater. This probability is then compared to an established threshold of 5%. The results of the modeling for SWMU 57 is presented in Appendix E.2 and summarized below:

- Current Maintenance Worker: 1.9% probability that fetal blood levels would exceed 10 µg/dL (<5%);
- Hypothetical Future Construction Worker: 2.6% probability that fetal blood levels would exceed 10 µg/dL (<5%);
- Hypothetical Future Commercial Worker: 1.4% probability that fetal blood levels would exceed 10 µg/dL (<5%); and
- Hypothetical Future Child resident: 0.01% probability that child blood levels would exceed 10 µg/dL (<5%).

The results of the lead modeling predicted the probability of the receptors for SWMU 57 expected to have blood levels of 10 μg/dL or greater were below the established threshold of 5%.

6.4.2 Iron Margin of Exposure Evaluation

Because iron concentrations in soil resulted in an HQ of 0.5 or higher for the child resident at SWMU 57, a "margin of exposure evaluation" was conducted for the site. This evaluation consists of a comparison of estimated intake of iron to the RDA and concentrations known to cause adverse health effects in children (USEPA 2001a).

For the margin of exposure evaluation, the estimated iron intakes at the sites for a future resident child scenario for surface soil and total soil are calculated using the assumptions and equations provided in Appendix E.2. These estimated iron intake levels are then compared to the RDA for children (6 months to 10 years old) of 10 mg/day (NCEA 1996). In addition, using an average child weight of 15 kg (USEPA 1989), the child intakes for surface soil and total soil are calculated and compared to the calculated provisional RfD of 0.7 mg/kg-day. The results of the margin of exposure evaluation are summarized in the table below.

Results of Iron Margin of Exposure Evaluation

		RDA Evaluation			Provisional Risk Reference Dose (RfD) Evaluation		
	Iron EPC (mg/kg)	Child Daily Intake Estimate (mg/day)	RDA (mg/day)	Result	Child Daily Intake (mg/kg-day)	Calculated Provisional RfD (mg/kg-day)	Result
Surface Soil	44,944	8.6	10	<RDA	0.58	0.7	<RfD
Total Soil	45,129	8.7	10	<RDA	0.58	0.7	<RfD

The iron exposure assessment results for the hypothetical future child resident were below the applicable iron margin of exposure screening criteria for SWMU 57.

6.4.3 Background

Statistical evaluations were conducted to compare metals concentrations in soil at SWMU 57 to background concentrations presented in the RFAAP Facility-Wide Background Study Report (IT 2001). These evaluations followed the procedures outlined in the USEPA *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites* (USEPA 2002a) and included distribution testing and comparisons of site data to background using ProUCL 4.0. At SWMU 57, if the distribution testing showed that either site data sets and background data sets in each case were not normal, consistent with Section 4.1 of the above referenced USEPA guidance, comparisons of site to background were conducted using non-parametric testing to evaluate whether site concentrations were consistently higher or lower than the background data set. If the distribution of the site and background data sets were both distributed normally, a paired t-test was conducted to evaluate whether site concentrations were consistently higher or lower than the background data set unless non-detects were present in either data set then the default comparison using ProUCL 4.0 is nonparametric. Appendix D.2 presents results of the statistical evaluations.

Based on the background evaluations presented in Appendix D.2, COPCs identified for SWMU 57 that are consistently lower than background include arsenic, cobalt, iron, manganese, and vanadium for surface soil and arsenic, cobalt, thallium, and vanadium for total soil. Note that background comparisons

could not be conducted for antimony (surface soil and total soil), cadmium (surface soil), and thallium (surface soil) due to the number of detections in the background data set.

6.5 UNCERTAINTIES ANALYSIS

Risk assessments involve the use of assumptions, judgments, and incomplete data to varying degrees that contribute to the uncertainty of the final estimates of risk. Uncertainties result both from the use of assumptions or models in lieu of actual data and from the error inherent in the estimation of risk related parameters and may cause risk to be overestimated or underestimated. Based on the uncertainties described below, this risk assessment should not be construed as presenting an absolute estimate of risk to persons potentially exposed to COPCs.

Consideration of the uncertainty attached to various aspects of the risk assessment allows better interpretation of the risk assessment results and understanding of the potential adverse effects on human health. In general, the primary sources of uncertainty are associated with environmental sampling and analysis, selection of chemicals for evaluation, toxicological data, and exposure assessment. The effects of these uncertainties on the risk estimates are discussed below.

6.5.1 Environmental Sampling and Analysis

If the samples do not adequately represent media at SWMU 57, hazard/risk estimates could be overestimated or underestimated. The sampling and analysis plan was designed to investigate anticipated area of contamination and delineate area of concern at the SWMU. Therefore, there is less chance that the hazard/risk estimates are biased low. Also, if the analytical methods used do not apply to some chemicals that are present at the area, risk could be underestimated. Because the analytical methods at the site were selected to address all chemicals that are known or suspected to be present on the basis of the history of the area, the potential for not identifying a COPC is reduced.

Uncertainty in environmental chemical analysis can stem from several sources including errors inherent in the sampling or analytical procedures. Analytical accuracy errors or sampling errors can result in rejection of data, which decreases the available data for use in the HHRA, or in the qualification of data, which increases the uncertainty in the detected chemical concentrations. There is uncertainty associated with chemicals reported in samples at concentrations below the method reporting limit but still included in data analysis and with those chemicals qualified "J" indicating that the concentrations are estimated. Another issue involves the amount of blank related (i.e., B-qualified) data in the data set. These data were retained in the HHRA without modification. The inclusion of "B" qualified data in the risk assessment may overestimate risk.

Another uncertainty associated with sampling and analysis concerns the inclusion of chemicals that are potentially present in the environment due to anthropogenic sources. For example, PAHs are considered ubiquitous in soil from anthropogenic sources, such as the burning of fossil fuels, forest fires, and airborne particulates eroded from roadways and automobile tires. If such chemicals are not site-related, the risks associated with the site may be overestimated. This uncertainty may have a low-to-moderate effect on overestimating risks.

6.5.2 Selection of Chemicals for Evaluation

A comparison of maximum detected chemical concentrations to USEPA Region III RBCs was conducted for both surface and total soil. Chemicals whose maximum concentrations were below their respective RBCs were not carried through the assessment. It is unlikely that this risk based screening excluded chemicals that should be included, based on the conservative exposure assumptions and conservatively derived toxicity criteria that are the basis of the RBCs. Although following this methodology does not provide a quantitative risk estimate for every chemical, it focuses the assessment on the chemicals accounting for the greatest risks (i.e., chemicals whose maximum concentrations exceed their respective RBCs) and the cumulative risk estimates would not be expected to be significantly greater. As presented

on the non-detect MDL screening tables in Appendix E.1, Tables E.1-2.3 and E.1-2.5, the maximum MDL exceeded the adjusted RBCs for several chemicals in soil and groundwater; therefore, the site-related risks and hazards could be underestimated for the risk assessments due to inadequate detection limits.

Background concentrations of metals in soil at RFAAP have been characterized and are used in statistical comparisons to site soil to evaluate whether concentrations of metals detected at SWMU 57 are consistently higher or lower than background. Uncertainties associated with the use of these data may lead to a low-to-moderate overestimation or underestimation of surface and total soil risks due to metals.

Screening criteria are derived from RDAs for essential human dietary minerals, trace elements, and electrolytes that are toxic at very high doses (i.e., calcium, magnesium, potassium, and sodium). Omitting these essential human nutrients from further evaluation is expected to have a low effect on risk and hazard estimates.

6.5.3 Exposure Assessment

The primary areas of uncertainty affecting exposure parameter estimation involve the assumptions regarding exposure pathways, the estimation of exposure point concentrations, and the exposure parameters used to estimate chemical doses.

An underlying assumption in the HHRA is that individuals at the site would engage in activities that result in exposures via each selected pathway. For example, it was assumed that maintenance workers engage in regular activities (once a week) under current and future land use conditions resulting in exposure to COPCs. This assumption is conservative, in that it is more likely that the activity patterns occur occasionally.

In establishing EPCs, the concentrations of chemicals in the media evaluated are assumed to remain constant over time. Depending on the properties of the chemical and the media in which it was detected, this assumption could over estimate risks, depending on the degree of chemical transport to other media or the rate and extent a chemical degrades over time.

The exposure parameters used to describe the extent, frequency, and duration of exposure is associated with uncertainty. Actual risks for individuals within an exposed population may differ from those predicted, depending upon their actual intake rates (e.g., soil ingestion rates), nutritional status, or body weight. Exposure assumptions were selected to produce an upper bound estimate of exposure in accordance with USEPA guidelines regarding evaluation of potential exposures at Superfund sites (e.g., exposures were assumed to occur for 25 years for workers). In addition, many USEPA (1991a) default exposure parameters are highly conservative and are based on risk management interpretations of limited data. For example, although current USEPA guidance recommends default soil ingestion rates of 100 mg/day for individuals over 6 years of age, other studies, such as Calabrese et al. (1990), have shown that the USEPA default soil ingestion rate of 100 mg/day is likely to greatly overestimate adult exposures and risks. In addition, chemicals in soil are assumed 100% bioavailable; this assumes that ingested chemicals present in a soil matrix are absorbed through the gastrointestinal (GI) tract, which is unlikely due to the affinity of contaminants for soil particles. Therefore, based on the conservative exposure assumptions used in the HHRA, exposures and estimated potential risks are likely to be overestimated for the ingestion of soil pathways.

Evaluation of the dermal absorption exposure pathway is affected by uncertainties in dermal exposure parameters. For example, there is uncertainty associated with the exposed skin surface areas used, since the choice of exposed body parts could slightly overestimate or underestimate risks. Uncertainties that are more significant are associated with the selection and use of dermal absorption factors. For this HHRA, the dermal absorption factors and calculations were based on USEPA Region III guidance and USEPA's *Risk Assessment Guidance for Superfund (RAGS): Part E, Supplemental Guidance for Dermal Risk Assessment* (USEPA 2004b). Very limited information is available on dermal absorption of

chemicals from contacted soil under environmental conditions. In fact, there are not actual human epidemiological data to support the hypothesis that absorption of soil bound compounds under exposure conditions is a complete route of exposure. For example, the Public Health Statements from the Agency for Toxic Substance Disease Registry (ATSDR 1999b) indicates cadmium is not known to result in human health effects by dermal absorption because virtually zero cadmium can enter the body through the skin under normal circumstances (i.e., without exposure to very high concentrations for long periods or exposure to skin that is damaged (ATSDR 1999a). Therefore, using the dermal absorption factors to evaluate dermal absorption exposures to soil may result in an overestimation of risks.

6.5.4 Toxicological Data

The HHRA relies on USEPA derived dose response criteria. These health effects criteria are conservative and are designed to be protective of sensitive subpopulations. The health criteria used to evaluate long-term exposures, such as RfDs or CSFs, are based on concepts and assumptions that bias an evaluation in the direction of overestimation of health risk. As USEPA notes in its *Guidelines for Carcinogenic Risk Assessment* (USEPA 1986a), there are major uncertainties in extrapolating both from animals to humans and from high to low doses. There are important species differences in uptake, metabolism, and organ distribution of carcinogens, as well as species and strain differences in target site susceptibility, human populations are variable with respect to genetic constitution, diet, occupational and home environment, activity patterns, and other cultural factors.

These uncertainties are compensated for using upper bound 95% UCLs for CSFs (carcinogens), and safety factors for RfDs (non-carcinogens). The assumptions used here provide a rough but plausible estimate of the upper limit of risk; in other words, it is not likely that the true risk would be much more than the estimated risk, but it could very well be considerably lower, even approaching zero. More refined modeling in the area of dose response calculation (e.g., using maximum likelihood dose response values rather than the 95% UCL) would be expected to substantially lower the final risk.

For dermal absorption exposure pathways, the absence of dermal toxicity criteria necessitates the use of oral toxicity data. To calculate risk estimates for the dermal absorption pathway, absorbed dermal absorption doses are combined with oral toxicity values (also discussed above in Section 6.3). Oral toxicity values, which are typically expressed in terms of potential (or administered) doses, should be adjusted when assessing dermal absorption doses, which are expressed as internal (or absorbed) doses. In this assessment, absolute oral absorption factors that reflect the toxicity study conditions were used to modify the oral toxicity criteria. For those chemicals lacking sufficient information, a default oral absorption factor of 1.0 was used. The risk estimates for the dermal absorption pathways may be overestimated or underestimated, depending on how the values used in the HHRA reflect the difference between the oral and dermal routes.

Inhalation toxicity criteria are unavailable for many of the COPCs. This HHRA does not use oral-based toxicity criteria to estimate risks from inhalation exposure because of the following uncertainties associated with such a substitution:

- Many contaminants show portal-of-entry toxicity – that is, adverse health effects occur primarily at the tissue site at which the chemical is introduced into the body (e.g., GI tract, lung, or skin). For example, orally administered benzo(a)pyrene is associated with benign and malignant tumors in the gut mucosa (Neal and Rigdon 1967), but inhaled benzo(a)pyrene produces an increased incidence of upper respiratory tract tumors (Thyssen et al. 1981). Therefore, quantitative risk estimates based on these two administration routes are dissimilar;
- Physiological and anatomical differences between the GI tract and respiratory systems invalidate a cross-route quantitative risk extrapolation. The small intestine of humans contains a very large surface area that readily absorbs most compounds by passive diffusion (Klaasen et al. 1986). The

oral absorption of a few compounds, such as iron, is an energy-dependent (active-transport) process, wherein; the absorption rate is proportional to the body's current need for iron;

- The rate and extent of pulmonary absorption are much more complex and depend on such factors as particle size distribution of the airborne toxicant and blood-gas solubility of the toxicant (Klaasen et al. 1986). Particles with median aerodynamic diameters of approximately 1 micrometer (μm) or less are absorbed by the alveolar region of the human lung. Larger particles deposit in the tracheobronchial or nasopharyngeal regions where they are cleared by mucociliary mechanisms and subsequently swallowed or physically removed and exhaled. Therefore, pulmonary absorption is more highly dependent on the physiochemical properties of the material than oral absorption;
- Because highly soluble gases (e.g., chloroform) are more rapidly absorbed into the blood than poorly soluble gases (e.g., ethylene), they take much longer to reach equilibrium. Thus, the inhalation absorption rate of a gas is more dependent on blood solubility than the oral absorption rate of the same substance administered as a liquid; and
- Human inhalation risk estimates based on oral toxicity data in subhuman species are distorted by both route-to-route extrapolation and interspecies extrapolation. For example, the rodent GI tract, which includes a structurally unique fore stomach, is anatomically and functionally distinct from the human lung, which contains a very large alveolar surface area for extensive absorption. The rate and extent of absorption across these distinct physiological systems are not alike.

In addition, for inhalation exposure to substances present as dusts, vapors, gases, or airborne particulate matter, dose extrapolation is far more complex, and therefore associated with uncertainty. The major confounding factors that prohibit a direct dose extrapolation of an inhaled toxicant are the following:

- Over 40 functionally different cell types in the lung – the distribution, consequent metabolic reactions, and air exchange rates vary widely across species;
- Differential concentration and activity of the detoxifying protein glutathione;
- Interspecies and intraspecies differences in the ability to repair pulmonary cell damage, and to clear toxic contaminants and immune complexes from the respiratory tract. For example, species vary in the ability to activate macrophages – nonspecific immune cells that can both protect the inner lining of the respiratory system and, at high concentrations, damage healthy tissues;
- Anatomical variations in the respiratory pathway, which affect both absorption rates and time to reach steady-state blood levels; and
- Sensitivity to solubility and concentration variables; because of metabolic saturation (i.e., the exhaustion of normal metabolic activity caused by exposure to high concentrations), highly soluble contaminants deviate from first-order kinetics – which makes it difficult to predict the rates and extent of biotransformation and detoxification reactions. Furthermore, intermittent inhalation exposure to highly blood-soluble chemicals results in bioaccumulation in fat tissue because of the insufficient time between exposure sessions for complete clearance of the contaminant. Such slow release from the fat compartment to other body tissues can result in toxicological and metabolic effects that are difficult to assess and vary across species.

For chemicals without Integrated Risk Information System (IRIS) toxicity criteria, provisional toxicity criteria were used where available (Appendix E.1 - Tables E.1-5.1 through E.1-6.2). Provisional toxicity criteria present a source of uncertainty, since USEPA has evaluated the compound, but consensus has not been established on the toxicity criteria. Provisional oral toxicity values were used for aluminum, antimony, arsenic (subchronic only), chromium (subchronic only), cobalt, iron, manganese, thallium, vanadium, zinc (subchronic only), Aroclor 1254 (subchronic only), and chloroform (subchronic only).

For inhalation, aluminum, antimony, cadmium, cobalt, and chloroform provisional toxicity data were used. For this assessment, use of provisional toxicity criteria was preferable to not evaluating the chemical in order to limit data gaps. However, because these toxicity criteria have not been formally accepted by USEPA, there is uncertainty with these values and, therefore, with the risks calculated using these toxicity criteria.

For some chemicals, toxicity criteria were unavailable (Appendix E.1 - Tables E.1-5.1 through E.1-6.2). Although lack of published toxicity data could result in an underestimation of risk, this uncertainty is likely to be balanced by the conservative nature of the verified toxicity values that were available for use.

6.5.5 Risk Characterization

Minor uncertainty is associated with rounding of the risk and hazard estimates. Thus, the actual risk or hazard may be slightly greater or less than the presented values. A related issue is that rounding causes minor differences between summed risk and hazard values, depending on how the summing is performed. For example, RAGS Table 7s in Appendix E presents risks and hazards that are summed for exposure route, exposure point, exposure medium, and medium total. Only for the first (exposure route) are the individual chemical-specific risks and hazards summed to derive the total. For the subsequent summations (exposure point, exposure medium, and medium total), each is the summation of the preceding sums. For this reason, there can also be minor rounding-related differences between the "same" values presented in RAGS Table 9s and 10s in Appendix E.

6.6 HHRA SUMMARY AND CONCLUSIONS

This HHRA was performed to evaluate the potential human health effects associated with previous activities at the SWMU. Receptors evaluated included: current/future maintenance worker, hypothetical future construction worker, hypothetical future commercial worker, hypothetical future adult resident, hypothetical future child resident, and hypothetical future lifetime resident.

As presented in Section 6.4, the total risk for each receptor is below or within USEPA's target risk range for Superfund sites (1E-06 to 1E-04, USEPA 1989) with the exception of the hypothetical future lifetime resident due primarily to arsenic and chloroform in groundwater. The iron exposure assessment results for the hypothetical future child resident were below the applicable iron margin of exposure screening criteria. The results of the lead modeling predicted the probability of the receptors expected to have blood levels of 10 μg /dL or greater were below the established threshold of 5%. The total HIs after target organ segregation for all receptors are equal to or below the USEPA reference HI of 1E+00 with the exception of the hypothetical future construction worker (blood, central nervous system (CNS), and kidney) and the hypothetical future child resident (blood, CNS, GI tract, kidney, liver, bone marrow, and fetus). The site-related hazards are further characterized as follows:

Hypothetical Future Construction Worker

The blood HI of 3 for the hypothetical future construction worker is primarily due to antimony in soil (HQ=3). A background comparison for antimony cannot be conducted to the low number of detections in the background data set.

The CNS HI of 20 for the hypothetical future construction worker is primarily due to aluminum (HQ=2.8) and manganese (HQ=17) in soil via the inhalation pathway. Aluminum and manganese were consistently above background for total soil.

The site-related kidney HI for the hypothetical future construction worker, when excluding metal hazard drivers below background (vanadium), is 1E-01 which below the USEPA reference of 1E+00.

Hypothetical Future Child Resident

The blood HI of 7 for the hypothetical future child resident is primarily due to antimony (HQ=5) and iron (HQ=0.8) in soil and antimony (HQ=0.9) in groundwater. Iron was consistently above background for

total soil while a background comparison for antimony cannot be conducted to the low number of detections in the background data set.

The CNS HI of 3 for the hypothetical future child resident is primarily due to aluminum (HQ=0.3) and manganese (HQ=2.4) in soil and manganese in groundwater (HQ=0.7). Aluminum and manganese were consistently above background for total soil.

The GI tract HI of 3 for the hypothetical future child resident is primarily due to chromium (HQ=2.3) and iron (HQ=0.8) in soil. Chromium and iron were consistently above background for total soil.

The site-related kidney HI for the hypothetical future child resident, when excluding metal hazard drivers below background (vanadium), is 4E-01 which below the USEPA reference of 1E+00.

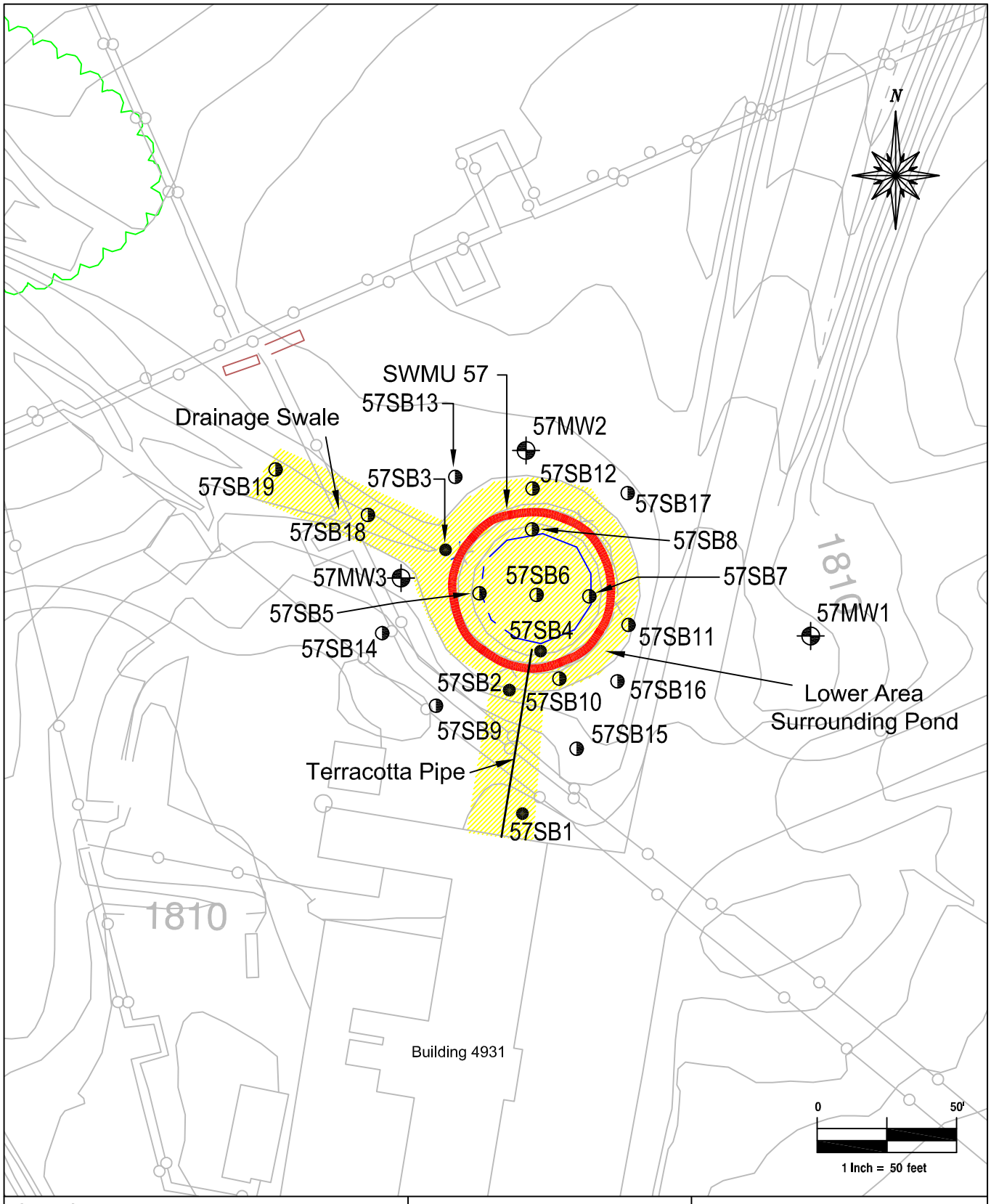
The liver HI of 4 for the hypothetical future child resident is primarily due to chromium (HQ=2.3) and iron (HQ=0.8) in soil and chloroform (HQ=0.4) in groundwater. Chromium and iron were consistently above background for total soil.

The bone marrow HI of 2 for the hypothetical future child resident is primarily due to chromium (HQ=2.3) in soil. Chromium was consistently above background for total soil.

The fetus HI of 2 for the hypothetical future child resident is primarily due to chromium (HQ=2.3) in soil. Chromium was consistently above background for total soil.

6.6.1.1 HHRA Conclusions

In summary for SWMU 57, the results of the risk assessment indicate that the calculated site-related cancer risks and hazards (when taking target organs and background into consideration) are within USEPA target ranges for the current receptor, maintenance worker. The risk assessment indicates an elevated risk for the future hypothetical lifetime resident due to arsenic and chloroform in groundwater. The risk assessment also indicated elevated hazards for the future hypothetical construction worker and the future hypothetical child resident due to primarily to metals concentrations in soil.



Legend

- Approximate SWMU Boundary
- Topographic Contour
- SSP Soil Sample Location
- RFI Sample Location
- Monitoring Well Location
- Vegetation
- Fence
- Aboveground Piping
- HHRA Study Area

FIGURE 6-1

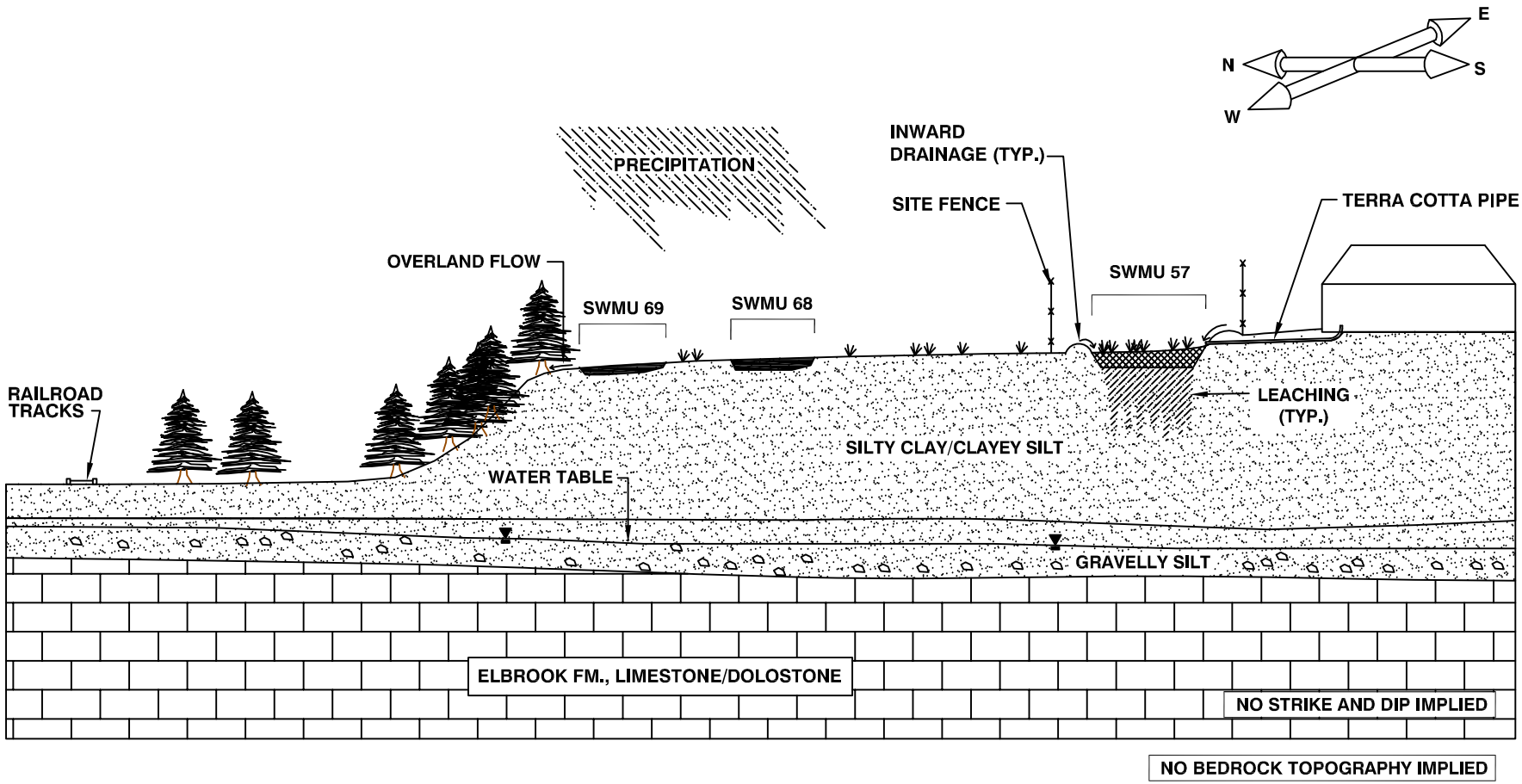
Risk Assessment Area

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.6-1 RA Area

SWMU 57

RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



CONCEPTUAL DRAWING - NO SCALE IMPLIED

FIGURE 6-2
Conceptual Site Model

Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: Not to Scale	File Name: Fig. 6-2 CSM

SWMU 57
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Radford, Virginia

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5540 Falmouth Street
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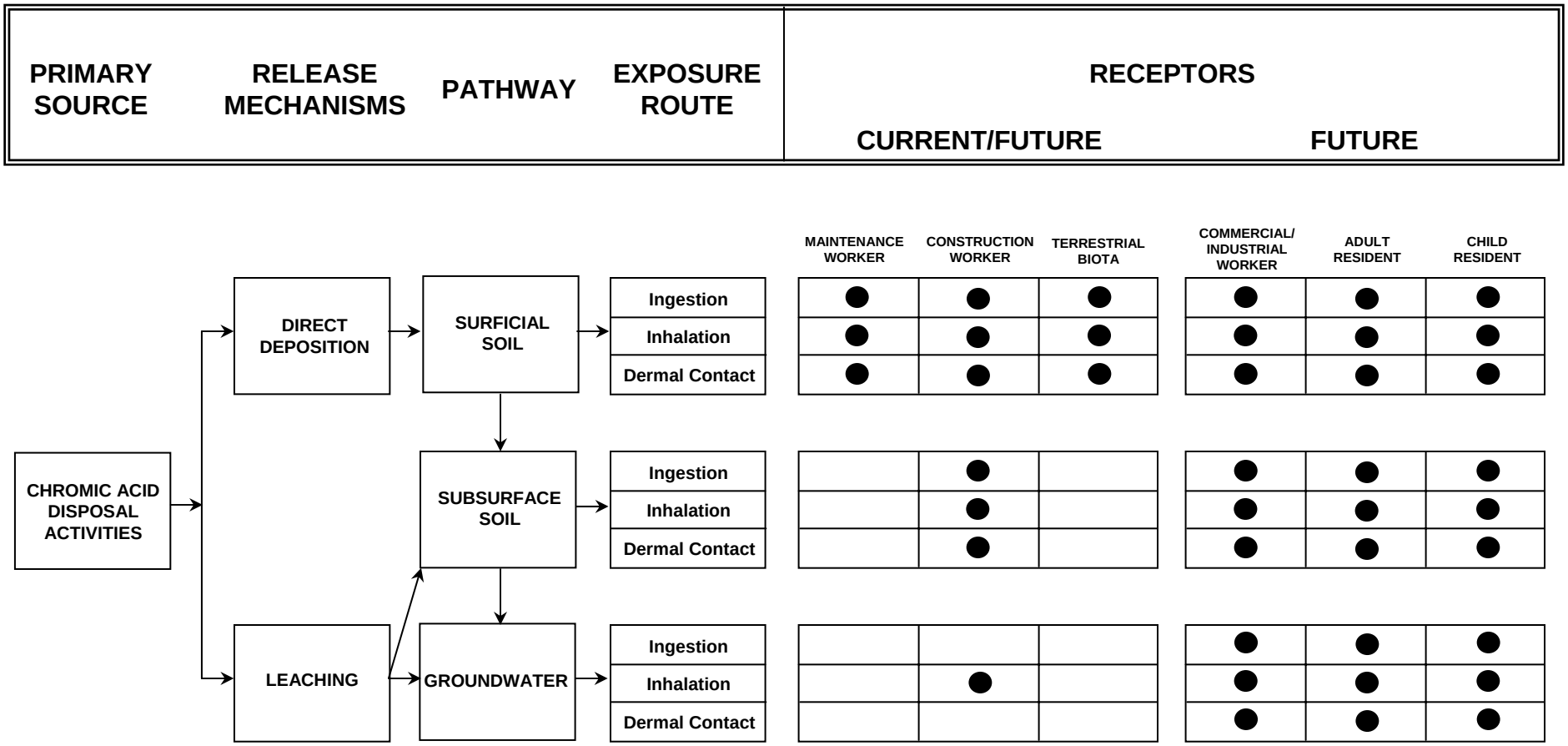

FIGURE 6-3
Conceptual Site Diagram

Date: *April 2008*	**URS Project#:** *11656421*
Prepared by: *DBC*	**Approved by:** *JOS*
Scale: *1" = 2000'*	**File Name:** *Fig.6-3 CSD*

SWMU 57
RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

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Table 6-1
Sample Assemblages for Soil COPC Screening
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

SWMU 57			
Surface Soil			
57SB1A	57SB7A	57SB19A	
57SB2A	57SB8A		
57SB3A	57SB9A		
57SB4A	57SB10A		
57SB4A2	57SB11A		
57SB5A	57SB12A		
57SB6A	57SB18A		
Subsurface Soil			
57SB1AB	57SB5AB	57SB7C	57SB18B
57SB1B	57SB5B	57SB8AB	57SB19B
57SB2AB	57SB5C	57SB8B	
57SB2B	57SB6AB	57SB8C	
57SB3B	57SB6B	57SB9AB	
57SB4AB	57SB6C	57SB10B	
57SB4B	57SB7AB	57SB11B	
57SB4C	57SB7B	57SB12B	
Samples Collected Outside Study Area Excluded from HHRA			
57SB13A	57SB16A		
57SB13B	57SB16B		
57SB13C	57SB16C		
57SB14A	57SB17A		
57SB14B	57SB17B		
57SB14C	57SB17C		
57SB15A			
57SB15B			
57SB15C			
Samples Collected at a Depth >15' Excluded from HHRA			
57SB1C			
57SB2C			
57SB3C			
57SB10C			
57SB11C			
57SB12C			
57SB18C			
57SB19C			

Notes:
HHRA = Human Health Risk Assessment

Table 6-2
RDA-based Screening Criteria Calculations
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

SOIL AND GROUNDWATER CRITERIA

Soil Screening Criteria (mg/kg) = $\frac{\text{RDA/AI}}{(IR_S \times EF \times ED \times 10^{-6}\ \text{kg/mg} \times \text{year}/365\ \text{days}) / AT}$

Groundwater Screening Criteria (µg/L) = $\frac{\text{RDA/AI} \times 1000\ \mu\text{g/mg}}{(IR_W \times EF \times ED \times \text{year}/365\ \text{days}) / AT}$

Parameter Definition		Value	Units
RDA/AI	= Recommended Daily Allowance/Adequate Intake	nutrient-specific	mg/day
IR_S	= Soil Ingestion Rate		
	- adult resident	100	mg soil/day
	- child resident	200	mg soil/day
IR_W	= Tap water ingestion rate		
	- adult resident	2	L water/day
	- child resident	1	L water/day
EF	= Exposure frequency		
	- residential	350	days/year
ED	= Exposure duration		
	- adult resident	24	years
	- child resident	6	years
AT	= Averaging time		
	- adult resident	24	years
	- child resident	6	years

			RDA/AI[c,d] (mg/day)		Soil Screening Criteria (mg/kg)			Groundwater Screening Criteria (µg/L)		
	Reference	CAS	Adult	Child	Adult Resident	Child Resident	Selected Criteria (Minimum)	Adult Resident	Child Resident	Selected Criteria (Minimum)
Calcium	(a)	7440-70-2	800	210	8.3E+06	1.1E+06	1.095E+06	4.2E+05	2.2E+05	2.2E+05
Magnesium	(a)	7439-95-4	130	30	1.4E+06	1.6E+05	1.564E+05	6.8E+04	3.1E+04	3.1E+04
Potassium	(b)	2023-69-5	1600	500	1.7E+07	2.6E+06	2.607E+06	8.3E+05	5.2E+05	5.2E+05
Sodium	(b)	7440-23-5	400	120	4.2E+06	6.3E+05	6.257E+05	2.1E+05	1.3E+05	1.3E+05

(a) Recommended Dietary Allowances, 10th edition ©1989 by the National Academy of Sciences (National Academy Press, Washington, D.C.)
(b) Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride, ©1997 by the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board, Institute of Medicine (National Academy Press, Washington, D.C.)
(c) RDA/AIs for calcium and magnesium represent the lower end of the RDA/AI for persons 7 years old and over (adults) and 6 years old and under (children).
(d) RDA/AIs for potassium and sodium represent the lower end of the minimum requirement for healthy persons 7 years old and over (adults) and 6 years old and under (children).

7.0 SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

7.1 ECOLOGICAL RISK SCREENING PROCESS

The purpose of the ecological risk screening is to provide conclusions and recommendations regarding potential ecological risk associated with SWMU 57. SLERAs were performed in accordance with the Final Process for Ecological Risk Assessment – Radford AAP (URS 2007d). The SLERA process is summarized below in Sections 7.1.1 through 7.1.7. Refer to Appendix F.1 for a detailed description of the SLERA process and example sample calculations utilized for the evaluation of SWMU 57. A summary of the SLERA results are provided in Section 7.2 and the complete tables for the SLERA are provided in Appendix F.2.

7.1.1 Scope of Work

The SLERA includes Steps 1, 2, and 3a of Ecological Risk Assessment Guidance for Superfund (ERAGS, USEPA 1997). Step 1 includes a screening-level problem formulation and ecological effects evaluation. Step 2 includes a preliminary exposure estimate and risk calculation. Step 3a reviews and refines the conservative assumptions used in the risk calculation (Step 2). The addition of Step 3a focuses the outcome of the SLERA, streamlines the review process, and functions as the initial basis for ecological risk management decision making.

The objectives of the ecological risk screening are to:

- Identify potentially complete exposure pathways between COPECs and receptors;
- Assess whether the COPECs exceed toxicological screening values that are considered to be protective of ecological receptors;
- Identify uncertainty and/or data gaps in the ecological risk screening; and
- Identify an appropriate SMDP for each site area based on the ecological risk screening results.

7.1.1.1 Ecological Site Characterization

An overview of the site physiography, water resources, geology, and soil for SWMU 57 is presented in Section 2.0. Due the small size of the SWMU (0.06 acre) and the proximity to the New River (approximately 1,500 feet), SWMU 57 would likely not be an attractive habitat to aquatic receptors with the exception of amphibians. Amphibians were observed within the unit at the time of the July 2005 site visit.

In addition to the information contained in Section 2.0, additional site characterization is required for the ecological risk screening, which includes local ecological receptors (threatened and endangered species) and ecological resources. A discussion of potential biota likely to use the site areas, are included in this section. During a site reconnaissance performed on July 21, 2005, wildlife species were not observed at the site with the exception of amphibians within the pond area. During previous site visits other wildlife species such as red foxes and deer were observed at the site outside the fenced pond area. The result of the ecological site reconnaissance is provided in Appendix F.3.

In addition, the Virginia Department of Game and Inland Fisheries Installation-Wide Biological Survey (1999) recorded various species associated with the grassland communities at RFAAP. Based on their survey of the grassland habitats, the invertebrates (approximately 250 species) and birds (83 species) accounted for the majority of species observations at RFAAP. Potential species utilizing the grassland areas of the site include common passerine birds (e.g., American robin) and small mammals (e.g., short-tailed shrew). Larger mammals (e.g., white-tailed deer and red fox) and raptors (e.g., red-tailed hawk) may potentially utilize the grassland habitat for foraging. Animals such as the mallard duck, belted kingfisher, and raccoon could be expected to forage in the New River.

The Virginia Department of Game and Inland Fisheries (VDGIF) survey identified three threatened wildlife species and two rare plant species associated with RFAAP grassland communities (currently not on the 2002 Plant Watch List; http://www.dcr.state.va.us/dnh/plantlist02.pdf). They include:

- Regal Fritillary Butterfly (*Speyeria idalia*);
- Henslow's Sparrow (*Ammodramus henslowii*);
- Loggerhead Shrike (*Lanius ludovicianus*);
- Midland Sedge (*Carex mescochorea*); and
- Shaggy False Gromwell (*Onosmodium hispidissimum*).

Threatened wildlife observations in 1999 at RFAAP included the Regal Fritillary Butterfly (VDGIF 1999). The Regal Fritillary Butterfly was documented in the east-central and eastern edges of the MMA. No threatened wildlife species or rare plant species were observed at the site.

7.1.2 Identification of Chemicals of Potential Ecological Concern

7.1.2.1 Approach

The medium of concern with respect to the SLERA is surface soil. Soil samples were collected from 0 to 1 ft bgs below organic layers at the surface. This layer contains the zone of highest biological activity of soil organisms and the soil that is most frequently contacted by terrestrial biota. Although fossorial wildlife may be in contact with soil below 1 ft bgs, the preys of these animals are primarily associated with surficial soil. Furthermore, incidental exposure to the soil below 1 ft bgs is likely to be insignificant relative to surface soil exposure. The following sections describe the process used to evaluate soil, the selection of COPECs evaluated in the SLERA, and the uncertainties associated with COPEC selection. A qualitative assessment of potential risks to amphibians is presented in Section 7.2.3.

7.1.2.2 Summary of COPEC Selection

As outlined in Section 7.1.5, for the soil direct contact COPEC screening, the MDCs for detected chemicals were compared to established toxicity reference values (TRVs). Direct contact COPECs were selected for further consideration in the SLERA if the MDC exceeded the available screening value. Chemicals for which no screening values are available are considered uncertainties and not carried through the risk assessment. For food chain, COPECs were selected for further consideration in the preliminary risk calculations of the SLERA if the detected chemical was bioaccumulative as listed on Table 4-2 in *Bioaccumulative Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs* (USEPA 2000b).

7.1.2.3 Terrestrial

Potential ecological receptors at SWMU 57 may be exposed to COPECs in soil through the following exposure routes:

- Direct contact/absorption from soil;
- Direct ingestion of soil;
- Incidental ingestion of soil; and
- Direct ingestion of biota with accumulated COPECs.

Although receptors may be exposed to COPECs through inhalation or drinking surface water, sufficient literature regarding toxicity due to these pathways is lacking to quantitatively evaluate such exposure routes. Given the potential mobility of COPECs between food web trophic levels, a number of terrestrial categories were selected. Individual receptor species were selected to represent five wildlife receptor

categories and these species possess the following characteristics that are essential for assessing COPEC mobility within the food web:

- Highly likely to occur at the site;
- Limited home range;
- Important role in the local food web; and
- Sufficient toxicological information is available in the literature.

Receptor categories and the species selected to represent the wildlife categories include:

- Plant communities;
- Soil invertebrate/microbial communities;
- Omnivorous birds: American Robin (*Turdus migratorius*);
- Carnivorous birds: Red-tailed Hawk (*Buteo jamaicensis*);
- Herbivorous animals: Meadow Vole (*Microtus pennsylvanicus*);
- Omnivorous mammals: Red Fox (*Vulpes vulpes*); and
- Carnivorous mammals: Short-tailed Shrew (*Blarina brevicauda*).

Potential wildlife utilizing the site includes passerine bird and small mammalian species common to RFAAP grasslands (VDGIF 1999). During site visits, wildlife species were observed at the site such as squirrels, deer, and red foxes.

7.1.3 Identification of Exposure Pathways and Potential Receptors Analysis

7.1.3.1 Data Organization

The following table identifies the soil samples used for the SLERA. Soil samples collected inside the pond area for the RFI were analyzed for TCL VOCs, TCL SVOCs (including PAHs), explosives (including nitroglycerin and PETN), TAL metals and cyanide, TCL pesticides, and TCL PCBs. Soil samples collected outside the pond area for the RFI were analyzed for TCL VOCs and TCL metals. Soil samples collected for the SSP investigation were analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives (including nitroglycerin and PETN), TAL metals, and cyanide. Additionally, sample 57SB4A collected for the SSP investigation was analyzed for TCL pesticides and TCL PCBs. Refer to Table 3-1 for a complete list of samples and analyses.

Samples collected from borings 57SB13 through 57SB17 were excluded from the SLERA given that these borings were completed in the upper area surrounding the pond and the results of the nature and extent assessment did not indicate apparent impacts from the SWMU. Also note that sample 57SB4A2 (originally SSP sample 57SB4B) is included in the surface soil grouping although the sample was collected from approximately 1.5 ft bgs since the sample is representative of the material in the pond above the asphalt liner. A total of 15 surface soil samples were used for the SLERA. Refer to Figure 7-1 for the study area incorporating the borings used for the SLERA.

Soil Samples Evaluated for SLERA

Soil Samples Within Pond Area	Soil Samples Outside Pond Area
57SB4A	57SB1A
57SB4A2	57SB2A
57SB5A	57SB3A
57SB6A	57SB9A
57SB7A	57SB10A
57SB8A	57SB11A
	57SB12A
	57SB18A
	57SB19A

Detected chemical occurrence and distribution tables are presented in Appendix F.2, Table F.2-1. Refer to Section 4.0, Table 4-1, for a complete list of results for detected analytes. In addition, to evaluate the adequate sensitivity of the MDL for the necessary screening levels, Appendix F.2, Table F.2-2 provides a screening of the maximum MDL versus available ecological screening values for non-detected chemicals in surface soil. Additional information regarding the data used in the SLERA is summarized below:

- Flagged data such as J-flagged data (estimated concentration) and B-flagged data (detected in an associated blank) are considered detections and are used without modification;
- Rejected results (R-flagged) are not used;
- Data from duplicate sample pairs are averaged and treated as one result. If an analyte is detected in one of the sample pair, one half the detection limit of the non-detect is averaged with the detected result and the result is considered detected; and
- Chemicals that were not detected in at least one sample were considered as uncertain analytes in the evaluation of risk. Other qualified analytical data were retained in the assessment.

7.1.3.2 Ecological Conceptual Site Model (ECSM)

The terrestrial ecological conceptual site model (ECSM) is presented on Figure 7-2. Surface soil is a potential exposure medium of concern based on historical activities at the site. Based on the site characterization and data, the terrestrial receptor exposure to surface soil pathway exists. In addition as addressed in Section 7.2.3, amphibians were observed in the pond area at the time of the site visit and represent a receptor to surface soil within the pond area.

7.1.4 Identification of Assessment and Measurement Endpoints

Assessment endpoints are explicit statements of ecological resources (entities) and attributes of those entities that are important to protect (USEPA 1998). Measurement endpoints represent quantifiable ecological characteristics that can be measured, interpreted, and related to ecological resources chosen as assessment endpoints. Assessment and measurement endpoints for the resources in the terrestrial sites are outlined below.

7.1.4.1 Terrestrial

Assessment and measurement endpoints for terrestrial receptors are as follows:

Assessment Endpoints	Measurement Endpoints
• Survival, growth, and reproduction of terrestrial plants	• MDCs for chemicals detected in surface soil were compared to concentrations representing no adverse effects thresholds to the survival of plants communities reported in the scientific literature
• Survival, growth, and reproduction of soil invertebrates and microbial communities	• MDCs for chemicals detected in surface soil were compared to concentrations representing no adverse effects thresholds to the survival of soil invertebrates or microbial communities reported in the scientific literature
• Survival, growth, and reproduction of terrestrial wildlife (birds and mammals) populations and communities	• MDCs for detected bioaccumulative chemicals in soil will be compared to no observable adverse effects levels (NOAELs) and lowest observable adverse effects levels (LOAELs) associated with effects on growth, reproduction, or survival of terrestrial wildlife

7.1.5 Preliminary Exposure Estimate and Ecological Effects Evaluation

The preliminary exposure estimate and ecological effects evaluation considers the most conservative risk scenario. Highly conservative assumptions are used to estimate COPEC exposure to terrestrial receptors for pathways to be quantitatively evaluated. Conservative TRVs are used to evaluate the ecological effects of exposure using the two approaches discussed below.

Risk is assessed by comparing the preliminary exposure estimate (MDC) of each detected chemical to the established TRV (detailed in Appendix F.1, Section 2.1). The preliminary risk is characterized in terms of a HQ, which is expressed as:

$$\mathbf{HQ = MDC/TRV}$$

where:

HQ = Hazard Quotient for the contaminant (unitless)
MDC = Maximum Detected Concentration for contaminant (mg/kg)
TRV = Screening Level for contaminant (mg/kg)

An HQ of less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects. The potential for risk increases as the HQ increases above one. However, this result should be considered in the context of other characteristics of the exposure area. In addition, it should be noted that the calculation of chemical specific HQs does not account for multiple chemicals acting through the same exposure mechanism. The results of the preliminary exposure assessment are presented in Appendix F.2.

7.1.5.1 Direct Contact Approach

The maximum soil concentrations for detected chemicals are used as the preliminary exposure estimate concentrations to develop a conservative risk scenario for the direct contact pathway to soil invertebrates and terrestrial plants. To assess the potential impact of PCBs on plants, the sum detected PCBs is compared to the available BTAG screening level for total PCBs (Appendix F.2, Table F.2-3a). In addition to assess the potential impact of PAHs on invertebrates, the sum of high molecular weight and

low molecular weight PAHs are compared to the available Eco SSLs for these compound groups (Appendix F.2, Table F.2-3b).

7.1.5.2 Dose Rate Modeling Approach

Preliminary risk characterization for wildlife receptors uses the conservative preliminary exposure estimate and ecological effects evaluation to characterize risk to potential terrestrial receptors. Risk is assessed by comparing the preliminary exposure estimate of each detected bioaccumulative chemical, as defined in Table 4-2 in *Bioaccumulative Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status, and Needs*, EPA-823-R-00-001 (USEPA 2000b), to the TRV developed in the ecological effects evaluation. An example calculation for dose rate modeling is provided in Appendix F.1., Section 4.1, utilizing the equation below.

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \ (BAF_{food} \cdot DF) + IR_s \ )AF}$$

where:

C_{TRV} = NOAEL or LOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg COPC/kg body weight-day)

BW = Minimum Body Weight of the receptor (kg)

IR_{food} = Maximum Ingestion Rate of food (kg food ingested per day, dry weight)

BAF_{food} = BAF of most contaminated dietary component used, specific to prey type and COPC (ratio of mg of COPC/kg fauna, wet weight to mg COPC/ kg substrate, dry weight)

DF = Dietary Fraction (most contaminated dietary component assumed to be 100% of diet)

IR_s = Maximum Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)

AF = 100% Area Use Factor

In the preliminary dose rate modeling approach, the maximum COPEC concentrations for detected bioaccumulative chemicals, along with assumptions of maximum ingestion rate, minimum body weight, 100% area use, and 100% bioavailability are used in the conservative risk scenario as the preliminary exposure estimate for soil and compared to the calculated TRVs. Preliminary receptor-specific exposure parameters are presented on Table F.2-9 (Appendix F.2).

7.1.6 Refined Exposure Estimate and Risk Characterization

Refined exposure estimates and ecological effects are developed for two major receptor categories having complete exposure pathways to be quantitatively evaluated: 1) direct contact to plants and invertebrates, and 2) wildlife ingestion (i.e., omnivorous birds and mammals, carnivorous birds and mammals, and herbivorous mammals). The refined exposure and risk characterization, Step 3a of ERAGS, reviews and refines the conservative assumptions used in the risk calculation (URS 2007d). In Step 3a, conservative assumptions used in the preliminary exposure and risk characterization are replaced with more environmentally realistic assumptions to evaluate risk posed by constituents identified in the preliminary risk characterization. The addition of Step 3a focuses the outcome of the SLERA, streamlines the review process, and functions as the initial basis for ecological risk management decision-making.

As noted below for the refined exposure estimate and risk characterization, (95% UCL) is used as the exposure concentration rather than the MDC. Methods used to calculate 95% UCLs are based on guidance provided in the following documents *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites* (USEPA 2002b) and *On the Computation of a 95% Upper Confidence Limit of the Unknown Population Mean Based Upon Data Sets with Below Detection Limit Observations* (USEPA 2006a).

In general, the method used to calculate a 95% UCL depends on: 1) the prevalence of non-detects, and 2) the data distribution (e.g., normal or lognormal). Non-detects introduce uncertainty in the data set because the true concentration may be between zero to just below the detection limit. Therefore, distributional assumptions are difficult to make for COPCs with a high rate of non-detects. ProUCL 4.0 is used to calculate EPCs for the sites with the exception of data sets with less than 5% detects for which MDCs were used for the SLERA. EPCs for soil COPECs are presented in Table F.2-4 of Appendix F.2.

For the refined evaluation, risk is assessed by comparing the EPC (95% UCL) of each detected chemical to the TRV. The refined risk HQ is expressed as:

HQ = EPC/TRV

where:

HQ = Hazard Quotient for the contaminant (unitless)
EPC = Calculated Exposure Point Concentration for chemical (mg/kg)
TRV = Screening Level for chemical (mg/kg)

An HQ of less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects. The potential for risk increases as the HQ increases above one. However, this result should be considered in the context of other characteristics of the exposure area. In addition, it should be noted that the calculation of chemical specific HQs does not account for multiple chemicals acting through the same exposure mechanism. The results of the preliminary exposure assessment are presented in Appendix F.2.

7.1.6.1 Direct Contact Approach

The refined exposure estimate for the direct contact pathway to soil invertebrate and microbial communities incorporates the 95% UCL as the exposure concentration for evaluating the COPECs using a conservative yet more realistic exposure assumption than MDCs.

7.1.6.2 Dose Rate Modeling Approach

The conservative assumptions used in the preliminary exposure estimate and ecological effects evaluation were replaced with more environmentally realistic assumptions resulting in a more realistic estimate of potential risk. An example calculation for dose rate modeling is provided in Appendix F.1, Section 4.4, utilizing the equation below.

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + IR_s) AF_{refined}}$$

where:

C_{TRV} = NOAEL or LOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg COPC/kg body weight-day)

BW = Average Body Weight of the receptor (kg)

IR_{food} = Average Ingestion Rate of food (kg food ingested per day, dry weight)

BAF_{food} = BAF of dietary component used, specific to prey type and COPC (ratio of mg of COPC/kg fauna, wet weight to mg COPC/ kg substrate, dry weight)

DF = Dietary Fraction

IR_s = Average Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)

$AF_{refined}$ = Refined Area Use Factor (detailed below)

The refined exposure estimates and ecological effects are developed for wildlife receptors having complete exposure pathways to be quantitatively evaluated (i.e., omnivorous birds, and carnivorous and herbivorous mammals). In the refined model, an average body weight, average ingestion rate, and a 95%

UCL as the EPC are used. Refined receptor-specific exposure parameters are presented on Table F.2-9 (Appendix F.2). In addition, a realistic area use factor ($AF_{refined}$) was calculated as the ratio of the site study area to the average home range of the receptor which is also presented in Table F.2-9. Note that an area use factor for the refined exposure assessment and risk characterization was calculated as the ratio of the study area (0.065 hectares) to the average home range of the receptor (Figure 7-1).

7.1.7 Risk Management – Scientific Management Decision Point

The findings of the ecological risk screen including site characterization and risk calculations are used as input to risk management decision-making for the site. The SMDP reached from the ecological risk screening concludes that one of the following statements is true:

- There is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the site on the basis of ecological risk;
- The information is not adequate to make a decision at this point and further refinement of data is needed to augment the ecological risk screening; or
- The information collected and presented indicates that a more thorough assessment is warranted.

7.2 SLERA RESULTS

7.2.1 Preliminary Risk Characterization

The complete preliminary risk characterization tables are provided in Appendix F.2 and summarized below.

7.2.1.1 Terrestrial Plants

Preliminary direct contact HQs calculated for plants are presented in Appendix F.2, Table F.2-6, for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of aluminum, antimony, cadmium, calcium, chromium, cobalt, copper, lead, manganese, mercury, selenium, vanadium, and zinc resulted in HQ values that were greater than 1.

7.2.1.2 Soil Invertebrates and Microbial Communities

Preliminary direct contact HQs calculated for invertebrates are presented in Appendix F.2, Table F.2-8, for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of antimony, chromium, copper, iron, manganese, mercury, vanadium, and zinc resulted in HQ values that were greater than 1.

7.2.1.3 Terrestrial Wildlife

Quantitative risk characterization for terrestrial wildlife is limited to direct ingestion of biota and incidental ingestion of soil. The preliminary risks for detected bioaccumulative chemicals are summarized in Appendix F.2, Table F.2-24, for each terrestrial wildlife receptor and the chemicals with HQs greater than 1 are characterized as follows:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
Meadow Vole	none	arsenic, cadmium, chromium, copper, lead, selenium, zinc
Short-tailed Shrew	copper, selenium, dieldrin, endosulfan II	arsenic, cadmium, chromium, lead, zinc, Aroclor 1254, Aroclor 1260
Red Fox	dieldrin, endosulfan II	arsenic, cadmium, chromium, copper, lead, selenium, zinc, Aroclor 1254, Aroclor 1260

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
American Robin	copper, dieldrin	cadmium, chromium, lead, mercury, selenium, zinc, Aroclor 1254, Aroclor 1260
Red-tailed Hawk	none	cadmium, chromium, lead, zinc

7.2.2 Refined Risk Characterization

The complete refined risk characterization tables are provided in Appendix F.2 and summarized below.

7.2.2.1 Terrestrial Plants

Refined direct contact HQs calculated for plants are presented in Appendix F.2, Table F.2-6, for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of aluminum, antimony, cadmium, calcium, chromium, cobalt, lead, manganese, vanadium, and zinc resulted in refined HQ values that were greater than 1.

7.2.2.2 Soil Invertebrates and Microbial Communities

Refined direct contact HQs calculated for invertebrates are presented in Appendix F.2, Table F.2-8, for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of antimony, chromium, iron, manganese, mercury, vanadium, and zinc resulted in refined HQ values that were greater than 1.

7.2.2.3 Terrestrial Wildlife

The refined risk characterization results are presented in Appendix F.2, Table F.2-24, and summarized below for each of the receptors with chemical HQs greater than 1:

Receptor	NOAEL Only Exceedances	NOAEL and LOAEL Exceedances
Meadow Vole	chromium (2.8)	none
Short-tailed Shrew	cadmium (1.9), chromium (1.5), Aroclor 1254 (3.3), Aroclor 1260 (3.3)	none
Red Fox	none	none
American Robin	cadmium (1.6), lead(2.1), zinc (1.1)	chromium (6.5/1.3)
Red-tailed Hawk	none	none

*Note: (6.5/1.3) = NOAEL-based HQ/LOAEL-based HQ

7.2.3 Risk Management – Scientific Management Decision Point

Terrestrial plant COPECs with refined HQs greater than 1 included: aluminum, antimony, cadmium, calcium, chromium, cobalt, lead, manganese, vanadium, and zinc. Cobalt, manganese, and vanadium are consistently below background (see Appendix D.2); therefore, these chemicals are not considered site related. A discussion of the methodology of site versus background comparison is provided in Section 6.4.3.

Soil invertebrates and microbial processes COPECs with refined HQs greater than 1 included antimony, chromium, iron, manganese, mercury, vanadium, and zinc. Iron, manganese, and vanadium are consistently below background; therefore, these chemicals are not considered site related.

The refined risk characterization for wildlife resulted in the identification of chromium with a LOAEL-based HQ greater than 1 for the American robin (HQ = 1.3).

Concentrations of COPECs in surface soil within the pond area may have the potential to adversely affect the existing amphibians observed with this area. The potential exposure pathways for amphibians include direct contact with sediment and ingestion of contaminated food items. There are no readily available screening values for amphibians; therefore, as presented in Appendix F.2, Table F.2-25 the MDCs for chemicals detected in the surface soil within the pond were screened against available BTAG freshwater sediment screening values (USEPA 2006a). This screening resulted in exdeedances for metals, pesticides, total PCBs, one SVOC, and total high molecular weight PAHs, which indicates a potential for adverse effects to the existing amphibian population at the site.

After consideration of spatial distribution of data at the site, the results of the SLERA, background concentrations, and nature of the material in place at the site, the SMDP is the following:

There is adequate information to conclude that the potential exists for an adverse ecological impact to terrestrial plants and soil invertebrates due to metals in soil, the American robin due to exposure to chromium in soil, and amphibians due to metals, pesticides, total PCBs, one SVOC, and high molecular weight PAHs in soil within the pond area. Elevated concentrations are primarily located within the pond area or its appurtenances. No other significant potential impacts to ecological receptors due to site-related activities were identified. Significant uncertainty is associated with the potential impacts to plants, invertebrates, the American robin, and amphibians. It is recommended that the need for remedial action to address these potential impacts be evaluated along with the uncertainty associated with the derivation of the HQs, the location of HHRA COCs, the fate and transport evaluation, and other relevant factors, which would influence any decision to implement action.

7.3 EXPOSURE AND RISK UNCERTAINTY ANALYSIS

Based on this assessment, while factors such as lack of toxicity screening values (TSVs) and wildlife profile assumptions may create limited uncertainty, the overall result of the conservative nature of the process has produced a conservative assessment of potential ecological risks associated with the site.

Assumptions and other factors that tend to overestimate, underestimate, or have an unknown effect on the findings of the ecological risk screening are presented below with a discussion of their uncertainty.

7.3.1 Data Quality

Insufficient sampling density or the analyte list may not provide a representative estimate of exposure to COPECs. Misrepresentation of exposure results in uncertainty and may lead to an overestimation or underestimation of risk. Fifteen locations at the site under consideration reduce this uncertainty. Moreover, the extensive list of constituents analyzed reduces the likelihood of failing to identify a COPEC. Therefore, the uncertainty in the ecological risk screening results associated with data quality is likely minimal.

7.3.2 COPEC Bioavailability

Chemical analyses of exposure media measured the total levels of the COPECs rather than the more bioavailable toxic forms. The availability of the total concentrations alone assumes that the entire fraction is bioavailable and toxic. This is likely to be a very conservative assumption that varies from constituent to constituent. It was also assumed that no geochemical factors limited receptor exposure to, or the potential for toxic expression of COPECs. It is likely that COPECs may, to some degree, adsorb to fine-grained particles and/or complex with chemical complexing agents and organic ligands in the exposure media. Such actions may change the chemical speciation of the COPECs to a less toxic form, or reduce the concentrations of bioavailable chemicals and subsequent uptake by receptors. Therefore, risk is likely to be overestimated.

7.3.3 Wildlife Profile Assumptions

Dose rate models require a number of assumptions, which could result in either an overestimation or underestimation of risk to receptors. For example, body weights and ingestion rates are estimated from limited information. In addition, receptors are assumed to feed on specified food sources, although some such as the Red Fox may feed opportunistically on a greater variety of food types.

Area use factor (AF) was estimated based on the size of the study area relative to the home ranges of the receptors. However, the foraging of birds and mammals is not assessed simply by size, but rather a function of habitat suitability, habitat productivity, and species-specific foraging behaviors. Therefore, because habitat quality is not accounted for in estimating AF, the risk to terrestrial receptors in this assessment is likely to be overestimated.

7.3.4 Lack of Toxicological Data

The evaluation of ecological effects was limited in the direct contact and wildlife ingestion pathways due to limited toxicological data of the COPECs. The effects of many COPECs evaluated for the direct contact pathway were not quantified due to the lack of TRVs. In addition, NOAEL and LOAEL TRVs were not available for receptors exposed to multiple COPECs. Therefore, due to the lack of toxicological data, the risk to potential receptors may be underestimated or unknown.

7.3.5 TRVs

NOAEL and LOAEL TRVs identified for wildlife receptors represent the most conservative application of toxicity test results identified from the literature. High uncertainty factors were used to provide TRVs representative of chronic exposure and sub-lethal effects. This approach is likely to overestimate the sensitivity of many ecological receptors and likely overestimates risk to potential receptors.

7.3.6 Hazard Quotients

Uncertainties in characterizing risks are primarily associated with the assumption that an HQ greater than 1 is an adequate indicator of the potential for ecological risks of individual chemicals. Given the use of conservative and realistic exposure and effects assumptions previously discussed, there is minimal uncertainty that the potential for ecological risks of individual chemicals are not identified in the ecological risk screening of the sites. Conversely, there is a strong possibility for false positive identification of ecological risks for some individual chemicals.

7.3.7 Exposure and Risk Uncertainty Conclusions

While factors such as lack of screening value and wildlife profile assumptions may create limited uncertainty, the very small size and negligible habitat quality of the site in combination with these limited uncertainties has produced a conservative assessment of potential ecological risks associated with SWMU 57.

7.4 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the SLERA and risk management considerations, it is recommended that the need for remedial action to address the potential adverse ecological impacts be evaluated along with the uncertainty associated with the derivation of the HQs, the location of HHRA COCs, the fate and transport evaluation, and other relevant factors, which would influence any decision to implement action.

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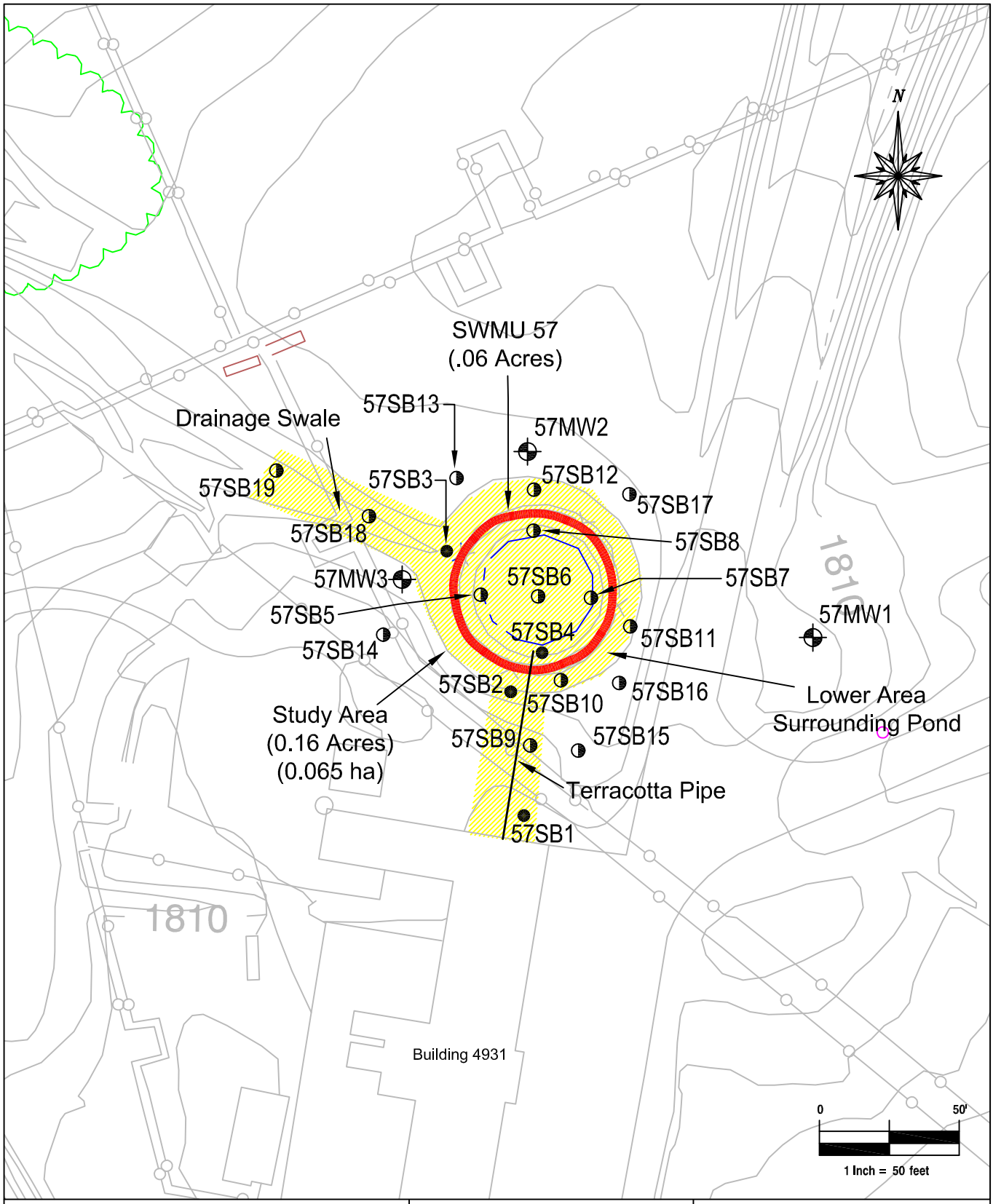


Legend

- Approximate SWMU Boundary
- Topographic Contour
- SSP Soil Sample Location
- RFI Sample Location
- Monitoring Well Location
- Vegetation
- Fence
- Aboveground Piping
- SLERA Study Area

FIGURE 7-1

Study Area for Calculation of Area Use Factor - SLERA

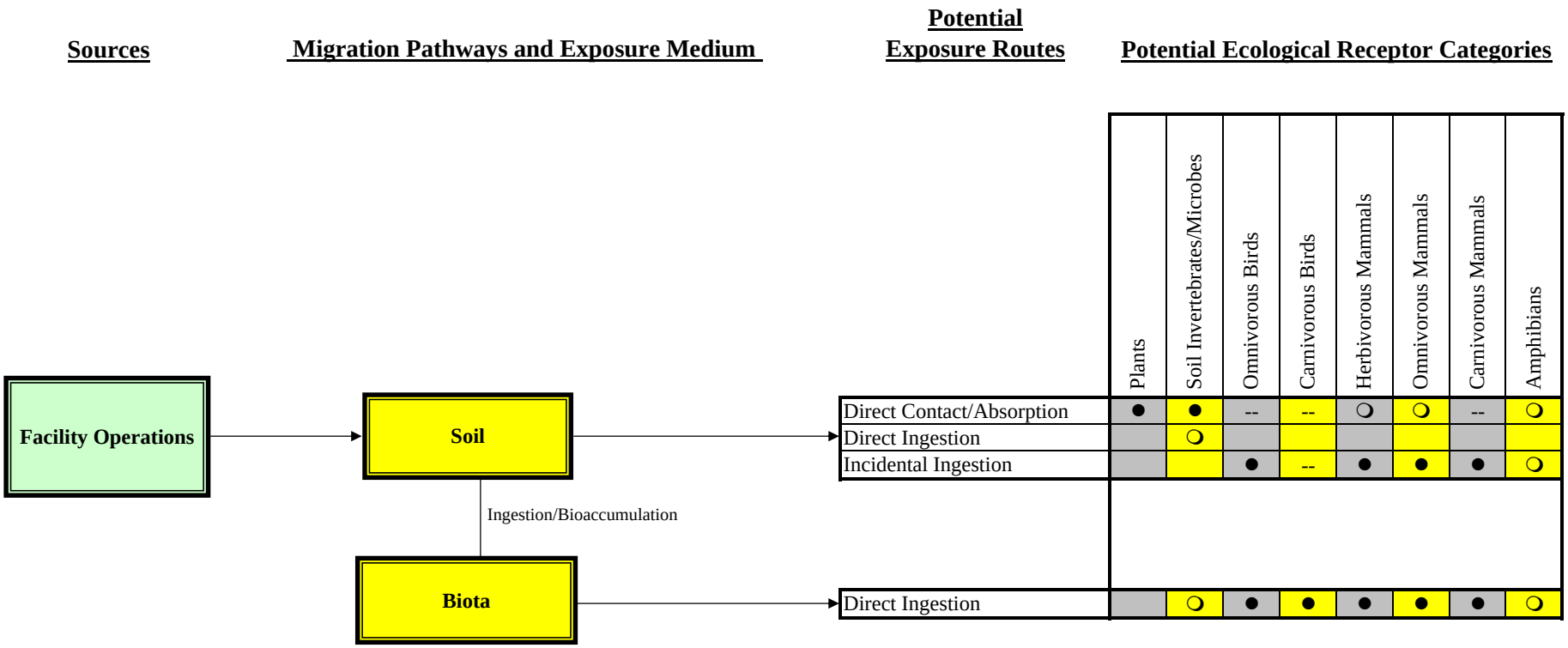
Date: April 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.7-1 Study Area

SWMU 57

RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230

Figure 7-2
Terrestrial Ecological Conceptual Site Model
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia



NOTES:

● = POTENTIALLY COMPLETE PATHWAY EVALUATED QUANTITATIVELY

❍ = COMPLETE PATHWAY EVALUATED QUALITATIVELY

-- = PATHWAY IS INSIGNIFICANT

BLANK = INCOMPLETE PATHWAY

8.0 ESTABLISHMENT OF CORRECTIVE MEASURE OBJECTIVES

This section identifies the corrective measures objectives (CMOs) for the chemicals of concern (COCs,) and media of interest identified by the site, risk, and fate and transport assessments conducted for the RFI. CMOs are cleanup objectives developed to protect human health and the environment and provide the basis for identification, detailed analysis, and selection of corrective measures alternatives.

8.1 SUMMARY OF RFI RESULTS

As indicated in Section 6.0, the current inactive industrial land use of the site is unlikely to change in the future in support of the Army's mission. The results of the risk assessment indicated that the calculated risk (2E-06) and hazard (8E-01) for the maintenance worker receptor associated with the current and most likely future land use at the site were at the lower end of USEPA's target risk range (1E-06 to 1E-04) and hazard range (1E+00 or less) for Superfund sites (USEPA 1989).

The risk assessment indicated that under an unlikely future hypothetical scenario, where the land use of the site would change from inactive to developed commercial/industrial property, the calculated hazard for future hypothetical construction worker would be above the target hazard of 1E+00, when considering target organs and background, primarily due to ingestion of antimony in soil and inhalation of aluminum and manganese. Calculated risks and hazards for future hypothetical commercial industrial worker were within USEPA's target risk and hazard ranges. Potential risks could be posed to human health and the environment under a hypothetical residential scenario where land use changed. The calculated risk for a lifetime resident under such a scenario (4E-04) is above USEPA's target range due primarily to chloroform in groundwater. The hazard for the adult resident when considering target organs and background is below the USEPA's target hazard range while the hazard for the child resident exceeds the USEPA target hazard range for several target organs primarily due to aluminum, antimony, cadmium, chromium, iron, and manganese in soil.

As previously discussed in Section 4.2, potential site-related COCs in groundwater are limited to chloroform, antimony, arsenic, and manganese, which have been detected at maximum concentrations below their MCLs or unadjusted T-RBC (manganese). Appreciable leaching of other COCs from soil to groundwater was not apparent from the groundwater sample data collected for the RFI.

As presented in Section 7.0, there is adequate information to conclude that the potential exists for an adverse ecological impact to terrestrial plants and soil invertebrates due to metals in soil, the American robin due to exposure to chromium in soil, and amphibians due to metals, pesticides, total PCBs, one SVOC, and high molecular weight PAHs in soil within the pond area. Elevated concentrations are primarily located within the pond area or its appurtenances. No other significant potential impacts to ecological receptors due to site-related activities were identified. Due to the significant uncertainties involving the calculation of ecological HQs and considering that the ecological assessment is limited to a screening level assessment, it is not appropriate to calculate definitive ecological remedial goals (RGs). Therefore, in lieu of further study at this stage an initial evaluation of the protectiveness of proposed human health risk-based remediation (see Section 8.4) for ecological receptors is provided in Section 11.2.1 for the corrective measures alternatives.

8.2 CHEMICALS OF CONCERN (COCs)

8.2.1 Soil

Soil COCs for the CMS are those chemicals identified in the risk assessment as risk/HI drivers, which contributed to a total risk greater than 1E-04 or a total target organ hazard greater than one and have been detected consistently above soil background as indicated by statistical analysis. Soil COCs for the CMS are identified in the following table.

Soil COCs for CMS

Hypothetical Future Land Use Scenario	COCs
Industrial (Construction Worker)	Aluminum, Antimony, Manganese,
Residential (Child Resident)	Aluminum, Antimony, Cadmium, Chromium, Iron, and Manganese

8.2.2 Groundwater

Groundwater COCs for the CMS are those chemicals identified in the risk assessment as risk/HI drivers, which contributed to a total risk greater than 1E-04 or a total target organ hazard greater than one. Groundwater COCs for the CMS are identified in the following table.

Groundwater COCs for CMS

Hypothetical Future Land Use Scenario	COCs
Residential (Child)	Antimony, Manganese, and Chloroform
Residential (Lifetime)	Arsenic, Chloroform

8.3 CORRECTIVE MEASURES OBJECTIVES

CMOs have been developed for the COCs and media of interest at SWMU 57 with consideration of the following:

- Current land use of the site is industrial consisting of a 0.06 acre former chromic acid pond, a terracotta pipe, and a drainage swale located adjacent to the pond for a total site area of 0.16 acre.
- Land use of the site is unlikely to change in the future (e.g., industrial with no development) due to the small size of the site and that the site is surrounded by unassociated aboveground piping precluding development and access for development.
- Groundwater is not used as a water supply in the site area.
- The pond area is currently inhabited by amphibians.

The following CMO has been developed for SWMU 57 based on the results of the site, risk, and fate and transport assessments and the most likely future land use at the site (industrial):

- Mitigate the potential risks/hazards that have been identified for evaluated future hypothetical industrial receptors for exposure to soil (construction workers) at the site.

The residential exposure pathway also will be evaluated in the CMS to assess the remedial effort that would be required to achieve clean closure at SWMU 57 with unrestricted future land use without controls or long-term monitoring (LTM) requirements.

8.4 REMEDIAL GOALS

8.4.1 Soil

Remedial goals (RGs) for COCs in soil have been calculated for future industrial and residential scenarios as presented in Appendix G. COCs for soil were limited to noncarcinogenic metal compounds. When calculating soil RGs with respect to hazard, a target HI was selected to ensure that the calculated HI for each target organ was at or below the EPA target HI of 1E+00 (e.g., if three chemicals affect the same target organ the target HI for RG calculations for each chemical would equal 0.33 or an HI of 1 divided by the number of chemical affecting the same target organ). The lowest of the calculated noncarcinogenic RGs was then selected as the RG for the receptor for that chemical. The lowest

calculated values were then compared to the background values (95% UTLs) and the maximum of the values was selected as the final RG. Although in adherence to the current and foreseeable use of the property in support of the Army mission the expected future land use of the site will remain industrial, RGs for both the residential and industrial scenarios were developed. Residential and industrial RGs for metals in soil are summarized below.

Industrial Soil RG Summary

Chemical	Medium	Receptor	Calculated RG (mg/kg)	Lowest Industrial RG (mg/kg)	Background (mg/kg)	Industrial RG (mg/kg)
Aluminum	Surface Soil	Maintenance Worker	2,270,000	4,520	40,041	40,041
	Total Soil	Commercial Worker	838,000			
	Total Soil	Construction Worker	4,520			
Antimony	Surface Soil	Maintenance Worker	1,680	49.1	--	49.1
	Total Soil	Commercial Worker	568			
	Total Soil	Construction Worker	49.1			
Manganese	Surface Soil	Maintenance Worker	26,200	64.2	2,543	2,543
	Total Soil	Commercial Worker	7,140			
	Total Soil	Construction Worker	64.2			

Residential Soil RG Summary

Chemical	Medium	Receptor	Calculated RG (mg/kg)	Lowest Residential RG (mg/kg)	Background (mg/kg)	Residential RG (mg/kg)
Aluminum	Total Soil	Child Resident	37,500	37,500	40,041	40,041
		Adult Resident	347,000			
Antimony	Total Soil	Child Resident	13.2	13.2	--	13.2
		Adult Resident	115			
Cadmium	Total Soil	Child Resident	23.2	23.2	0.69	23.2
		Adult Resident	208			

Chemical	Medium	Receptor	Calculated RG (mg/kg)	Lowest Residential RG (mg/kg)	Background (mg/kg)	Residential RG (mg/kg)
Chromium	Total Soil	Child Resident	36.5	36.5	65.3	65.3
		Adult Resident	278			
Iron	Total Soil	Child Resident	17,600	17,600	50,962	50,962
		Adult Resident	162,000			
Manganese	Total Soil	Child Resident	455	455	2,543	2,543
		Adult Resident	3,620			

8.4.2 Groundwater

Groundwater COCs are limited to arsenic, antimony, chloroform, and manganese. RGs developed for these constituents are identified in the following table.

Groundwater RG Summary

Chemical	RG (µg/L)	Basis for RG Selection	Maximum Concentration Detected (µg/L)	Maximum GW Concentration Above RG?
Antimony	6	EPA MCL	5.3[1]	No
Arsenic	10	EPA MCL	2.15[1]	No
Chloroform	80	EPA MCL for THMs	57[1]	No
Manganese	730	EPA Region III T-RBC	175[1]	No

Note: [1] Maximum detected concentration is an average of sample and associated duplicate sample.

As indicated in the above table, maximum detected concentrations are below RGs established for each of the COCs, and therefore, development of corrective measures specifically to address COC concentrations in groundwater is not required.

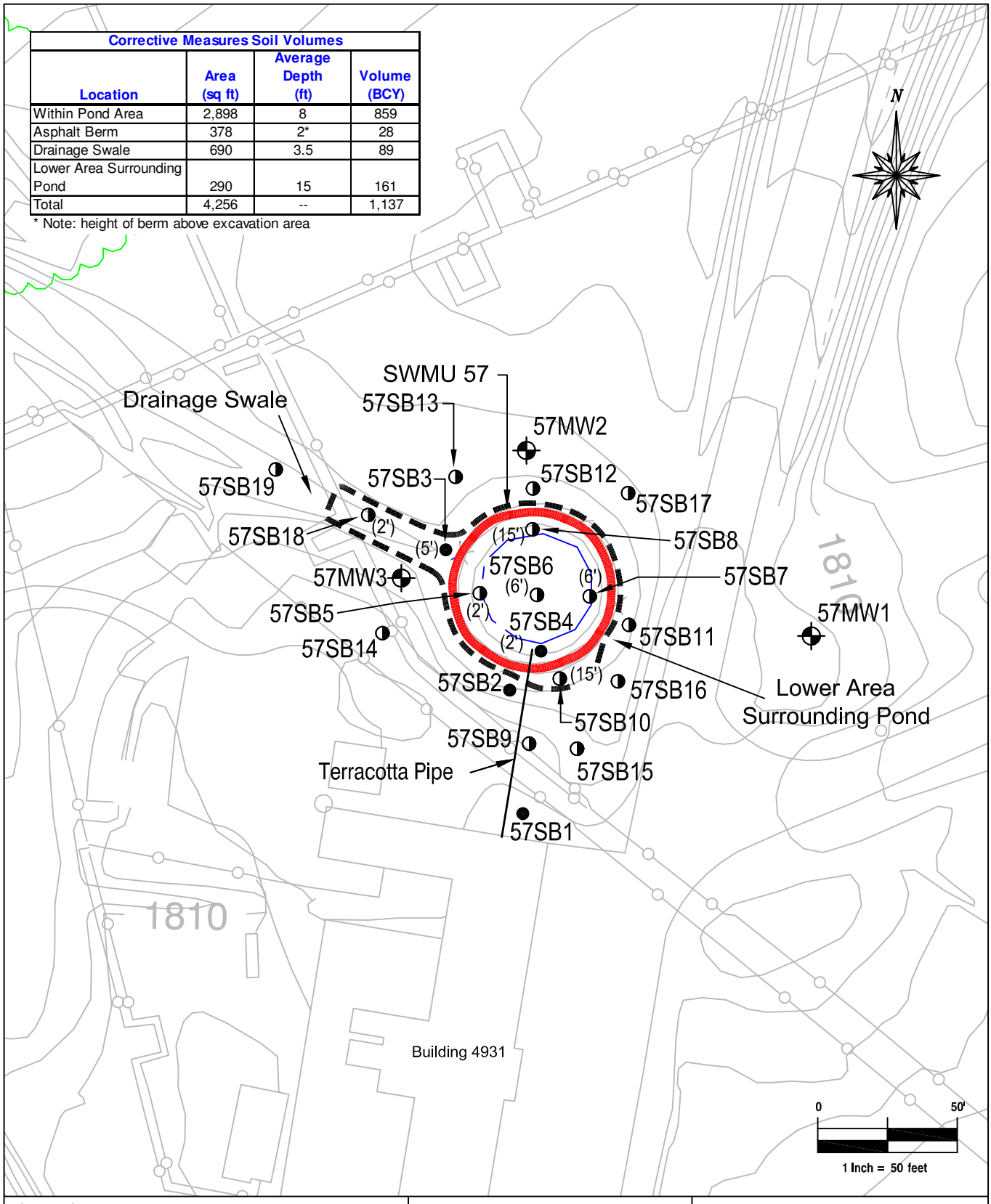
8.5 IDENTIFICATION OF CORRECTIVE MEASURES AREA

The RGs were used to complete an assessment to identify areas that would require corrective measures for soil under hypothetical future industrial and residential scenarios. As stated previously in Section 6.1.1.1, soil samples collected from a depth of greater than 15 ft bgs were excluded from the HHRA given the unlikelihood that soil below this depth would be disturbed and mixed with surface soil during excavation; and therefore, samples collected from 15 feet bgs or less were compared to the calculated human health risk based soil RGs to identify areas requiring corrective measures. Tables 8-1 and 8-2 present COC soil data comparisons to industrial RGs and residential RGs, respectively, and identify soil sample locations that have concentrations above their RGs.

Figures 8-1 shows the site area that would require corrective measures for soil under hypothetical future industrial scenario (construction worker). Figure 8-2 shows the site area that would require corrective measures for soil under a hypothetical residential land use scenario. Each figure shows the approximate areas and volumes of soil that would be subject to corrective measures under the applicable scenario.

Corrective Measures Soil Volumes			
Location	Area (sq ft)	Average Depth (ft)	Volume (BCY)
Within Pond Area	2,898	8	859
Asphalt Berm	378	2*	28
Drainage Swale	690	3.5	89
Lower Area Surrounding Pond	290	15	161
Total	4,256	--	1,137

* Note: height of berm above excavation area



Legend

- Approximate SWMU Boundary
- Topographic Contour
- SSP Soil Sample Location
- RFI Sample Location
- Monitoring Well Location
- Area for Corrective Measures Consideration
- (2') Approximate Depth of Excavation
- Aboveground Piping
- Vegetation
- Fence
- (BCY) Bank Cubic Yard

FIGURE 8-1

Area for Corrective Measures Consideration - Industrial RGs

Date: May 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.8-1 Ex.Area

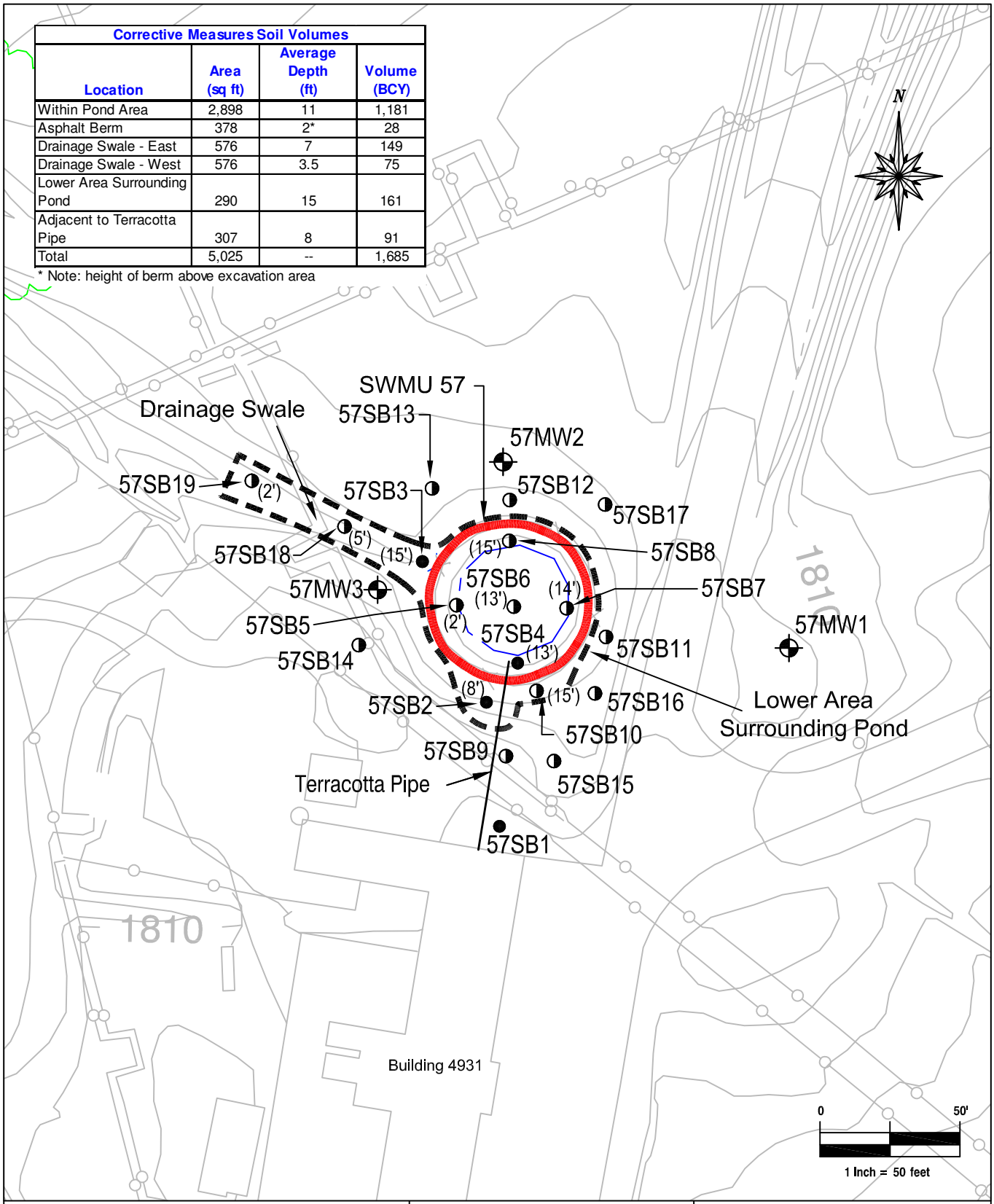
SWMU 57

RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230

Corrective Measures Soil Volumes			
Location	Area (sq ft)	Average Depth (ft)	Volume (BCY)
Within Pond Area	2,898	11	1,181
Asphalt Berm	378	2*	28
Drainage Swale - East	576	7	149
Drainage Swale - West	576	3.5	75
Lower Area Surrounding Pond	290	15	161
Adjacent to Terracotta Pipe	307	8	91
Total	5,025	--	1,685

* Note: height of berm above excavation area



Legend

- Approximate SWMU Boundary
- Topographic Contour
- SSP Soil Sample Location
- RFI Sample Location
- Monitoring Well Location
- Area for Corrective Measures Consideration
- (2') Approximate Depth of Excavation
- Aboveground Piping
- Vegetation
- Fence
- (BCY) Bank Cubic Yard

FIGURE 8-2

Area for Corrective Measures Consideration - Residential RGs

Date: May 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.8-2 Ex.Area

SWMU 57

RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230

Table 8-1
Site Data vs. Remedial Goal Comparison - Industrial Scenario
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID			57SB1A		57SB1AB		57SB1AB-DUP(DUP-4)		57SB1B		57SB2A		57SB2AB		57SB2B		57SB3A		57SB3A-DUP(SBD6)		57SB3B		57SB4A		57SB4A2		57SB4AB		57SB4AB-DUP(DUP-5)	
Sample Date		Industrial RG	10/7/2003		1/10/2008		1/10/2008		10/7/2003		10/7/2003		1/9/2008		10/7/2003		10/7/2003		10/7/2003		10/7/2003		10/7/2003		10/7/2003		1/11/2008		1/11/2008	
Sample Depth (ft bgs)			0-1		10-12		10-12		10-12		0-1		1.5-2		8-12		0-1		0-1		14-16		0-1		1.5		1.5-4		1.5-4	
	CAS #		Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	40,041	11,900		26,000	,J,s	28,000	,J,s	23,800		32,200		35,000		13,900		28,900		33,000		37,400		30,100		33,300		26,000	,J,s	24,000	,J,s
Antimony	7440-36-0	49.1	1.2		0.17	J	0.16	J	0.21	J	3.6		14		<0.5	U	**102**		**104**		0.29	J	6.3		9.7		0.81		0.8	
Manganese	7439-96-5	2,543	699		180		170		264		361		860	,K,m	1,090		544		514		518		**3,200**		273		300		320	

Sample ID			57SB4B		57SB4C		57SB5A		57SB5AB		57SB5AB-DUP(DUP-6)		57SB5B		57SB5C		57SB6A		57SB6AB		57SB6B		57SB6C		57SB7A		57SB7AB		57SB7B	
Sample Date		Industrial RG	1/11/2008		1/11/2008		1/14/2008		1/14/2008		1/14/2008		1/14/2008		1/14/2008		1/10/2008		1/10/2008		1/10/2008		1/10/2008		1/11/2008		1/11/2008		1/11/2008	
Sample Depth (ft bgs)			6-8		13-15.5		0-1		1.25-4		1.25-4		6-8		13-15		0-1		1.7-4		6-9		13-15.5		0-1		2-5		6-9	
	CAS #		Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	40,041	18,000	,J,s	12,000	,J,s	26,000	,J,s	19,000	,J,s	18,000	,J,s	27,000	,J,s	13,000	,J,s	23,000	,J,s	28,000	,J,s	28,000	,J,s	18,000	,J,s	28,000	,J,s	38,000	,J,s	20,000	,J,s
Antimony	7440-36-0	49.1	0.4		0.045	J	14		0.51		0.48		0.52		0.26		**280**		2.2		17		0.39		**340**		4.2		0.34	
Manganese	7439-96-5	2,543	990		500		1,600		2,100		2,100		590		390		670		**7,700**		1,900		910		170		**2,800**		1,200	

Sample ID			57SB7C		57SB8A		57SB8AB		57SB8B		57SB8C		57SB9A		57SB9AB		57SB10A		57SB10B		57SB11A		57SB11A-DUP(DUP-2)		57SB11B		57SB12A		57SB12B	
Sample Date		Industrial RG	1/11/2008		1/14/2008		1/14/2008		1/14/2008		1/14/2008		1/10/2008		1/10/2008		1/8/2008		1/8/2008		1/9/2008		1/9/2008		1/9/2008		1/9/2008		1/9/2008	
Sample Depth (ft bgs)			14-16		0-1		1.2-4		6-8		13-15		0-1		10-12		0-1		10-12		0-1		0-1		10-12		0-1		10-12	
	CAS #		Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	40,041	28,000	,J,s	26,000	,J,s	22,000	,J,s	25,000	,J,s	25,000	,J,s	18,000	,J,s	26,000	,J,s	19,000		30,000		21,000		28,000		22,000		24,000		23,000	
Antimony	7440-36-0	49.1	0.28		15		0.21		14		1.2		0.4		0.071	J	0.34		0.23		0.19	J	0.42		0.15	J	0.54		0.096	J
Manganese	7439-96-5	2,543	280		**4,400**		**3,400**		**6,000**		**3,200**		630		140		350	,K,m	**3,900**	,K,m	60	,K,m	110	,K,m	79	,K,m	240	,K,m	780	,K,m

Sample ID			57SB13A		57SB13A-DUP(DUP-3)		57SB13B		57SB14A		57SB14B		57SB15A		57SB15A-DUP(DUP-1)		57SB15B		57SB16A		57SB16B		57SB17A		57SB17B		57SB18A		57SB18B	
Sample Date		Industrial RG	1/9/2008		1/9/2008		1/9/2008		1/10/2008		1/10/2008		1/8/2008		1/8/2008		1/8/2008		1/8/2008		1/8/2008		1/7/2008		1/7/2008		1/9/2008		1/9/2008	
Sample Depth (ft bgs)			0-1		0-1		10-12		0-1		10-12		0-1		0-1		10-12		0-1		10-12		0-1		10-12		0-1		10-12	
	CAS #		Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	40,041	17,000		19,000		24,000		12,000	,J,s	28,000	,J,s	15,000		14,000		25,000		22,000		31,000		12,000		20,000		28,000		22,000	
Antimony	7440-36-0	49.1	0.47		0.46		0.27		0.93		0.11	J	1.2		1.4		0.12	J	0.62		0.31		0.26		0.15	J	**87**		0.27	
Manganese	7439-96-5	2,543	2,100	,K,m	2,400	,K,m	1,300	,K,m	930		260		410	,K,m	600	,K,m	1,500	,K,m	1,600	,K,m	130	,K,m	1,100	,K,m	40	,K,m	980	,K,m	690	,K,m

Sample ID			57SB19A		57SB19B	
Sample Date		Industrial RG	1/9/2008		1/9/2008	
Sample Depth (ft bgs)			0-1		10-12	
	CAS #		Result	LQ, VQ, r	Result	LQ, VQ, r
TAL Metals (mg/kg)						
Aluminum	7429-90-5	40,041	30,000		20,000	
Antimony	7440-36-0	49.1	33		0.61	
Manganese	7439-96-5	2,543	930	,K,m	370	,K,m

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
TAL = Target Analyte List
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
RG = Remedial Goal

bold = Exceeds RG

Laboratory Qualifiers
J = Estimated value.
U = The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
Validation Qualifiers
J = Analyte present. Reported value may not be accurate or precise.
K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.
Reason Codes
s = Surrogate failure
m = MS/MSD recovery failure

Table 8-2
Site Data vs. Remedial Goal Comparison - Residential Scenario
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID			57SB1A		57SB1AB		57SB1AB-DUP(DUP-4)		57SB1B		57SB2A		57SB2AB		57SB2B		57SB3A		57SB3A-DUP(SBD6)		57SB3B		57SB4A		57SB4A2		57SB4AB		57SB4AB-DUP(DUP-5)	
Sample Date		Residential	10/7/2003		1/10/2008		1/10/2008		10/7/2003		10/7/2003		1/9/2008		10/7/2003		10/7/2003		10/7/2003		10/7/2003		10/7/2003		10/7/2003		1/11/2008		1/11/2008	
Sample Depth (ft bgs)	CAS #	RG	0-1		10-12		10-12		10-12		0-1		1.5-2		8-12		0-1		0-1		14-16		0-1		1.5		1.5-4		1.5-4	
			Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	40,041	11,900		26,000	,J,s	28,000	,J,s	23,800		32,200		35,000		13,900		28,900		33,000		37,400		30,100		33,300		26,000	,J,s	24,000	,J,s
Antimony	7440-36-0	13.2	1.2		0.17	J	0.16	J	0.21	J	3.6		**14**		<0.5	U	**102**		**104**		0.29	J	6.3		9.7		0.81		0.8	
Cadmium	7440-43-9	23.2	1.5		<2	U	<2	U	2.8		6.7		12		0.46	J	**27**	,J,f	**41**	,J,f	1.2		1.5		1.6		<2	U	<2	U
Chromium	7440-47-3	65.3	20		24		25		28		**70**		**160**		9.3		**268**	,J,f	**454**	,J,f	43		43		45	,J,m	23		23	
Iron	7439-89-6	50,962	13,400		34,000		37,000		41,300		39,700		37,000		34,500		47,100		46,500		**53,400**		**78,700**		**59,000**		29,000		33,000	
Manganese	7439-96-5	2,543	699		180		170		264		361		860	,K,m	1,090		544		514		518		**3,200**		273		300		320	

Sample ID			57SB4B		57SB4C		57SB5A		57SB5AB		57SB5AB-DUP(DUP-6)		57SB5B		57SB5C		57SB6A		57SB6AB		57SB6B		57SB6C		57SB7A		57SB7AB		57SB7B	
Sample Date		Residential	1/11/2008		1/11/2008		1/14/2008		1/14/2008		1/14/2008		1/14/2008		1/14/2008		1/10/2008		1/10/2008		1/10/2008		1/10/2008		1/11/2008		1/11/2008		1/11/2008	
Sample Depth (ft bgs)	CAS #	RG	6-8		13-15.5		0-1		1.25-4		1.25-4		6-8		13-15		0-1		1.7-4		6-9		13-15.5		0-1		2-5		6-9	
			Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	40,041	18,000	,J,s	12,000	,J,s	26,000	,J,s	19,000	,J,s	18,000	,J,s	27,000	,J,s	13,000	,J,s	23,000	,J,s	28,000	,J,s	28,000	,J,s	18,000	,J,s	28,000	,J,s	38,000	,J,s	20,000	,J,s
Antimony	7440-36-0	13.2	0.4		0.045	J	**14**		0.51		0.48		0.52		0.26		**280**		2.2		**17**		0.39		**340**		4.2		0.34	
Cadmium	7440-43-9	23.2	<2	U	<2	U	6.5		2.5		2.6		<2	U	0.35	J	**51**		0.12	J,B,p	2.5		<2	U	**120**		0.24	J	<2	U
Chromium	7440-47-3	65.3	33		18		47		48		35		33		23		**370**		30		39		33		**1,500**		46		23	
Iron	7439-89-6	50,962	**87,000**		31,000		36,000		30,000		28,000		36,000		27,000		24,000		**67,000**		38,000		35,000		29,000		**51,000**		**68,000**	
Manganese	7439-96-5	2,543	990		500		1,600		2,100		2,100		590		390		670		**7,700**		1,900		910		170		**2,800**		1,200	

Sample ID			57SB7C		57SB8A		57SB8AB		57SB8B		57SB8C		57SB9A		57SB9AB		57SB10A		57SB10B		57SB11A		57SB11A-DUP(DUP-2)		57SB11B		57SB12A		57SB12B	
Sample Date		Residential	1/11/2008		1/14/2008		1/14/2008		1/14/2008		1/14/2008		1/10/2008		1/10/2008		1/8/2008		1/8/2008		1/9/2008		1/9/2008		1/9/2008		1/9/2008		1/9/2008	
Sample Depth (ft bgs)	CAS #	RG	14-16		0-1		1.2-4		6-8		13-15		0-1		10-12		0-1		10-12		0-1		0-1		10-12		0-1		10-12	
			Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	40,041	28,000	,J,s	26,000	,J,s	22,000	,J,s	25,000	,J,s	25,000	,J,s	18,000	,J,s	26,000	,J,s	19,000		30,000		21,000		28,000		22,000		24,000		23,000	
Antimony	7440-36-0	13.2	0.28		**15**		0.21		**14**		1.2		0.4		0.071	J	0.34		0.23		0.19	J	0.42		0.15	J	0.54		0.096	J
Cadmium	7440-43-9	23.2	<2	U	1.8	J	<2	U	1.1	J	<2	U	0.16	J,B,p	<2	U	0.62	J	<2	U	<2	U	0.18	J,B,p	<2	U	<2	U	<2	U
Chromium	7440-47-3	65.3	50		37		22		37		29		23		26		21		40		26		31		18		33		15	
Iron	7439-89-6	50,962	35,000		**65,000**		**67,000**		**55,000**		**74,000**		19,000		36,000		7,100		47,000		8,300		12,000		11,000		27,000		29,000	
Manganese	7439-96-5	2,543	280		**4,400**		**3,400**		**6,000**		**3,200**		630		140		350	,K,m	**3,900**	,K,m	60	,K,m	110	,K,m	79	,K,m	240	,K,m	780	,K,m

Sample ID			57SB13A		57SB13A-DUP(DUP-3)		57SB13B		57SB14A		57SB14B		57SB15A		57SB15A-DUP(DUP-1)		57SB15B		57SB16A		57SB16B		57SB17A		57SB17B		57SB18A		57SB18B	
Sample Date		Residential	1/9/2008		1/9/2008		1/9/2008		1/10/2008		1/10/2008		1/8/2008		1/8/2008		1/8/2008		1/8/2008		1/8/2008		1/7/2008		1/7/2008		1/9/2008		1/9/2008	
Sample Depth (ft bgs)	CAS #	RG	0-1		0-1		10-12		0-1		10-12		0-1		0-1		10-12		0-1		10-12		0-1		10-12		0-1		10-12	
			Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	40,041	17,000		19,000		24,000		12,000	,J,s	28,000	,J,s	15,000		14,000		25,000		22,000		31,000		12,000		20,000		28,000		22,000	
Antimony	7440-36-0	13.2	0.47		0.46		0.27		0.93		0.11	J	1.2		1.4		0.12	J	0.62		0.31		0.26		0.15	J	**87**		0.27	
Cadmium	7440-43-9	23.2	<2	U	<2	U	<2	U	0.25	J,B,p	<2	U	0.63	J	0.98	J	<2	U	0.42	J	<2	U	0.27	J	<2	U	16		<2	U
Chromium	7440-47-3	65.3	33		31		25		19		23		29		27		39		24		27		17		20		**150**		27	
Iron	7439-89-6	50,962	44,000		41,000		38,000		14,000		33,000		16,000		13,000		**53,000**		15,000		22,000		13,000		12,000		39,000		34,000	
Manganese	7439-96-5	2,543	2,100	,K,m	2,400	,K,m	1,300	,K,m	930		260		410	,K,m	600	,K,m	1,500	,K,m	1,600	,K,m	130	,K,m	1,100	,K,m	40	,K,m	980	,K,m	690	,K,m

Sample ID			57SB19A		57SB19B	
Sample Date		Residential	1/9/2008		1/9/2008	
Sample Depth (ft bgs)	CAS #	RG	0-1		10-12	
			Result	LQ, VQ, r	Result	LQ, VQ, r
TAL Metals (mg/kg)						
Aluminum	7429-90-5	40,041	30,000		20,000	
Antimony	7440-36-0	13.2	**33**		0.61	
Cadmium	7440-43-9	23.2	5		<2	U
Chromium	7440-47-3	65.3	**67**		24	
Iron	7439-89-6	50,962	40,000		23,000	
Manganese	7439-96-5	2,543	930	,K,m	370	,K,m

Notes:

CAS = Chemical Abstracts Service

bold = Exceeds RG

ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
TAL = Target Analyte List
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
RG = Remedial Goal

Laboratory Qualifiers
J = Estimated value.
U = The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
Validation Qualifiers
J = Analyte present. Reported value may not be accurate or precise.
K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.
Reason Codes
f = Field duplicate imprecision
m = MS/MSD recovery failure
p = Preparation blank contamination
s = Surrogate failure

9.0 IDENTIFICATION AND SCREENING OF CORRECTIVE MEASURES TECHNOLOGIES

In this section, corrective measures technologies are identified based on their potential applicability to site conditions, COCs, and CMOs. Each of these technologies is screened based on their expected effectiveness, implementability, and cost as described below:

- **Effectiveness** – with primary consideration of the ability of the technology to meet CMOs and be protective of human health and the environment;
- **Implementability** – with primary consideration for the technical and administrative feasibility, and availability of necessary equipment and personnel for implementation; and
- **Cost** – including both capital and present value of operation and maintenance (O&M) costs, as applicable.

Screening of the technologies is presented in Table 9-1. This table briefly describes the technologies and evaluations based on their expected effectiveness, implementability, and relative cost. Key advantages, disadvantages, and/or limitations of each alternative are also identified in this table. Technologies identified and screened for this CMS are identified below.

Summary of Technologies Identified and Screened

Target Media	Remedial Technology	Eliminated From Further Consideration	Retained for Further Evaluation
All	Institutional Controls		X
All	Engineering Controls		X
Soil	Capping		X
Soil	Onsite Stabilization and Solidification	X	
Soil	Excavation and Offsite Disposal/Treatment		X

Based on the results of the technology screening, four technologies have been retained to develop corrective measures alternatives for the site. Corrective measure alternatives are developed and evaluated in Section 10.0.

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Table 9-1
Identification and Screening of Corrective Measures Technologies
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Technology	Description	Effectiveness	Implementability	Relative Cost	Retained for CMA Development
Institutional Controls	Institutional controls are non-engineered instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use.	• Effective when used along with engineering controls and other technologies to prevent human health exposure to impacted media. • This technology does not reduce the volume or toxicity of impacted media at the site. **Ranking: Moderate to High**	• Readily implementable. • Administratively feasible. • Would require monitoring of institutional controls. to ensure that unacceptable human exposure does not occur in the future. • Would require long term monitoring and maintenance. **Ranking: High**	Low	Yes
Engineering Controls	Physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.	• Existing controls are in place at the site including a perimeter fence around the pond and an asphalt berm and liner to contain material within the pond. • The use of engineering controls in combination with other technologies such as excavation and institutional controls would prevent exposure to any material left in place with COC concentrations above remedial goals. • Would need to be combined with institutional controls to maximize effectiveness. • This technology does not reduce the volume or toxicity of impacted media at the site. **Ranking: Moderate to High**	• Well proven and readily implementable technology. • Administratively feasible. • Would require long term monitoring and maintenance. **Ranking: High**	Low to Moderate	Yes
Soil Capping	Caps can be constructed with a single layer (asphalt, concrete, or soil) or with multiple layers that may include an upper vegetative layer, drainage layer, and low permeability layer with geotextile and clay base. Caps may be used to minimize or prevent exposure to contaminated soil or waste, prevent vertical infiltration of water into waste that would create leachate, contain waste, or create a surface that can be used for vegetation or other purposes.	• When used in combination with soil excavation and institutional controls, soil capping would effectively prevent human health or ecological exposure to any remaining subsurface soil at the site with COC concentrations above remedial goals. • This technology does reduce the volume or toxicity of impacted media at the site. **Ranking: Moderate to High**	• Well proven and readily implementable technology. • Readily implementable. • Administratively feasible. • Would require institutional and engineering controls due to material with COCs above remedial goals being left in place. • Would require long term monitoring and maintenance. **Ranking: High**	Low to Moderate	Yes

Table 9-1
Identification and Screening of Corrective Measures Technologies
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Technology	Description	Effectiveness	Implementability	Relative Cost	Retained for CMA Development
Soil Stabilization and Solidification	In solidification, a reagent is added to transform a sludge, sediment, or soil into a solid form. Solidification immobilizes the contaminants within the crystalline structure of the solidified material, thus reducing the contaminant leaching potential. In stabilization, a reagent is added to transform the material so that the hazardous constituents are in their least mobile or toxic form. Various specific methods can be used to conduct solidification and stabilization onsite including *in situ* soil mixing using a large diameter auger (typically 3 to 12 ft diameter) with mixing paddles and grout ports and ex situ batch treatment systems.	• Inorganic COCs at site are amenable to stabilization and solidification. • This technology would reduce immobilize the COCs in soil and reduce their toxicity and bioavailability. • Solidification/stabilization process would likely increase volume of immobilized material. • For in situ techniques, human health and ecological risks would be mitigated in conjunction with ICs and soil capping. • For in situ techniques, land reuse options may be limited due to presence of hard solidified mass in subsurface. Future use of solidified site may affect ability to maintain immobility of COCs. • Ex situ stabilization of material would not be required prior to offsite disposal based on waste characteristics testing during RFI (non hazardous). **Ranking: Moderate to High**	• Personnel and equipment are available for implementation. • Implementation of *in situ* method would likely require removal of pond area to a depth immediately below asphalt liner for access of drilling equipment. • The drainage swale area would inaccessible to drilling equipment that would be used for pond area *in situ* stabilization/solidification. • Would require land use controls and long-term monitoring and maintenance. • Site characteristics would make implementability of *in situ* method lower and require the use of additional technologies to meet CMO thereby increasing costs. • Site area characteristics would make ex situ onsite stabilization and solidification more difficult. **Ranking: Low**	Moderate to High	No
Soil: Soil Excavation and Off-Site Disposal	Pond material and associated soil in and around the pond is excavated and transported to a permitted treatment and disposal facility or facilities. Material characterization performed during the RFI indicates that material inside the pond and excavated soil at the site would be a non hazardous waste. Treatment and disposal options will depend on the nature of the material and waste characterization results. The most likely option is placement in a landfill.	• Effective at achieving CMO and remedial goals for soil. • Would remove release sources. • Would result in a reduction in volume of material and soil at the site. • Mobility, and possibly toxicity and volume, of soil and material would be further reduced at the offsite disposal facility • Would eliminate potential human health exposure to material in pond and surrounding surface soil. • Would eliminate potential ecological receptor exposure to material in pond and surrounding surface soil. • Would eliminate potential migration of COCs at the surface. • High long-term effectiveness and reliability when appropriately implemented. **Ranking: High**	• Well proven and implementable technology. • Where used, beneficial results would be achieved immediately after completion of excavation as source areas would be removed. • Excavated material is expected to be non hazardous. • Material in pond above the liner may require stabilization for excavation and loading due to possible saturated conditions. • Administratively feasible and routine in terms of requirements. • Can be implemented without special waste management permits. • Appropriate health and safety measures and onsite controls will be required for implementation. • Services and materials are readily available. **Ranking: High**	High	Yes

10.0 DEVELOPMENT OF CORRECTIVE MEASURE ALTERNATIVES

Based on the identification and screening process conducted in Section 9.0, the four retained corrective measure technologies have been used to develop the following corrective measures alternatives to meet the CMO identified for SWMU 57:

- Alternative One: No Further Action;
- Alternative Two: Institutional Controls, Engineering Controls, and Long-Term Monitoring;
- Alternative Three: Soil Excavation and Offsite Disposal for Industrial Land Use, Institutional Controls, and Long-Term Monitoring; and
- Alternative Four: Excavation of Soil and Offsite Disposal for Clean Closure and Unrestricted Land Use.

Corrective measures alternatives are described in the following sections.

10.1 ALTERNATIVE ONE – NO FURTHER ACTION

The No Further Action alternative will be used as a baseline to measure the performance of the other alternatives.

10.2 ALTERNATIVE TWO – INSTITUTIONAL CONTROLS, ENGINEERING CONTROLS, AND LONG-TERM MONITORING

Elements of this alternative are described below.

10.2.1 Institutional Controls

Institutional Controls (ICs) would consist of incorporating land use controls (LUCs) and access restrictions for SWMU 57 into the RFAAP Installation Master Plan, Geographic Information System (GIS), and other instructions and orders, as applicable, to ensure long-term protection of human health and the environment. A LUC implementation plan would be designed and prepared to assure the effectiveness and reliability of the required ICs. ICs would be designed to restrict future active industrial development at the site and prevent unacceptable human health exposure to soil and pond material left in place.

10.2.2 Engineering Controls

Existing engineering controls would remain in place at the site including the perimeter fence around the pond to limit access to the pond area and the asphalt containment system for the pond including the berm and liner. Warning signs would be affixed to the existing fence to indicate access limitations.

10.2.3 Long-Term Monitoring

Long-term monitoring would include administration of institutional controls, inspections, and maintenance of engineering controls, and periodic monitoring of groundwater to verify the effectiveness of the remedy and detect any significant releases to groundwater that would pose a risk to human health or the environment. A LTM plan would be developed that specifies administration and maintenance requirements, and the specific elements of the groundwater monitoring program including locations, frequency, analytical requirements, management of IDM, reporting requirements, and actions to be taken if potentially significant releases are identified by monitoring. The anticipated LTM program for groundwater is summarized in the following table.

Long-Term Groundwater Monitoring Program

Monitoring Well	Monitoring Frequency	Analytical Parameters
57MW2	Years 1-30 Semi-Annual	Field water quality: pH, specific conductance, temperature, dissolved oxygen, oxidation/reduction potential TCL VOCs – SW-846 Method 8260B TAL Metals – SW-846 Method 6010B and/or 6020
57MW3		

For purposes of the CMS and cost estimating, 30 years of semi-annual groundwater monitoring is assumed to demonstrate the long-term effectiveness of the remedy and that the remedy is performing as expected. The proposed LTM program would be included in the remedy-implementation work plan submitted to the USEPA and VDEQ for approval prior to remedy implementation. This work plan would include specific information on any proposed criteria and triggers for decreasing the groundwater monitoring frequency over time.

10.2.4 Remedy Completion Report

A remedy completion report would be prepared that documents the remedial actions implemented and completed at the site. This report would be submitted to the EPA and VDEQ.

10.2.5 Annual LTM Reports

Annual LTM reports would be prepared to describe each year's activities, such as LUC and LTM inspections and maintenance activities, and groundwater monitoring along with analytical results. Any required action or activities related to the remedy implementation would be presented to access whether additional remedial actions or site controls are required. Any criteria and trigger points for modification of the LTM program including groundwater monitoring would be evaluated in these reports and recommendations would be made based on the evaluations.

10.3 ALTERNATIVE THREE – EXCAVATION OF SOIL AND OFFSITE DISPOSAL FOR INDUSTRIAL LAND USE WITH INSTITUTIONAL CONTROLS

Elements of this alternative are described below.

10.3.1 Institutional Controls

ICs would consist of incorporating LUCs and access restrictions for SWMU 57 into the RFAAP Installation Master Plan, GIS, and other instructions and orders, as applicable, to ensure long-term protection of human health and the environment. A LUC implementation plan would be designed and prepared to assure the effectiveness and reliability of the required ICs. ICs would be designed to prevent future activities in the site area that would result in unacceptable human health exposure.

10.3.2 Excavation of Pond and Surrounding Area

Under Alternative Three, excavation and removal of material would occur in and around the pond area to remove soil and material containing COC concentrations above established industrial RGs, as shown on Figure 10-1. The entire footprint of the pond area and lower area surrounding the pond would be removed to depths up to 15 ft bgs. An approximate 50 ft long segment of the drainage ditch closest to the pond would be excavated to estimated depths ranging from 2 to 5 ft bgs. Specific excavation depths and areas will depend on the results of confirmatory soil sampling as discussed below. The aboveground portion of the terracotta pipe also would be removed during excavation. Approximate excavation depths and quantities are summarized on Figure 10-1 and in the following table.

Excavation Areas and Quantities – Alternative Three

Location	Area (SF)	Anticipated Average Depth (ft)	In-Place Volume		Tons
			Cubic Feet (CF)	Cubic Yards (BCY)	
Within Pond Area	2,898	8	23,184	859	1,203
Asphalt Containment Berm	378	2*	756	28	39
Drainage Swale	690	3.5	2,415	89	125
Lower Area Surrounding Pond	290	15	4,350	161	225
Total	**4,256**	**--**	**30,705**	**1,137**	**1,592**

Notes: SF = square feet, CF = cubic feet, BCY = bank cubic yards, * height of berm above excavation area.

Based on waste characterization results for material present within the pond, the estimated 1,592 tons of excavated material would be non hazardous waste. Excavated material would be transported to an offsite landfill permitted to receive non hazardous waste. Prior to any material removal, any water present in the pond (typically four inches or less) would be removed by a vacuum truck or pumps, containerized, and depending on characteristics (suspended solids, etc.) would be disposed at the RFAAP wastewater treatment plant or an offsite facility. Residual material present in the pond above the asphalt liner may require stabilization before excavation and loading if it is saturated.

Estimated Quantity of Remediation Waste

For purposes of the CMS and cost estimating purposes the following quantities of remediation waste have been assumed:

- Approximately 1,592 tons of nonhazardous soil and solid material excavated from pond and surrounding areas assuming a material density of 1.4 tons per cubic yard;
- Approximately 6,900 gallons of nonhazardous water from the pond assuming an average of 4-inches of water is present within a 2,800 square foot area of the pond inside the asphalt berm; and
- Approximately 1,200 gallons of decontamination water and approximately 10 cubic yards of nonhazardous solid waste from decontamination activities.

Excavation and Remediation Waste Management

Estimated costs developed for Alternative Three assume that materials to be removed would be characterized for disposal purposes prior to removal and that conventional earthmoving equipment, such as loaders and/or excavators, would excavate the material and directly load it into trucks for offsite transport and disposal. It is also assumed that excavation shoring, such as a trench box, would be used for excavations conducted in the pond area due to the estimated depth of excavation below 5 ft bgs, limited site area, and surrounding physical features, such as overhead pipes and topography, which would limit sloping and access to the excavation area.

For purposes of cost estimating, it is assumed that a vacuum truck would be used to dewater the pond prior to excavation of the pond area and that pumped water would be transported to the RFAAP wastewater treatment plant for treatment/disposal. Costs are also included for mobilizing equipment and personnel, construction and maintenance of a decontamination area, setup of erosion and control measures, preparation of staging areas, and use of portable equipment for any required dust suppression.

For purposes of cost estimating, it is assumed that one composite soil sample per 200 tons of material excavated would be collected for purposes of waste characterization (RCRA waste characteristics). It is assumed one sample of pond water would be analyzed for parameters of interest for the RFAAP

wastewater treatment plant including chemical oxygen demand, pH, and toxicity characteristic leaching procedure (TCLP) metals.

The final disposal facility for excavated material would be selected by the remediation contractor and RFAAP based on the results of the waste characterization, capacity of the treatment, storage, and disposal facility to accommodate incoming waste, verification of permits and insurance necessary to handle waste, the disposal facility's ability to meet permit compliance requirements, and transportation and disposal costs.

For purposes of cost estimating, it is assumed that decontamination water collected during remedial implementation would be transferred to a tanker truck and transported to the RFAAP wastewater treatment plant for disposal. Costs for waste characterization of this material have been included in the CMS cost estimate.

Confirmation Sampling

Confirmatory soil samples would be collected from the bottom and sidewalls of the excavation area to confirm the lateral and vertical extent of soil above established industrial RGs has been removed. The vertical extent of soil excavation would be limited to 15 ft bgs given that soil below this depth is unlikely to be disturbed during any future activities at the site. For cost estimating purposes, it is assumed that 30 confirmatory soil samples would be collected from the excavation area for analysis of aluminum, antimony, and manganese, which are the COCs for industrial soil. The proposed confirmatory soil sampling and analysis plan with the specific number and location of samples and analytical parameters would be presented in the work plan for remedy implementation.

Site Restoration

Once the excavation is completed, the area would be backfilled with clean fill to a grade consistent with the surrounding terrain. The fill would be compacted in 6 to 8-inch lifts to within 6-inches of finished grade. Approximately 6-inches of topsoil would then be placed and the site would be final graded. Erosion and sediment controls would be implemented and excavation areas would be seeded.

Health and Safety

Health and safety measures would be implemented to protect on-site workers during excavation activities. For cost-estimating purposes, modified Level D PPE and decontamination equipment has been assumed.

10.3.3 Long-Term Monitoring

Long-term monitoring would include administration of institutional controls and maintenance of existing engineering controls for 30 years, and periodic monitoring of groundwater to verify that significant releases have not occurred to groundwater from material left in place that would pose a risk to human health or the environment. A LTM plan would be developed that specifies administration and maintenance requirements, and the specific elements of the groundwater monitoring program including locations, frequency, analytical requirements, management of IDM, reporting requirements, and actions to be taken if potentially significant releases are identified by monitoring. The anticipated LTM program for groundwater is summarized in the following table.

Long-Term Groundwater Monitoring Program

Monitoring Well	Monitoring Frequency and Duration	Analytical Parameters
57MW2	Years 1-3 Semi-Annual	Field water quality: pH, specific conductance, temperature, dissolved oxygen, oxidation/reduction potential
57MW3	Years 3-30 Once per 3 Years	TCL VOCs – SW-846 Method 8260B Dissolved Metals: Arsenic, Antimony, and Manganese - SW-846 Method 6010B or 6020

For purposes of the CMS and cost estimating, 30 years of groundwater monitoring is assumed with semi-annual groundwater monitoring conducted for the first three years to demonstrate the effectiveness of the remedy and that the remedy is performing as expected. After three years it is assumed that the monitoring program would be reduced to once per three years, with the assumption that remedy effectiveness is demonstrated and relatively stable monitoring results are observed over time. The proposed LTM program would be included in the remedy-implementation work plan submitted to the USEPA and VDEQ for approval prior to remedy implementation. This work plan would include specific information on any proposed criteria and triggers for decreasing the groundwater monitoring frequency over time.

10.3.4 Remedy Completion Report

A remedy completion report would be prepared that documents the remedial actions implemented and completed at the site. This report would be submitted to the EPA and VDEQ.

10.3.5 Annual LTM Reports

Annual LTM reports would be prepared to describe each year's activities, such as LUC and LTM inspections and maintenance activities, and groundwater monitoring along with analytical results. Any required action or activities related to the remedy implementation would be presented to access whether additional remedial actions or site controls are required.

10.4 ALTERNATIVE FOUR – EXCAVATION OF SOIL AND OFFSITE DISPOSAL FOR CLEAN CLOSURE AND RESTRICTED LAND USE

Elements of this alternative are described below.

10.4.1 Excavation of Pond and Surrounding Area

Under Alternative Four, excavation and removal of material would occur in and around the pond area to remove soil and material containing COC concentrations above established residential RGs, as shown on Figure 10-2. The entire footprint of the pond area, lower area surrounding the pond, and area within and adjacent to the terracotta pipe near the pond would be removed to depths up to 15 ft bgs. An approximate 80 ft long segment of the drainage ditch closest to the pond would be excavated to progressively shallower depths at increased distance from the pond as shown on Figure 10-2. Specific excavation depths and areas will depend on the results of confirmatory soil sampling as discussed below. The aboveground portion of the terracotta pipe also would be removed during excavation. Approximate excavation depths and quantities are summarized on Figure 10-2 and in the following table.

Excavation Areas and Quantities – Alternative Four

Location	Area (SF)	Anticipated Average Depth (ft)	In-Place Volume		Tons
			Cubic Feet (CF)	Cubic Yards (BCY)	
Within Pond Area	2,898	11	31,878	1,181	1,653
Asphalt Containment Berm	378	2*	756	28	39
Drainage Swale – East (Closest to Pond)	576	7	4,032	149	209
Drainage Swale – West	576	3.5	2,016	75	105
Lower Area Surrounding Pond	290	15	4,350	161	225
Adjacent to Terracotta Pipe	307	8	2,456	91	127
Total	**5,025**	**--**	**45,488**	**1,685**	**2,358**

Notes: SF = square feet, CF = cubic feet, BCY = bank cubic yards, * height of berm above excavation area.

Based on waste characterization results for material present within the pond, the approximate 2,358 tons of excavated material would be non hazardous waste. Excavated material would be transported to an offsite landfill permitted to receive non hazardous waste. Prior to any material removal, any water present in the pond (typically four inches or less) would be removed by a vacuum truck or pumps, containerized, and depending on characteristics (suspended solids, etc.) would be disposed at the RFAAP wastewater treatment plant or an offsite facility. Residual material present in the pond above the asphalt liner may require stabilization before excavation and loading if it is saturated.

Estimated Quantity of Remediation Waste

For purposes of the CMS and cost estimating purposes the following quantities of remediation waste have been assumed:

- Approximately 2,358 tons of nonhazardous soil and solid material excavated from pond and surrounding areas assuming a material density of 1.4 tons per cubic yard;
- Approximately 6,900 gallons of nonhazardous water from the pond assuming an average of 4-inches of water is present within a 2,800 square foot area of the pond inside the asphalt berm; and
- Approximately 1,700 gallons of decontamination water and approximately 10 cubic yards of nonhazardous solid waste from decontamination activities.

Excavation and Remediation Waste Management

Estimated costs developed for Alternative Four assume that materials to be removed would be characterized for disposal purposes prior to removal and that conventional earthmoving equipment, such as loaders and/or excavators, would excavate the material and directly load it into trucks for offsite transport and disposal. It is also assumed that excavation shoring, such as a trench box, would be used for excavations conducted in the pond area due to the estimated depth of excavation below 5 ft bgs, limited site area, and surrounding physical features, such as overhead pipes and topography, which would limit sloping and access to the excavation area.

For purposes of cost estimating, it is assumed that a vacuum truck would be used to dewater the pond prior to excavation of the pond area and that pumped water would be transported to the RFAAP wastewater treatment plant for treatment/disposal. Costs are also included for mobilizing equipment and personnel, construction and maintenance of a decontamination area, setup of erosion and control measures, preparation of staging areas, and use of portable equipment for any required dust suppression.

For purposes of cost estimating, it is assumed that one composite soil sample per 200 tons of material excavated would be collected for purposes of waste characterization (RCRA waste characteristics). It is assumed one sample of pond water would be analyzed for parameters of interest for the RFAAP wastewater treatment plant including chemical oxygen demand, pH, and TCLP metals.

The final disposal facility for excavated material would be selected by the remediation contractor and RFAAP based on the results of the waste characterization, capacity of the treatment, storage, and disposal facility to accommodate incoming waste, verification of permits and insurance necessary to handle waste, the disposal facility's ability to meet permit compliance requirements, and transportation and disposal costs.

For purposes of cost estimating, it is assumed that decontamination water collected during remedial implementation would be transferred to a tanker truck and transported to the RFAAP wastewater treatment plant for disposal. Costs for waste characterization of this material have been included in the CMS cost estimate.

Confirmation Soil Sampling

Confirmation samples would be collected from the bottom and sidewalls of the excavation to confirm the lateral and vertical extent of soil above established residential RGs has been removed. The vertical extent of soil excavation would be limited to 15 ft bgs given that soil below this depth is unlikely to be disturbed during any future activities at the site. Confirmation soil samples would be analyzed for metal COCs with established residential RGs including aluminum, antimony, cadmium, chromium, iron, and manganese. For cost estimating purposes, it is assumed that 36 confirmatory soil samples would be collected from the excavation area. The proposed confirmatory soil sampling and analysis plan with the specific number and location of samples and analytical parameters would be presented in the work plan for remedy implementation.

Site Restoration

Once the excavation is completed, the area would be backfilled with clean fill to a grade consistent with the surrounding terrain. The fill would be compacted in 6 to 8-inch lifts to within 6-inches of finished grade. Approximately 6-inches of topsoil would then be placed and the site would be final graded. Erosion and sediment controls would be implemented and excavation areas would be seeded.

Health and Safety

Health and safety measures would be implemented to protect on-site workers during excavation activities. For cost-estimating purposes, modified Level D PPE and decontamination equipment has been assumed.

10.4.2 Confirmation Groundwater Sampling for Closure

Confirmation groundwater sampling would be conducted prior to remedy implementation to verify RFI findings that COC concentrations in groundwater are below applicable MCLs and risk-based criteria and confirm that clean closure is achievable at the site. The anticipated confirmatory groundwater sampling plan is summarized in the following table.

Confirmatory Groundwater Sampling

Monitoring Well	Monitoring Frequency	Analytical Parameters
57MW2	Once (Prior to Remedy Implementation)	Field water quality: pH, specific conductance, temperature, dissolved oxygen, oxidation/reduction potential TCL VOCs – SW-846 Method 8260B Dissolved Metals: Antimony, Arsenic, Chromium, and Manganese SW-846 Method 6010B or 6020
57MW3		

10.4.3 Work Plan

A site-specific work plan would be prepared for remedy implementation including excavation and site restoration activities, which would include plans and specifications for excavation, waste characterization, transportation, and disposal, decontamination, confirmatory sampling, erosion and sediment control, backfilling, and site restoration, QA requirements and procedures, and a health and safety. The work plan would be submitted to the USEPA and VDEQ for approval prior to remedy implementation.

10.4.4 Monitoring Well Abandonment

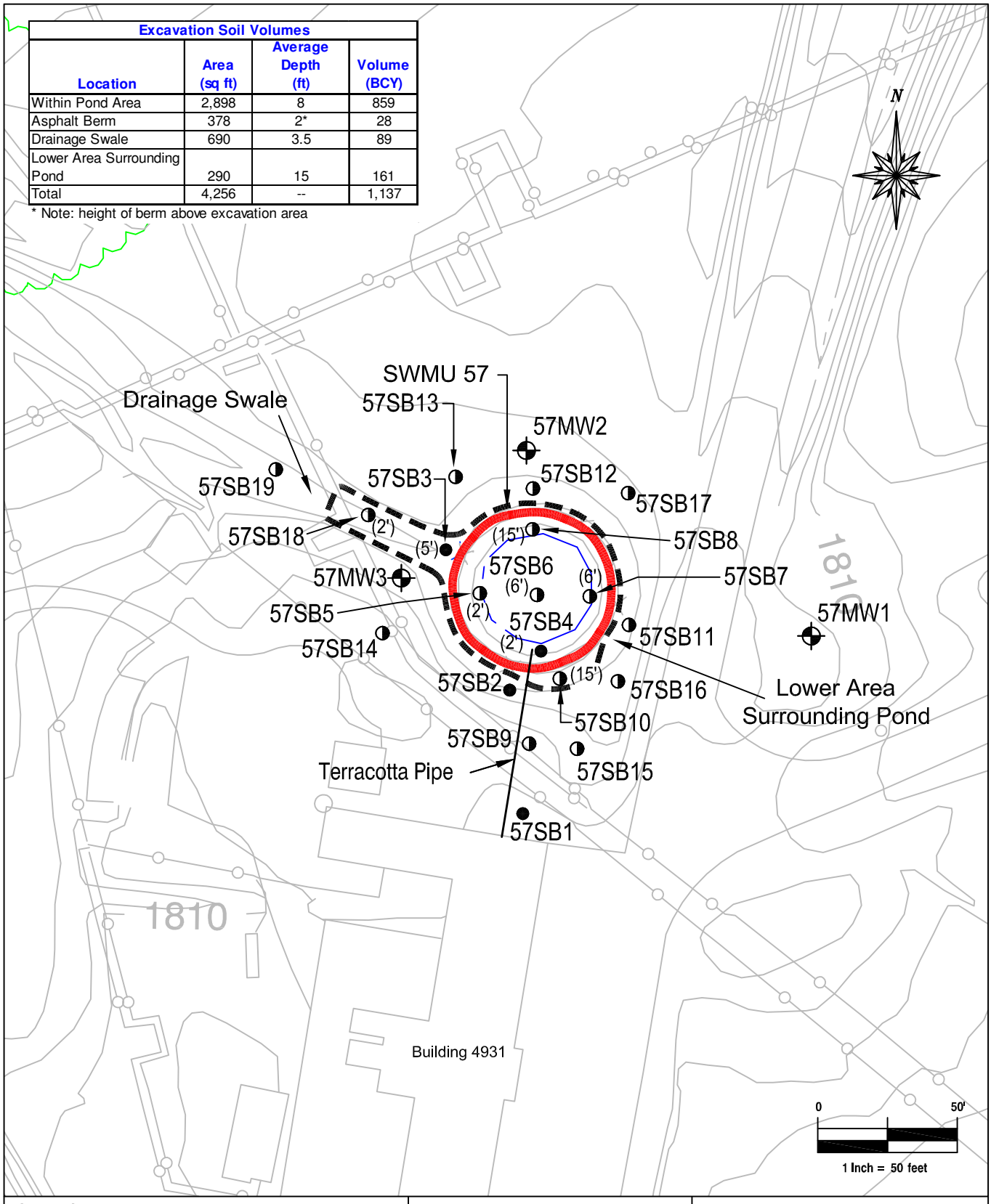
Existing monitoring wells 57MW1, 57MW2, and 57MW3 would be abandoned after completion of the remedy and verification that requirements for clean closure have been met. For purposes of the CMS and cost estimating, it is assumed that monitoring wells would be abandoned by pressure grouting in place and removal of the surface casing and pad.

10.4.5 Remedy Completion and Closure Report

A remedy completion and closeout report would be prepared that documents the remedial actions implemented and completed at the site. This report would be submitted to the USEPA and VDEQ.

Excavation Soil Volumes			
Location	Area (sq ft)	Average Depth (ft)	Volume (BCY)
Within Pond Area	2,898	8	859
Asphalt Berm	378	2*	28
Drainage Swale	690	3.5	89
Lower Area Surrounding Pond	290	15	161
Total	4,256	--	1,137

* Note: height of berm above excavation area



Legend

- Approximate SWMU Boundary
- Topographic Contour
- SSP Soil Sample Location
- RFI Sample Location
- Monitoring Well Location
- Excavation Area
- (2') Approximate Depth of Excavation
- Aboveground Piping
- Vegetation
- Fence
- (BCY) Bank Cubic Yard

FIGURE 10-1

Excavation Area - Alternative 3

Date: May 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.10-1 Ex.Area

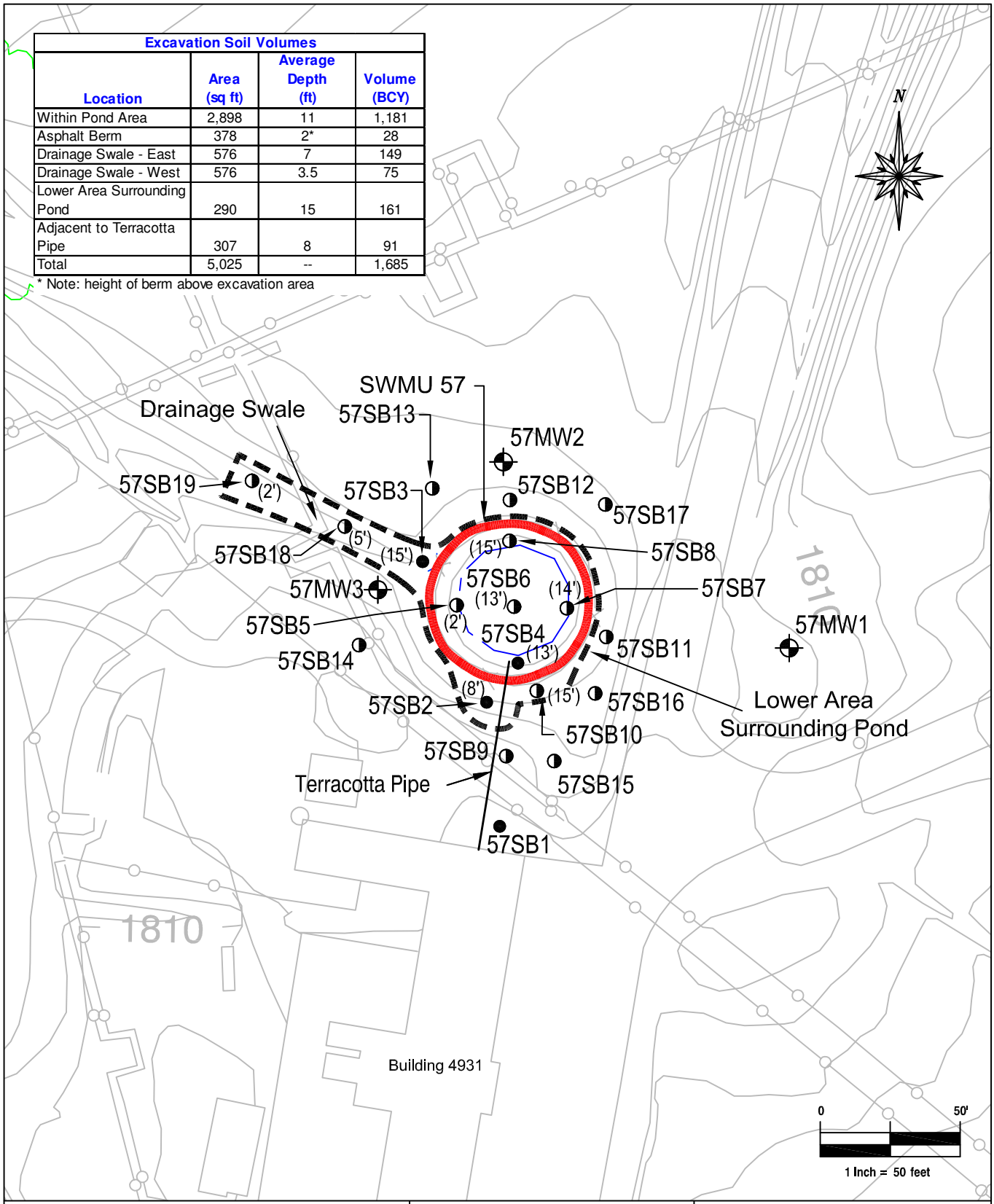
SWMU 57

RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230

Excavation Soil Volumes			
Location	Area (sq ft)	Average Depth (ft)	Volume (BCY)
Within Pond Area	2,898	11	1,181
Asphalt Berm	378	2*	28
Drainage Swale - East	576	7	149
Drainage Swale - West	576	3.5	75
Lower Area Surrounding Pond	290	15	161
Adjacent to Terracotta Pipe	307	8	91
Total	5,025	--	1,685

* Note: height of berm above excavation area



Legend

- Approximate SWMU Boundary
- Topographic Contour
- SSP Soil Sample Location
- RFI Sample Location
- Monitoring Well Location
- Excavation Area
- (2') Approximate Depth of Excavation
- Aboveground Piping
- Vegetation
- Fence
- (BCY) Bank Cubic Yard

FIGURE 10-2

Excacation Area - Alternative 4

Date: May 2008	URS Project #: 11656421
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 50 feet	File Name: Fig.10-2 Ex.Area

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RFI/CMS Report
Radford Army Ammunition Plant
Radford, Virginia

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Richmond, Virginia 23230

11.0 EVALUATION OF CORRECTIVE MEASURES ALTERNATIVES

Criteria used to evaluate the four potential corrective measures alternatives include effectiveness, implementability, and cost as described below.

11.1 EVALUATION CRITERIA

11.1.1 Effectiveness

Effectiveness criteria evaluated for each alternative include:

- Protection of human health and the environment;
- Attain media cleanup standards and criteria;
- Control the source of releases;
- Compliance with any applicable standards for the management of wastes;
- Long-term reliability and effectiveness;
- Reduction in toxicity, mobility, and/or volume through treatment; and
- Short-term effectiveness.

11.1.2 Implementability

Implementability criteria evaluated for each alternative include:

- Technical factors including: constructability, time for implementation, and time for beneficial results;
- Administrative feasibility; and
- Availability of services and materials.

11.1.3 Cost

Cost factors that are used to evaluate alternatives include costs associated with implementation of each corrective measure alternative. The estimated cost for each alternative is based on a conceptual design for each alternative and includes both capital cost and O&M. The total estimated cost and present value of each alternative are presented. The actual cost of each alternative is dependent on a variety of factors including the scope of work, schedule, market conditions, and other variables.

11.2 EFFECTIVENESS

11.2.1 Protection of Human Health and the Environment

Alternative One

Alternative One may not provide for future protection of human health and the environment because corrective measures are not implemented to control future land use or site access.

Alternative Two

Alternative Two would address the established CMO and protection of human health and the environment using a combination of ICs and maintenance of existing engineering controls in the pond area. ICs would be used to prevent uncontrolled human health exposure to material in the pond area and soil with COC concentrations above remedial goals. LTM would be used to verify continued protection of human health and the environment after remedy implementation. Existing engineering controls would be maintained to restrict site access and to prevent runoff from inside to the outside of the pond. This alternative would not

prevent potential ecological receptor exposure to material in the pond or to surface soil outside of the pond.

Alternative Three

Alternative Three would meet the established CMO and provide for protection of human health and the environment by excavating the pond area and surrounding soil with COC concentrations above industrial RGs. Excavated areas would be backfilled with clean fill. ICs would be implemented to limit future land use to industrial and prevent uncontrolled exposure to soil under a hypothetical future residential land use scenario. Removal of the pond material and soil around the pond would eliminate potential ecological receptor exposure to this material. LTM would be conducted to verify the remedy effectiveness.

Alternative Four

Alternative Four would exceed the established CMO and provide for protection of human health and the environment by excavating the pond area and surrounding soil with COC concentrations above residential RGs. Excavated areas would be backfilled with clean fill. This would also eliminate potential ecological receptor to material in the pond and surface soil surrounding the pond area. This alternative would provide for unrestricted land use.

11.2.2 Compliance with Media Standards and Criteria

Numerical RGs established for the CMS for media are risk based, with the exception of groundwater COCs that have a Federal MCL, in which case the MCL is used for the RG.

Alternative One

Media cleanup standards and criteria are not achieved by Alternative One because corrective measures are not implemented.

Alternative Two

Soil and material with COC concentrations above industrial RGs would remain in place under Alternative Two and therefore, media standards and criteria would not be achieved.

Alternative Three

Soil and material with COC concentrations above industrial RGs would be removed under Alternative Three and therefore, media standards and criteria for industrial use would be achieved.

Alternative Four

Soil and material with COC concentrations above residential RGs would be removed under Alternative Four and therefore, media standards and criteria for unrestricted use would be achieved.

11.2.3 Control of Sources of Releases

Alternative One

Alternative One does not necessary for provide for control of source releases from the pond area because no corrective measures are implemented.

Alternative Two

Alternative Two relies on maintaining existing engineering controls in the pond area to control the source of releases. The pond containment berm and liner would prevent runoff of material inside the pond to the outside and contain the material within the pond. Release sources outside of the pond area are not addressed by this alternative. LTM would be conducted to verify the effectiveness of existing engineering controls and the remedy on controlling the source of releases to groundwater.

Alternative Three

Alternative Three provides for source control and elimination by removal of material and soil containing COC concentrations above industrial RGs. Excavated areas would be backfilled with clean fill. LTM and associated maintenance activities would be conducted to verify the effectiveness of source control and removal. Source removal would be performed to the extent required to allow for future industrial use of the site without controls.

Alternative Four

Alternative Four provides for source control and elimination by removal of material and soil containing COC concentrations above residential RGs. Excavated areas would be backfilled with clean fill. Source removal would be performed to the extent to allow for future unrestricted use of the site.

11.2.4 Comply with any Applicable Standards for Management of Wastes

Alternative One

Alternative One does not include any waste management activities because corrective measures are not implemented.

Alternative Two

Alternative Two would involve the generation of limited waste associated with LTM including non hazardous purge water (based on RFI waste characterization results) and personal protective equipment (PPE). Non hazardous purge water would be disposed of at the RFAAP wastewater treatment plant and PPE would be disposed of as solid waste.

Alternatives Three and Four

Each of these alternatives would involve the generation of non-hazardous remediation waste including soil and material excavated from the site, any water removed from the pond prior to excavation, and purge water, and PPE associated with LTM. Waste characterization testing would be conducted prior to dewatering of the pond (if necessary) and excavation of soil and material to appropriately characterize material and develop waste profiles for disposal of the remediation waste. This would also allow for direct loading of excavated material into trucks to minimize activities and associated requirements with temporarily staging or managing soil onsite before loading. A final disposal facility or facilities would be selected for the wastes based on the waste characterization data, treatment, storage, disposal, and facility permit requirements, compliance with the facility's RCRA permit, and compliance with Federal regulations and Commonwealth of Virginia hazardous waste management regulations and policy.

11.2.5 Long-Term Reliability and Effectiveness

Alternative One

Alternative One does not achieve long-term effectiveness and permanence because corrective measures are not implemented to control land use, site access, or maintain containment in the pond area.

Alternative Two

ICs would be implemented and engineering controls maintained with the goal of achieving long-term effectiveness and permanence. LTM including groundwater monitoring would be conducted to verify the long-term reliability and effectiveness of this remedy.

Alternative Three

The overall long-term reliability and effectiveness of Alternative Three is expected to be high given the complete removal of the pond area and soil and material with COC concentrations above industrial RGs. ICs and LTM (including groundwater monitoring) would be used to ensure the long-term reliability and effectiveness of this remedy.

Alternative Four

The overall long-term reliability and effectiveness of Alternative Four is expected to be high given that it exceeds the CMO and results in the complete removal of the pond area and soil and material with COC concentrations above residential RGs. This would allow for unrestricted future land use of the site.

11.2.6 Reduction in Toxicity, Mobility, and/or Volume through Treatment

Alternative One

Alternative One does not reduce the toxicity, mobility, and volume of material or associated COCs because corrective measures are not implemented.

Alternative Two

Alternative Two does not reduce the toxicity, mobility, or volume of COCs in soil or pond material because the proposed corrective measures do not involve treatment or removal of material. Mobility of COCs would be unchanged given that existing engineering controls are maintained rather than enhanced.

Alternative Three

Alternative Three would reduce the volume of COCs in soil and the pond area by the excavation and offsite treatment and disposal (T&D) of approximately 1,137 BCY of soil and associated material. Mobility, and possibly toxicity and volume, would be further reduced at the offsite T&D facility.

Alternative Four

Alternative Four would reduce the volume of COCs in soil and the pond area by the excavation and offsite T&D of approximately 1,685 BCY of soil and associated material. Mobility, and possibly toxicity and volume, would be further reduced at the offsite T&D facility.

11.2.7 Short-Term Effectiveness

Alternative One

Alternative One does not require protection of workers and the community during remedial implementation because corrective measures are not implemented. However, the lack of ICs would potentially pose a future human health and environmental risk.

Alternative Two

Onsite activities would be limited to LTM. Potential short-term risk to site workers would be controlled and minimized by implementation of good work practices, appropriate health and safety measures, personnel protection equipment, and management of LTM waste in accordance with Department of Transportation, federal, and Commonwealth of Virginia requirements. The methodologies to safely perform these activities and mitigate short-term risks would be described in site-specific work plans and health and safety plans.

Alternatives Three and Four

Potential short-term risk to site workers, the environment, and community would be controlled and minimized by implementation of good construction and work practices, appropriate health and safety measures, standard dust suppression techniques, erosion and sediment control measures, personnel protection equipment, real-time air monitoring, and management of non-hazardous and hazardous waste in accordance with Department of Transportation, federal, and Commonwealth of Virginia requirements. The methodologies to safely perform these activities and mitigate short-term risks would be described in site-specific work plans and health and safety plans.

11.3 IMPLEMENTABILITY

11.3.1 Technical

Alternative One

Constructability would not be an issue for Alternative One because corrective measures are not implemented. Alternative One would not require time for implementation because corrective measures are not implemented; however, future beneficial results may not be achieved.

Alternative Two

Constructability would not be an issue for Alternative Two because corrective measures are limited to implementing ICs, maintaining existing controls in the pond area, and LTM. These technologies would be readily implementable at the site.

Alternative Three

Excavation and offsite disposal is a well-proven and readily implementable technology that is commonly used to remediate waste sites. Material in pond above the liner may require stabilization for excavation and loading due to possible saturated conditions. ICs and LTM proposed for this alternative are commonly used to remediate waste sites. These technologies are readily implementable and effective when appropriately layered, combined, and administered. Beneficial results would be achieved immediately after completion of this alternative given that materials would be removed to degree to allow for industrial use of the site without controls.

Alternative Four

Excavation and offsite disposal is a well-proven and readily implementable technology that is commonly used to remediate waste sites. Beneficial results would be achieved immediately after completion of this alternative given that materials would be removed to degree to allow for unrestricted use of the site without controls.

11.3.2 Administrative Feasibility

Alternative One

Alternative One would not require any permits or administrative actions because corrective measures are not implemented.

Alternative Two

Alternative Two is administratively feasible and is expected to be routine in terms of administrative requirements. Special permits would not be required for implementation.

Alternatives Three and Four

Each of these alternatives is administratively feasible and is expected to be routine in terms of administrative requirements. It is anticipated that these alternative would be implemented as a final interim measure and therefore, it would not require a modification of the facility's RCRA Corrective Action Permit at the time of implementation. Implementation of these alternatives would not require special permits for management, treatment, transportation, or disposal of waste. Facility-specific permits would be required to complete the work including an area entry permit and hot work permit.

11.3.3 Availability of Services and Materials

Alternative One

Alternative One would not require services and materials because corrective measures are not implemented.

Alternative Two

Alternative Two would require limited services and materials because corrective measures are limited to ICs, maintaining existing engineering controls, and LTM. Related services and materials are readily available to implement this alternative.

Alternatives Three and Four

Services and materials, such excavation contractors, treatment, storage, and disposal facility capacity, and disposal services are readily available to implement excavation and site restoration activities.

11.4 COST

Alternative One does not involve any actions, so there is no cost for this alternative. Detailed cost estimates for Alternative Two, Alternative Three, and Alternative Four are presented in Tables 11-1, 11-2, and 11-3, respectively, and are summarized below.

Summary of Cost for Corrective Measures Alternatives

Corrective Measures Alternative	Total Capital Cost	O&M Cost				Estimated Total Cost with O&M	PV @ 4.9%
		Annual Cost Years 1-3	Annual Cost Years 4-10	Annual Cost Years 11-30	Total O&M Cost		
Alternative One	$0	$0	$0	$0	$0	$0	$0
Alternative Two	$38,940	$23,019	$23,019	$23,019	$690,581	$729,521	$396,874
Alternative Three	$502,032	$16,389	$4,631	$4,631	$174,216	$676,249	$639,119
Alternative Four	$639,967	$0	$0	$0	$0	$639,967	$639,967

Table 11-1
Cost Estimate: Corrective Measures Alternative Two
Institutional Controls, Engineering Controls, and Long-Term Monitoring
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Capital Costs

Item	Units	Unit Cost ($)	Quantity	Total ($)
Task 1: Institutional Controls, Plans, and Dedicated Pump System for LTM				
Preparation, Implementation of Long-Term Monitoring Plan	EA	6,000	1	$6,000
Installation of Dedicated Pump System - 57MW2 and 57MW3	EA	3,500	1	$3,500
Preparation, Implementation of Institutional Control Plan, GIS System Update	EA	20,000	1	$20,000
			Subtotal: Tasks 1, 2, and 3	$29,500
	Project Management (10%)			$2,950
			Total - Tasks 1, 2, and 3	$32,450
	Contingency (20%)			$6,490
			Total Capital Costs	**$38,940**

Annual O&M Costs Years 1-30

Item	Units	Unit Cost ($)	Quantity	Total ($S)
LTM: Site Maintenance/Inspections and Semi-Annual Groundwater Monitoring				
Site Inspection and Maintenance	YR	750	1	$750
Groundwater Sampling - Field Labor	EVENT	1,760	2	$3,520
Groundwater Sampling Equipment and Supplies	EVENT	222	2	$444
Per Diem	EVENT	291	2	$582
Vehicle and Fuel	EVENT	272	2	$544
Sample Cooler Shipping	EVENT	85	2	$170
Groundwater Sample Analysis (VOCs and Metals)	EA	225	6	$1,350
			Subtotal	$7,360
IC Review and LTM Reporting				
Annual IC Review and LTM Data Analysis and Reporting	EA	10,000	1	$10,000
			Subtotal	$10,000
			Subtotal Annual O&M Cost	$17,360
	Project Management (10.5%)			$1,823
			Total Annual O&M Cost	$19,183
	Contingency (20%)			$3,837
			Total Annual O&M Cost for Years 1-30	**$23,019**
			Total O&M Cost for Years 1-30	**$690,581**
			Estimated Total Cost of Alternative Two with 30 Years of O&M	**$729,521**
			Present value @ 4.9%	**$396,874**

Table 11-2
Cost Estimate: Corrective Measures Alternative Three
Limited Soil Excavation and Offsite Disposal, Institutional Controls, Engineering Controls, and Long-Term Monitoring
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Capital Costs

Item	Units	Unit Cost ($)	Quantity	Total ($)
Task 1: Pre Excavation Waste Characterization				
Pre Excavation - Waste Characterization TCLP metals, pH, and COD - Pond Water	EA	225	1	$225
Pre Excavation - Waste Characterization TCLP, Explosives, pH, COD - Pond Material and Soil	EA	1,366	6	$8,196
			Subtotal Task 1	$8,421
Task 2: Excavation and Site Restoration				
Contractor Mobilization	EA	5,000	1	$5,000
Decontamination Activities and Dust Suppression: includes Setup and Removal	EA	10,000	1	$10,000
Erosion and Sediment Controls	LF	4.16	750	$3,120
Remove Existing Fence Around Pond	LF	10	188	$1,880
Dewater Pond with Vacuum Truck and Transport Water to RFAAP WWTP	EA	1,200	1	$1,200
Stabilize Material in Pond Before Excavation	EA	1,000	1	$1,000
Hydraulic Excavator - 45,000 lb	MO	7,590	1.0	$7,590
Tractor, Crawler Bulldozer - 70 hp	MO	4,313	1.0	$4,313
Hydraulic Excavator Attachment, Vibratory Plate Compactor	MO	2,700	1.0	$2,700
Vibratory Compactor, Roller	WK	910	1.0	$910
Trenching Box (8' X 8' X 8') (2)	MO	2,415	1.0	$2,415
Equipment Operators (2)	HR	72	120	$8,640
Field Supervisor	HR	60	120	$7,200
Offsite Fill Material, Delivered	LCY	7.67	1,388	$10,646
Offsite Topsoil, Delivered	LCY	27	120	$3,240
Seeding, Vegetative Cover	SY	1.88	450	$846
Confirmatory Soil Samples for Selected Metals - Expedited Analysis	EA	240	30	$7,200
			Subtotal Task 2	$77,899
Task 3: Waste Transport/Disposal				
Non-Hazardous Soil and Material - Transportation and Disposal	TON	95	1,592	$150,603
Pump Decontamination Water into Vacuum Tanker and Transport Water to RFAAP WWTP	EA	1,200	1	$1,200
Containerization, Transportation, and Disposal of Decontamination Solids and PPE	EA	3,200	1	$3,200
			Subtotal Task 3	$155,003
Task 4: Institutional Controls and Dedicated Pump System for LTM				
Preparation, Implementation of Institutional Control Plan, GIS System Update	EA	20,000	1	$20,000
Installation of Dedicated Pump System - 57MW2 and 57MW3	EA	3,500	1	$3,500
			Subtotal Task 4	$23,500
			Subtotal: Tasks 1, 2, 3, and 4	$264,823
	Project Management (10%)			$26,482
	Planning Documents (7%)			$18,538
	Construction Oversight (10%)			$26,482
	Reporting (8%)			$21,186
	Public Notice (1%)			$1,324
	As Built Drawings (1%)			$2,648
	Permitting (5%)			$13,241
	Other Direct Costs (12%)			$31,779
			Total - Tasks 1, 2, 3, and 4	$406,504
	Engineering Design (3.5%)			$14,228
	Contingency (20%)			$81,301
			Total Capital Costs	**$502,032**

Table 11-2
Cost Estimate: Corrective Measures Alternative Three
Limited Soil Excavation and Offsite Disposal, Institutional Controls, Engineering Controls, and Long-Term Monitoring
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Annual O&M Costs Years 1-3

Item	Units	Unit Cost ($)	Quantity	Total ($S)
LTM: Site Maintenance/Inspections and Annual Groundwater Monitoring				
Site Inspection and Maintenance	YR	750	1	$750
Groundwater Sampling - Field Labor	EVENT	1,760	2	$3,520
Groundwater Sampling Equipment and Supplies	EVENT	222	2	$444
Per Diem	EVENT	291	2	$582
Vehicle and Fuel	EVENT	272	2	$544
Sample Cooler Shipping	EVENT	85	2	$170
Groundwater Sample Analysis (VOCs and Metals)	EA	225	6	$1,350
			Subtotal	**$7,360**
IC Review and LTM Reporting				
Annual IC Review and LTM Data Analysis and Reporting	EA	5,000	1	$5,000
			Subtotal	**$5,000**
			Subtotal Annual O&M Cost	**$12,360**
	Project Management (10.5%)			$1,298
			Total Annual O&M Cost	$13,657
	Contingency (20%)			$2,731
			Total Annual O&M Cost for Years 1-3	**$16,389**
			Total O&M Cost for Years 1-3	**$49,166**

Annual O&M Costs Years 4-30

Item	Units	Unit Cost ($)	Quantity	Total ($S)
LTM: Site Maintenance/Inspections and Groundwater Monitoring Every Three Yrs				
Site Inspection and Maintenance	YR	750	1	$750
Groundwater Sampling - Field Labor	EVENT	1,760	0.33	$581
Groundwater Sampling Equipment and Supplies	EVENT	222	0.33	$73
Per Diem	EVENT	291	0.33	$96
Vehicle and Fuel	EVENT	272	0.33	$90
Sample Cooler Shipping	EVENT	85	0.33	$28
Groundwater Sample Analysis (VOCs and Metals)	EA	225	1	$225
			Subtotal	**$1,843**
IC Review and LTM Reporting				
Annual IC Review and LTM Data Analysis and Reporting	EA	5,000	0.33	$1,650
			Subtotal	**$1,650**
			Subtotal Annual O&M Cost	**$3,493**
	Project Management (10.5%)			$367
			Total Annual O&M Cost	$3,860
	Contingency (20%)			$772
			Total Annual O&M Cost for Years 4-30	**$4,631**
			Total O&M Cost for Years 4-30	**$125,050**
			Total O&M Cost for Years 1-30	**$174,216**
			Estimated Total Cost of Alternative Three with 30 Years of O&M	**$676,249**
			Present value @4.9%	**$639,119**

Table 11-3
Cost Estimate: Corrective Measures Alternative Four
Soil Excavation and Offsite Disposal for Clean Closure
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Capital Costs

Item	Units	Unit Cost ($)	Quantity	Total ($)
Task 1: Pre Excavation Waste Characterization				
Pre Remedial Groundwater Sample Analysis - Existing Wells 57MW2 and 57MW3 (VOCs, Metals)	EA	225	4	$900
Pre Excavation - Waste Characterization TCLP metals, pH, and COD - Pond Water	EA	225	1	$225
Pre Excavation - Waste Characterization TCLP, Explosives, pH, COD - Pond Material and Soil	EA	1,366	8	$10,928
			Subtotal Task 1	$12,053
Task 2: Excavation and Site Restoration				
Contractor Mobilization	EA	5,000	1	$5,000
Decontamination Activities and Dust Suppression: includes Setup and Removal	EA	12,500	1	$12,500
Erosion and Sediment Controls	LF	4.16	900	$3,744
Remove Existing Fence Around Pond	LF	10	188	$1,880
Dewater Pond with Vacuum Truck and Transport Water to RFAAP WWTP	EA	1,200	1	$1,200
Stabilize Material in Pond Before Excavation	EA	1,000	1	$1,000
Hydraulic Excavator - 45,000 lb	MO	7,590	1	$7,590
Tractor, Crawler Bulldozer - 70 hp	MO	4,313	1	$4,313
Hydraulic Excavator Attachment, Vibratory Plate Compactor	MO	2,700	1	$2,700
Vibratory Compactor, Roller	WK	910	1	$910
Trenching Box (8' X 8' X 8') (2)	MO	2,415	1	$2,415
Equipment Operators (2)	HR	72	160	$11,520
Field Supervisor	HR	60	160	$9,600
Offsite Fill Material, Delivered	LCY	7.67	2,065	$15,839
Offsite Topsoil, Delivered	LCY	27	125	$3,375
Seeding, Vegetative Cover	SY	1.88	500	$940
Confirmatory Soil Samples for Selected Metals - Expedited Analysis	EA	240	36	$8,640
			Subtotal Task 2	$93,165
Task 3: Waste Transport/Disposal				
Non-Hazardous Soil and Material - Transportation and Disposal	TON	95	2,358	$223,067
Pump Decontamination Water into Vacuum Tanker and Transport Water to RFAAP WWTP	EA	1,200	1	$1,200
Containerization, Transportation, and Disposal of Decontamination Solids and PPE	EA	3,600	1	$3,600
			Subtotal Task 3	$227,867
Task 4: Well Abandonment				
Abandonment of Existing Wells 57MW1, 57MW2, and 57MW3	LS	4,500	1	$4,500
			Subtotal Task 4	$4,500
			Subtotal: Tasks 1, 2, 3, and 4	$337,585
	Project Management (10%)			$33,758
	Planning Documents (7%)			$23,631
	Construction Oversight (10%)			$33,758
	Reporting (8%)			$27,007
	Public Notice (1%)			$1,688
	As Built Drawings (1%)			$3,376
	Permitting (5%)			$16,879
	Other Direct Costs (12%)			$40,510
			Total - Tasks 1, 2, 3, and 4	$518,192
	Engineering Design (3.5%)			$18,137
	Contingency (20%)			$103,638
			Total Capital Costs for Alternative Four	**$639,967**

12.0 RANKING OF CORRECTIVE MEASURES ALTERNATIVES

The four corrective measures alternatives presented in Section 10.0 and evaluated in Section 11.0 are assessed in this section using a numerical ranking system. The alternatives are ranking according to the criteria discussed in Section 11.0 including effectiveness, implementability, and cost. Each selection criterion for each alternative is ranked 1 through 6. A score of 1 indicates a least favorable ranking value and a score of 5 indicates most favorable ranking value. Criteria are also weighted based on importance. Effectiveness is given a weight factor of 3, because the primary purpose of the selected alternative is to be protective of human health and the environment. Implementability is given a weight factor of 2. Costs are given a weight factor of 1 because this criterion is considered the least important for selection of an alternative. The comparative analysis and ranking for the four alternatives is presented in Table 12-1. Absent other controlling factors and considerations, the alternative with the highest total score is considered the most appropriate. A summary of the numerical ranking also is presented in the following table.

Summary of Alternatives Comparative Analysis and Numerical Ranking

Criteria	Alt. One	Alt. Two	Alt. Three	Alt. Four
Effectiveness	3	6	15	18
Implementability	2	4	12	12
Cost	6	5	3	3
Total	**11**	**15**	**30**	**33**

Based on the ranking, Alternative Four, Excavation of Soil and Offsite Disposal for Clean Closure and Unrestricted Land Use had the highest numerical ranking (33) based on its effectiveness, implementability, and cost and therefore, it is the recommended alternative for the site remedy. Section 13.0 presents information on substantiation/justification of the final recommended remedy.

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Table 12-1
Ranking Assessment of Corrective Measures Alternatives
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Alternative	Effectiveness	Implementability	Cost	Total Score
Alternative One - No Further Action	• Alternative One may not provide for future protection of human health and the environment because corrective measures are not implemented to control future land use, site access, or potential exposure to pond material or soil at the site. 3X 3 / 1	• The alternative does not include any actions which require implementation. • Admistratively, this alternative would require the regulatory community to waive risk standards and criteria and therefore, is not implementable. 2X 2 / 1	Capital Cost: $0 Annual O&M Cost: $0 Total Cost w/30 years of O&M: $0 PV @4.9%: $0 1X 6 / 6	11
Alternative Two - Institutional Controls, Engineering Controls, and Long-Term Monitoring	• ICs and maintenance of existing engineering controls would be used to meet established corrective measures objective and prevent uncontrolled human heath exposure at the site. • This alternative would not eliminate potential ecological exposure to material in the pond or surface soil outside of the pond. • This alternative would not provide for a reduction in volume, toxicity, or mobility of COCs because material would remain in place and treatment or additional containment measures would not be implemented. • Would require more restrictive ICs than Alternatives Three and Four due to material in pond and surface soil with COC concentrations above industrial remedial goals being left in place in addition to subsurface soil and material. • Long-term reliability and effectiveness is likely lower than Alternatives Three or Four because corrective measures are limited to ICs, existing engineering controls, and LTM. • Would comply with applicable waste management standards. • Short-term risks would be controlled and minimized. 3X 6 / 2	• ICs and engineering controls are well proven readily implementable technologies that are commonly used to remediate sites. • Administratively feasible and expected to be routine in terms of administrative requirements. Would not require permit modification if implemented as an interim measure. • Services and materials are readily available to implement corrective measures activities. • Implementability rated lower than Alternatives Three and Four because overall beneficial results would be lower than these alternatives. 2X 4 / 2	Capital Cost: $38,940 Annual O&M Cost: $23,019 Total Cost w/30 yrs of O&M $729,521 PV @4.9%: $396,874 1X 5 / 5	15
Alternative Three - Soil Excavation and Offsite Disposal for Industrial, Institutional Controls, and Long-Term Monitoring and Maintenance	• This alternative would achieve the established corrective measures objective and eliminate human health exposure to surface and subsurface soil for industrial land use. • Media standards and criteria would be achieved for industrial remedial goals. Constituent levels in groundwater samples collected from the site are below established remedial goals and therefore are compliant with media standards and criteria. • Would require less restrictive ICs than Alternative Two due to removal of subsurface soil with COC concentrations above industrial remedial goals. • ICs would be implemented to limit future land use to industrial. • ICs and LTM are required to maintain and ensure the long-term reliability and effectiveness of this remedy. • Would comply with applicable waste management standards. • Short-term risks would be controlled and minimized. 3X 15 / 5	• Uses well-proven and readily implementable technologies that are commonly used to remediate sites. • Administratively feasible and expected to be routine in terms of administrative requirements. Would not require permit modification if implemented as an interim measure. • Services and materials are readily available to implement corrective measures activities and site restoration. • Higher implementability than Alternatives One and Two because beneficial results would be achieved immediately after implementation with ability for industrial land use without controls. 2X 12 / 6	Capital Cost: $502,032 Annual O&M Cost (1-3): $16,389 Annual O&M Cost (4-30): $4,631 Total Cost w/30 yrs of O&M: $676,249 PV @4.9%: $639,119 1X 3 / 3	30

Table 12-1
Ranking Assessment of Corrective Measures Alternatives
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Alternative	Effectiveness	Implementability	Cost	Total Score
Alternative Four - Excavation of Soil and Offsite Disposal for Clean Closure and Unrestricted Land Use	• This alternative would exceed the established corrective measures objective and allow for unrestricted land use at the site. Potential ecological exposure to surface soil would also be eliminated. • This alternative provides for more source control and elimination than Alternative Two by excavating soil and material with COC concentrations above residential remedial goals. • Media standards and criteria would be achieved for residential remedial goals. • Unlike Alternatives Two and Three, Alternative Four would not require ICs. Constituent levels in groundwater samples collected from the site are below established remedial goals and therefore are compliant with media standards and criteria. • Would comply with applicable waste management standards. • Expected to provide for overall high long-term effectiveness and reliability. • Short-term risks would be controlled and minimized. • Effectiveness considered slightly higher than Alternative Three because CMO is exceeded and LTM would not be required. 3X 18 / 6	• Uses well-proven and readily implementable technologies that are commonly used to remediate sites. • Administratively feasible and expected to be routine in terms of administrative requirements. Would not require permit modification if implemented as an interim measure. • Services and materials are readily available to implement corrective measures activities and site restoration. • Higher implementability than Alternatives One and Two because beneficial results would be achieved immediately after implementation with ability for unrestricted land use without controls. 2X 12 / 6	Capital Cost: $639,967 Annual O&M Cost: $0 Total Cost w/30 yrs of O&M: $639,967 PV @4.9%: $639,967 1X 3 / 3	33

Notes:

Ranking Value	Weight Factor		Example	
1 - Least Favorable → 6 - Most Favorable	Effectiveness	3	10	= Score
	Implementability	2	2 X 5	= weight factor X ranking value
	Cost	1		

13.0 SUBSTANTATION/JUSTIFICATION OF FINAL REMEDY

The following CMO has been developed for SWMU 57 based on the results of the site, risk, and fate and transport assessments and the most likely future land use at the site (industrial):

- Mitigate the potential risks/hazards that have been identified for evaluated future hypothetical industrial receptors for exposure to soil (construction workers) at the site.

Five potentially applicable corrective measure technologies for the site were identified and screened in the CMS with respect to their potential effectiveness and implementability in achieving the identified CMO. Four of the five technologies were retained for development of corrective measures alternatives based on the results of the technology screening. Three corrective measures alternatives were developed from these technologies in addition to a baseline no further action alternative including:

- Alternative One: No Further Action;
- Alternative Two: Institutional Controls, Engineering Controls, and Long-Term Monitoring;
- Alternative Three: Soil Excavation and Offsite Disposal for Industrial Land Use, Institutional Controls, and Long-Term Monitoring; and
- Alternative Four: Excavation of Soil and Offsite Disposal for Clean Closure and Unrestricted Land Use.

The four alternatives were evaluated with respect to criteria specified in Attachment D of the RFAAP RCRA Permit (EPA 2000a) and criteria for evaluating corrective measures alternatives in Section IV Part E of the RCRA Corrective Plan guidance document (USEPA 1994a). Alternatives Three and Four were found to meet the established CMO, with Alternative Three allowing for future industrial use of the site without controls and Alternative Four exceeding the CMO by allowing for clean closure with unrestricted land use.

Alternative Four has been selected as the final alternative for SWMU 57 because: 1) it meets the established CMO, 2) it has the highest overall comparative ranking with approximately the same present value cost as the next highest ranked alternative (Alternative Three), which provides for future industrial land use without controls, and 3) it provides for clean closure and unrestricted land use without LTM requirements.

Corrective Measure Alternative Four will consist of the following:

- Preparation of remedial implementation plans;
- Preparation of the site for excavation activities including removal of the perimeter fence surrounding the pond, dewatering the pond as necessary, and stabilizing material in the pond before excavation;
- Excavation of the pond area and associated surrounding soil with COC concentrations above residential RGs;
- Site restoration including backfilling, final grading, and restoration of vegetative cover;
- Abandonment of existing monitoring wells; and
- Preparation of closure documentation and reports.

Implementation of Alternative Four is expected to be completed in less than six months after site mobilization. This time frame is considered an estimate and the actual time to complete the corrective measures will be subject to site-specific conditions.

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SOLID WASTE MANAGEMENT UNIT 57 (RAAP-022) RCRA FACILITY INVESTIGATION/ CORRECTIVE MEASURES STUDY REPORT

RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

FINAL
SEPTEMBER 2009

URS

CONTRACT NO.
W9128F-04-D-0001
DELIVERY ORDER NO. DA03

SOLID WASTE MANAGEMENT UNIT 57 (RAAP-022) RCRA FACILITY INVESTIGATION/ CORRECTIVE MEASURES STUDY REPORT

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APPENDIX A

PHOTOGRAPHIC LOG

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PHOTO 1: SWMU 57 looking north.

PHOTO 2: Broken terra-cotta pipe located near SWMU 57.

PHOTO 3: Unassociated aboveground piping located north of SWMU 57.

PHOTO 4: Unassociated aboveground piping located west of SWMU 57.

APPENDIX B

STANDARD OPERATING PROCEDURES

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Standard Operating Procedures

SOP SERIES	TITLE
10.0	**DOCUMENTATION**
10.1	Field Logbook
10.2	Surface Water, Groundwater, and Soil/Sediment Field Logbooks
10.3	Boring Logs
10.4	Chain-of-Custody Forms
20.0	**SUBSURFACE INVESTIGATION**
20.1	Monitoring Well Installation
20.2	Monitoring Well Development
20.3	Well and Boring Abandonment
20.11	Drilling Methods and Procedures
30.0	**SAMPLING**
30.1	Soil Sampling
30.2	Groundwater Sampling
30.7	Sampling Strategies
30.9	Collection of Soil Samples By USEPA SW-846 Method 5035 Using Disposable Samplers
40.0	**FIELD EVALUATION**
40.1	Multiparameter Water Quality Monitoring Instrument
40.2	Water Level and Well-Depth Measurements
40.3	Slug Tests
50.0	**SAMPLE MANAGEMENT**
50.1	Sample Labels
50.2	Sample Packaging
70.0	**INVESTIGATION-DERIVED MATERIAL**
70.1	Investigation-Derived Material
80.0	**DECONTAMINATION**
80.1	Decontamination
90.0	**AIR MONITORING EQUIPMENT**
90.1	Photoionization Detector (HNu Model PI-101 and HW-101)

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STANDARD OPERATING PROCEDURE 10.1
FIELD LOGBOOK

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for recording daily site investigation activities.

Records should contain sufficient information so that anyone can reconstruct the sampling activity without relying on the collector's memory.

2.0 MATERIALS

- Field Logbook;
- Indelible ink pen; and
- Clear tape.

3.0 PROCEDURE

Information pertinent to site investigations will be recorded in a bound logbook. Each page/form will be consecutively numbered, dated, and signed. All entries will be made in indelible ink, and all corrections will consist of line out deletions that are initialed and dated. If only part of a page is used, the remainder of the page should have an "X" drawn across it. At a minimum, entries in the logbook will include but not be limited to the following:

- Project name (cover);
- Name and affiliation of personnel on site;
- Weather conditions;
- General description of the field activity;
- Sample location;
- Sample identification number;
- Time and date of sample collection;
- Specific sample attributes (e.g., sample collection depth flow conditions or matrix);
- Sampling methodology (grab or composite sample);
- Sample preservation, as applicable;
- Analytical request/methods;
- Associated quality assurance/quality control (QA/QC) samples;
- Field measurements/observations, as applicable; and
- Signature and date of personnel responsible for documentation.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

USEPA. 1990. *Sampler's Guide to the Contract Laboratory Program*. EPA/540/P-90/006, Directive 9240.0-06, Office of Emergency and Remedial Response, Washington, DC.

USEPA. 1991. *User's Guide to the Contract Laboratory Program*. EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response, January.

USEPA. 1998. *EPA Requirements for Quality Assurance Project Plans.* EPA/600/R-98/018, QA/R5, Final, Office of Research and Development, Washington, D.C.

STANDARD OPERATING PROCEDURE 10.2
SURFACE WATER, GROUNDWATER, AND SOIL/SEDIMENT FIELD LOGBOOKS

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for recording surface water, groundwater, and soil/sediment sampling information, as well as instrument calibration data in field logbooks.

2.0 MATERIAL

- Applicable field logbook (see attached forms); and
- Indelible ink pen.

3.0 PROCEDURE

All information pertinent to surface water, groundwater, or soil/sediment sampling will be recorded in the appropriate logbook. Each page/form of the logbook will be consecutively numbered. All entries will be made with an indelible ink pen. All corrections will consist of line out deletions that are initialed and dated.

3.1 SOIL/SEDIMENT

3.1.1 Field Parameters/Logbook (Form 10.2-a)

1. HIGH CONCENTRATION EXPECTED?: Answer "Yes" or "No.";
2. HIGH HAZARD?: Answer "Yes" or "No.";
3. INSTALLATION/SITE: Record the complete name of the installation or site;
4. AREA: Record the area designation of the sample site;
5. INST. NAME: Record the two-letter installation name for Radford Army Ammunition Plant – "RD";
6. SAMPLE MATRIX CODE: Record the appropriate sample matrix code. Common codes are "SD" for solid - sediment, "SI" for soil - gas, "SL for solid sludge, "SO" for surface other, "SS" for solid – soil, "SW" for surface wipe, "WD" for water – potable, "WG" for water – ground, "WS" water – surface, "WT" – water treated and "WW" water -waste;
7. SITE ID: Record a code up to 20 characters or numbers that is unique to the site;
8. ENV. FIELD SAMPLE IDENTIFIER: Record a code up to 20 characters specific for the sample;
9. DATE: Enter the date the sample was taken;
10. TIME: Enter the time (12-hour or 24-hour clock acceptable as long as internally consistent) the sample was taken;
11. AM PM: Circle "AM" or "PM" to designate morning or afternoon (12-hour clock);
12. SAMPLE PROG: Record "RFI" (RCRA Facility Investigation) or other appropriate sample program;
13. DEPTH (TOP): Record the total depth sampled;
14. DEPTH INTERVAL: Record the intervals at which the plug will be sampled;
15. UNITS: Record the units of depth (feet, meters);

16. SAMPLE MEASUREMENTS: Check the appropriate sampling method;
17. CHK: Check off each container released to a laboratory;
18. ANALYSIS: Record the type of analysis to be performed on each sample container;
19. SAMPLE CONTAINER: Record the sample container type and size;
20. NO.: Record the number of containers;
21. REMARKS: Record any remarks about the sample;
22. TOTAL NUMBER OF CONTAINERS FOR SAMPLE: Record the total number of containers;
23. SITE DESCRIPTION: Describe the location where the sample was collected;
24. SAMPLE FORM: Record the form of the sample (i.e., clay, loam, etc.) using The Unified Soil Classification System (USCS);
25. COLOR: Record the color of the sample as determined from standard Munsell Color Charts;
26. ODOR: Record the odor of the sample or "none";
27. PID: Record the measured PID values or other similar measurement instrument value;
28. UNUSUAL FEATURES: Record anything unusual about the site or sample;
29. WEATHER/TEMPERATURE: Record the weather and temperature; and
30. SAMPLER: Record your name.

3.1.2 Map File Form (refer to form 10.2-c)

1. SITE ID: Record the Site ID from the field parameter form;
2. POINTER: Record the field sample number for the sample being pointed to;
3. DESCRIPTION/MEASUREMENTS: Describe the location where the sample was taken, along with distances to landmarks;
4. SKETCH/DIMENSIONS: Diagram the surroundings and record the distances to landmarks;
5. MAP REFERENCE: Record which U.S.G.S. Quad Map references the site;
6. COORDINATE DEFINITION: Write the compass directions and the X- and Y-coordinates of the map run;
7. COORDINATE SYSTEM: Write "UTM" (Universal Transverse Mercator);
8. SOURCE: Record the 1-digit code representing the Map Reference;
9. ACCURACY: Give units (e.g., write "1-M" for 1 meter);
10. X-COORDINATE: Record the X-coordinate of the sample site location;
11. Y-COORDINATE: Record the Y-coordinate of the sample site location;
12. UNITS: Record the units used to measure the map sections;
13. ELEVATION REFERENCE: Record whether topography was determined from a map or a topographical survey;
14. ELEVATION SOURCE: Record the 1-digit code representing the elevation reference;
15. ACCURACY: Record the accuracy of the map or survey providing the topographical information;

16. ELEVATION: Record the elevation of the sampling site;
17. UNITS: Write the units in which the elevation is recorded; and
18. SAMPLER: Write your name.

3.2 SURFACE WATER

3.2.1 Field Parameter Logbook (Forms 10.2-b and 10.2-c)

1. CAL REF: Record the calibration reference for the pH meter;
2. pH: Record the pH of the sample;
3. TEMP: Record the temperature of the sample in degrees Celsius;
4. COND: Record the conductivity of the water;
5. Description of site and sample conditions (refer to 10.2-b);
6. Map File Form (refer to Section 3.1.2).

3.3 GROUNDWATER (FORMS 10.2- D)

3.3.1 Field Parameter Logbook (Form 10.2.b)

Refer to Section 3.2.1.

3.3.2 Map File and Purging Forms

1. WELL NO. OR ID: Record the abbreviation appropriate for where the sample was taken. Correct abbreviations can be found on pages 18-21 of the IRDMIS User's Guide for chemical data entry;
2. SAMPLE NO.: Record the reference number of the sample;
3. WELL/SITE DESCRIPTION: Describe the location where the sample was taken, along with distances to landmarks;
4. X-COORD AND Y-COORD: Record the survey coordinates for the sampling site;
5. ELEV: Record the elevation where the sample was taken;
6. UNITS: Record the units the elevation was recorded in;
7. DATE: Record the date in the form MM/DD/YY;
8. TIME: Record the time, including a designation of AM or PM;
9. AIR TEMP.: Record the air temperature, including a designation of C or F (Celsius or Fahrenheit);
10. WELL DEPTH: Record the depth of the well in feet and inches;
11. CASING HEIGHT: Record the height of the casing in feet and inches;
12. WATER DEPTH: Record the depth (underground) of the water in feet and inches;
13. WELL DIAMETER: Record the diameter of the well in inches;
14. WATER COLUMN HEIGHT: Record the height of the water column in feet and inches;
15. SANDPACK DIAM.: Record the diameter of the sandpack. Generally, this will be the same as the bore diameter;

16. EQUIVALENT VOLUME OF STANDING WATER: Use one of the following equations to determine one equivalent volume (EV);

    1 EV = volume in casing + volume in saturated sandpack. Or:

    $1\ EV = [\pi R_w^2 h_w + 0.30p(R_s^2 - R_w^2)h_s] * (0.0043)$

Where:

R_s = radius of sandpack in inches
R_w = radius of well casing in inches
h_s = height of sandpack in inches
h_w = water depth in inches

$0.0043 = gal/in^3$

and filter pack porosity is assumed as 30%, or

Volume in casing =
$(0.0043\ gal/in^3)(p)(12\ in/ft)(R_c^2)(W_h)$

Where:

R_c = radius of casing in inches, and
W_h = water column height in feet

Vol. in sandpack =
(0.0043 gal/in3)(p)(12 in/ft)(Rb2 - Rc2)(Wh)(0.30)

(if Wh is less than the length of the sandpack), or

Vol. in sandpack =
(0.0043 gal/in3)(p)(12 in/ft)(Rb2 - Rc2)(Sh)(0.30)

(if Wh is greater than the length of the sandpack).

where:

Rb = radius of the borehole, and
Sh = length of the sandpack.

Show this calculation in the comments section.

1. PUMP RATE: Record pump rate;
2. TOTAL PUMP TIME: Record total purge time and volume;
3. WELL WENT DRY? Write "YES" or "NO";
4. PUMP TIME: Record pump time that made the well go dry;
5. VOLUME REMOVED: Record the volume of water (gal) removed before the well went dry;
6. RECOVERY TIME: Record the time required for the well to refill;

7. PURGE AGAIN?: Answer “YES” or “NO”;
8. TOTAL VOL. REMOVED: Record the total volume of water (in gallons) removed from the well;
9. CAL REF.: Record the calibration reference for the pH meter;
10. TIME: Record time started (INITIAL T(0)), 2 times DURING the sampling and the time sampling ended (FINAL);
11. pH: Record the pH at start of sampling (INITIAL), twice DURING the sampling, and at the end of sampling (FINAL);
12. TEMP: Record the water temperature (Celsius) at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
13. COND: Record the conductivity of the water at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
14. D.O.: Record the dissolved oxygen level in the water at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
15. TURBIDITY: Record the readings from the turbidity meter (nephelometer) and units at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
16. ORD: Record the oxidation/reduction (RedOx) potential of the water sample at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
17. HEAD SPACE: Record any positive readings from organic vapor meter reading taken in well headspace before sampling;
18. NAPL: Record the presence and thickness of any non-aqueous phase liquids (LNAPL and DNAPL)
19. COMMENTS: Record any pertinent information not already covered in the form; and
20. SIGNATURE: Sign the form.

3.4 FIELD CALIBRATION FORMS (REFER TO FORM 10.2-E)

1. Record time and date of calibration;
2. Record calibration standard reference number;
3. Record meter ID number;
4. Record initial instrument reading, recalibration reading (if necessary), and final calibration reading on appropriate line;
5. Record value of reference standard (as required);
6. COMMENTS: Record any pertinent information not already covered on form; and
7. SIGNATURE: Sign form.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCE

USEPA. 1991. *User's Guide to the Contract Laboratory Program*. EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response, January.

FIELD PARAMETER/LOGBOOK FORM 10.2-a
SOIL AND SEDIMENT SAMPLES

HIGH CONCENTRATION EXPECTED? _____ HIGH HAZARD?

INSTALLATION/SITE _____ AREA _____

INST NAME _____ FILE NAME _____

SAMPLE MATRIX CODE _____ SITE ID _____
ENV. FIELD SAMPLE IDENTIFIER _____

DATE (MM/DD/YY) __/__/__ TIME _____ AM PM SAMPLE PROGRAM

DEPTH (TOP) _____ DEPTH INTERVAL _____ UNIT _____

SAMPLING METHOD:

SPLIT SPOON __ AUGER __ SHELBY TUBE __ SCOOP __ OTHER

CHK	ANALYSIS	SAMPLE CONTAINER	NO.	REMARKS

TOTAL NUMBER OF CONTAINERS FOR SAMPLE_____

DESCRIPTION OF SITE AND SAMPLE CONDITIONS

SITE DESCRIPTION:_____

SAMPLE FORM _____ COLOR _____ ODOR _____

PID (HNu)_____ UNUSUAL FEATURES_____

WEATHER/TEMPERATURE

SAMPLER _____

FIELD PARAMETER/LOGBOOK FORM 10.2-b
GROUNDWATER AND SURFACE WATER SAMPLES

HIGH CONCENTRATION EXPECTED? _____ HIGH HAZARD?

INSTALLATION/SITE _____ AREA

INST CODE _____ FILE NAME _____ SITE TYPE

SITE ID _____ FIELD SAMPLE NUMBER

DATE (MM/DD/YY) __/__/__ TIME _____ AM PM SAMPLE PROG.

DEPTH (TOP) _____ DEPTH INTERVAL _____ UNITS

SAMPLING MEASUREMENTS

CAL REF. _____ pH _____ TEMPERATURE °C _____ CONDUCTIVITY _____ REDOX _____

DISSOLVED OXYGEN ____ TURBIDITY _____ OTHER

CHK	ANALYSIS	SAMPLE CONTAINER	NO.	REMARKS

TOTAL NUMBER OF CONTAINERS FOR SAMPLE_____

DESCRIPTION OF SITE AND SAMPLE CONDITIONS

SITE DESCRIPTION_____

SAMPLING METHOD_____

SAMPLE FORM _____ COLOR _____ ODOR _____

PID (HNu)_____

UNUSUAL FEATURES_____

WEATHER/TEMPERATURE_____ SAMPLER _____

EXAMPLE MAP FILE LOGBOOK FORM 10.2-c
SURFACE WATER, SOIL, AND SEDIMENT SAMPLES

SITE ID_____ POINTER_____

DESCRIPTION/MEASUREMENTS_____

SKETCH/DIMENSIONS :

MAP REFERENCE_____

COORDINATE DEFINITION (X is _____ Y is _____)

COORDINATE SYSTEM _____ SOURCE _____ ACCURACY_____

X-COORDINATE _____ Y-COORDINATE _____ UNITS_____

ELEVATION REFERENCE_____

ELEVATION SOURCE _____ ACCURACY _____ELEVATION_____

UNITS_____

SAMPLER_____

EXAMPLE MAP FILE AND PURGING LOGBOOK FORM 10.2-d
GROUNDWATER SAMPLES

WELL COORD. OR ID _____ SAMPLE NO._____

WELL/SITE DESCRIPTION_____

_____

X-COORD. _____ Y-COORD. _____ ELEV. _____ UNITS

DATE ____/____/____ TIME _____ AIR TEMP.

WELL DEPTH _____ FT. _____ IN. CASING HT. _____ FT. _____ IN.

WATER DEPTH _____ FT. _____ IN. WELL DIAMETER _____ IN.

WATER COLUMN HEIGHT _____ FT. _____ IN. SANDPACK DIAM. _____ IN.

EQUIVALENT VOLUME OF STANDING WATER _____ (GAL) (L)

VOLUME OF BAILER _____ (GAL) (L) or PUMP RATE _____ (GPM) (LPM)

TOTAL NO. OF BAILERS (5 EV) _____ or PUMP TIME _____ MIN.

WELL WENT DRY? [Yes] [No] NUM. OF BAILERS _____ or PUMP TIME

VOL. REMOVED _____ (GAL) (L) RECOVERY TIME

PURGE AGAIN? [Yes] [No] TOTAL VOL. REMOVED _____ (GAL) (L)

DATE & TIME	QUANTITY REMOVED	TIME REQ'D	pH	Cond	Temp	ORD	Turb	DO	Character of water (color / clarity / odor / partic.)
(before)									
(during)									
(during)									
(during									
(after)									

COMMENTS_____

SIGNATURE_____

EXAMPLE FIELD CALIBRATION FORM 10.2-e
FOR pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY,
ORD, AND DISSOLVED OXYGEN METERS

INITIAL CALIBRATION	FINAL CALIBRATION
DATE:	**DATE:**
TIME:	**TIME:**

pH METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

pH STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
7.0			
10.0			
4.0			

CONDUCTIVITY METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

COND. STANDARD	INITIAL READING	RECALIB. READING	FINAL READING

TEMPERATURE METER CALIBRATION

METER ID_____

TEMP. STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
ICE WATER			
BOILING WATER			
OTHER _____			

EXAMPLE FIELD CALIBRATION FORM 10.2-e
FOR pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY,
ORD, AND DISSOLVED OXYGEN METERS

TURBIDITY METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING

ORD METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING

DISSOLVED OXYGEN METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING

COMMENTS_____

SIGNATURE_____

STANDARD OPERATING PROCEDURE 10.3
BORING LOGS

1.0 INTRODUCTION

The purpose of this standard operating procedure (SOP) is to describe the methods to be followed for classifying soil and rock, as well as preparing borehole logs and other types of soil reports.

2.0 MATERIALS

The following equipment is required for borehole logging:

- HTRW ENG Form 5056-R and 5056A-R boring log forms;
- Daily inspection report forms;
- Chain-of-custody forms;
- Request for analysis forms;
- ASTM D 2488 classification flow chart;
- Soil and/or Rock color chart (i.e., Munsell®);
- Grain size and roundness chart;
- Graph paper;
- Engineer's scale;
- Previous reports and boring logs;
- Pocketknife or putty knife;
- Hand lens;
- Dilute hydrochloric acid (10% volume);
- Gloves;
- Personal protective clothing and equipment, as described in work plan addenda health and safety plan;
- Photoionization detector or other appropriate monitoring equipment per site-specific health and safety plan; and
- Decontamination supplies (SOP 80.1).

3.0 PROCEDURE

Each boring log should fully describe the subsurface environment and the procedures used to obtain this description.

Boring logs should be prepared in the field on USACE Engineer Form 5056-R and 5056-R. Logs should be recorded in the field directly on the boring log form and not transcribed from a field book.

A “site geologist” should conduct borehole logging and soil/rock identification and description or other professional trained in the identification and description of soil/rock.

3.1 BORING LOG INFORMATION

As appropriate, the following information should be recorded on the boring log during the course of drilling and sampling activities:

- Project information including name, location, and project number;
- Each boring and well should be uniquely numbered and located on a sketch map as part of the log;
- Type of exploration;
- Weather conditions including events that could affect subsurface conditions;
- Dates and times for the start and completion of borings, with notations by depth for crew shifts and individual days;
- Depths/heights in feet and in decimal fractions of feet;
- Descriptions of the drilling equipment including rod size, bit type, pump type, rig manufacturer and model, and drilling personnel;
- Drilling sequence and descriptions of casing and method of installation;
- Description and identification of soils in accordance with ASTM Standard D 2488;
- Descriptions of each intact soil sample for the parameters identified in Section 3.2;
- Descriptions and classification of each non-intact sample (e.g., wash samples, cuttings, auger flight samples) to the extent practicable;
- Description and identification of rock;
- Description of rock (core(s)) for the parameters identified in Section 3.7;
- Scaled graphic sketch of the rock core (included or attached to log) according to the requirements identified in Section 3.7;
- Lithologic boundaries, with notations for estimated boundaries;
- Depth of water first encountered in drilling, with the method of first determination (any distinct water level(s) below the first zone will also be noted);
- Interval by depth for each sample taken, classified, and/or retained, with length of sample recovery and sample type and size (diameter and length);
- Blow counts, hammer weight, and length of fall for driven samplers;
- Rate of rock coring and associated rock quality designation (RQD) for intervals cored;
- Drilling fluid pressures, with driller’s comments;
- Total depth of drilling and sampling;
- Drilling fluid losses and gains should be recorded;
- Significant color changes in the drilling fluid returned;
- Soil gas or vapor readings with the interval sampled, with information on instrument used and calibration;

- Depth and description of any in-situ test performed; and
- Description of other field tests conducted on soil and rock samples.

3.2 SOIL PARAMETERS FOR LOGGING

In general, the following soil parameters should be included on the boring log when appropriate:

- Identification per ASTM D 2488 with group symbol;
- Secondary components with estimated percentages per ASTM D 2488;
- Color;
- Plasticity per ASTM D 2488;
- Density of non-cohesive soil or consistency of cohesive soil;
- Moisture condition per ASTM D 2488 (dry, moist, or wet);
- Presence of organic material;
- Cementation and HCL reaction testing per ASTM D 2488;
- Coarse-grained particle description per ASTM D 2488 including angularity, shapes, and color;
- Structure per ASTM D 2488 and orientation;
- Odor; and
- Depositional environment and formation, if known.

ASTM D 2488 categorizes soils into 13 basic groups with distinct geologic and engineering properties based on visual-manual identification procedures. The following steps are required to classify a soil sample:

1. Observe basic properties and characteristics of the soil. These include grain size grading and distribution, and influence of moisture on fine-grained soil.
2. Assign the soil an ASTM D 2488 classification and denote it by the standard group name and symbol.
3. Provide a written description to differentiate between soils in the same group if necessary.

Many soils have characteristics that are not clearly associated with a specific soil group. These soils might be near the borderline between groups, based on particle distribution or plasticity characteristics. In such a case, assigning dual group names and symbols (e.g., GW/GC or ML/CL) might be an appropriate method of describing the soil. The two general types of soils, for which classification is performed, coarse- and fine-grained soils, are discussed in the following sections.

3.3 COURSE-GRAINED SOIL IDENTIFICATION

For soils in the coarse-grained soils group, more than half of the material in the soil matrix will be retained by a No. 200 sieve (75-μm).

1. Coarse-grained soils are identified on the basis of the following:
   a) Grain size and distribution;
   b) Quantity of fine-grained material (i.e., silt and clay as a percentage); and

c) Character of fine-grained material.

2. The following symbols are used for classification:

Basic Symbols			Modifying Symbols
G	=	gravel	W = well graded
S	=	sand	P = poorly graded
			M = with silty fines
			C = with clayey fines

3. The following basic facts apply to coarse-grained soil classification.

- The basic symbol G is used if the estimated percentage of gravel is greater than that for sand. In contrast, the symbol S is used when the estimated percentage of sand is greater than the percentage of gravel.
- Gravel ranges in size from 3-inch to 1/4-inch (No. 4 sieve) diameter. Sand ranges in size from the No. 4 sieve to No. 200 sieve. The Grain Size Scale used by Engineers (ASTM Standard D 422-63) is the appropriate method to further classify grain size as specified by ASTM D 2488.
- Modifying symbol W indicates good representation of all particle sizes.
- Modifying symbol P indicates that there is an excess or absence of particular sizes.
- The symbol W or P is used only when there are less than 15% fines in a sample.
- Modifying symbol M is used if fines have little or no plasticity (silty).
- Modifying symbol C is used if fines have low to high plasticity (clayey).

Figure 10.03a is a flowchart for identifying coarse-grained soils by ASTM D 2488.

3.4 FINED-GRAINED SOIL IDENTIFICATON

If one-half or more of the material will pass a No. 200 sieve (75 μm), the soil is identified as fine-grained.

1. Fine-grained soils are classified based on dry strength, dilatancy, toughness, and plasticity.
2. Classification of fine-grained soils uses the following symbols:

Basic Symbols			Modifying Symbols		
M	=	silt (non plastic)	L	=	low liquid limit (lean)
C	=	clay (plastic)	H	=	high liquid limit (fat)
O	=	organic			
Pt	=	peat			

3. The following basic facts apply to fine-grained soil classification:
   - The basic symbol M is used if the soil is mostly silt, while the symbol C applies if it consists mostly of clay.
4. Use of symbol O (group name OL/OH) indicates that organic matter is present in an amount sufficient to influence soil properties. The symbol Pt indicates soil that consists mostly of organic material.

- Modifying symbols (L and H) are based on the following hand tests conducted on a soil sample:

  — Dry strength (crushing resistance).

— Dilatancy (reaction to shaking).

— Toughness (consistency near plastic limit).

- Soil designated ML has little or no plasticity and can be recognized by slight dry strength, quick dilatency, and slight toughness.
- CL indicates soil with slight to medium plasticity, which can be recognized by medium to high dry strength, very slow dilatancy, and medium toughness.

Criteria for describing dry strength per ASTM D 2488 are as follows:

Description	Criteria
None	Dry sample crumbles into powder with pressure of handling
Low	Dry specimen crumbles into powder with some finger pressure
Medium	Dry specimen breaks into pieces or crumbles with considerable finger pressure
High	Dry specimen cannot be broken with finger pressure but will break into pieces between thumb and a hard surface
Very high	Dry specimen cannot be broken between the thumb and a hard surface stiffness

Criteria for describing dilatancy per ASTM D 2488 are as follows:

None	No visible change in the sample
Slow	Water appears slow on the surface of the sample during shaking and does not disappear or disappears slowly upon squeezing
Rapid	Water appears quickly on the surface of the sample during shaking and disappears quickly upon squeezing

Criteria for describing toughness per ASTM D 2488 are as follows:

Description	Criteria
Low	Only slight pressure is required to roll the thread near the plastic limit and the thread and lump are weak and soft
Medium	Medium pressure is required to roll the thread to near the plastic limit and the thread and lump have medium stiffness
High	Considerable pressure is required to roll the thread to near the plastic limit and the thread and lump have very high stiffness

Figure 10.03b is a flowchart for identifying fine-grained soils by ASTM D 2488.

3.5 DENSITY AND CONSISTENCY

Relative density for coarse-grained soils and consistency for fine-grained soils can be estimated using standard penetration test blow count data (ASTM D 1586). The number of blows required for each 6 inches of penetration or fraction thereof is recorded. If the sampler is driven less than 18 inches, the number of blows per each complete 6-inch interval and per partial interval is recorded.

For partial increments, the depth of penetration should be recorded to the nearest 1 inch. If the sampler advances below the bottom of the boring under the weight of rods (static) and/or hammer, then this information should be recorded on the log.

The following are some "rule-of-thumb" guidelines for describing the relative density of coarse-grained soils:

Blow Count	Relative Density for Sand
0–4	Very loose
4–10	Loose
10–30	Medium dense
30–50	Dense
>50	Very Dense

The following are some "rule-of-thumb" guidelines for describing the consistency of fine-grained soils:

Blow Count	Consistency for Clays	Description
0–2	Very Soft	Sample sags or slumps under its own weight
2–4	Soft	Sample can be pinched in two between the thumb and forefinger
4–8	Medium Stiff	Sample can be easily imprinted with fingers
8–16	Stiff	Sample can be imprinted only with considerable pressure of fingers
16–32	Very Stiff	Sample can be imprinted very slightly with fingers
>32	Hard	Sample cannot be imprinted with fingers; can be pierced with pencil

3.6 OTHER DESCRIPTIVE INFORMATION

The approximate percentage of gravel, sand, and fines (use a percentage estimation chart) should be recorded per ASTM D 2488 as follows:

Modifiers	Descriptions
Trace	Less than 5%
Few	5%–10%
Little	15%–25%
Some	30%–45%
Mostly	50%–100%

Color/discoloration should be recorded and described using a soil color chart, such as the Munsell® Soil Color Charts. A narrative and numerical description should be given from the color chart, such as Brown 10 YR, 5/3 (Munsell®). Odor should be described if organic or unusual.

Plasticity should be described as follows:

Description	Criteria
Non-plastic	A 1/8-inch thread cannot be rolled at any water content
Low	Thread can barely be rolled and lump cannot be formed when drier than plastic limit.
Medium	Thread is easy to roll; plastic limit can be reached with little effort and lump crumbles when drier than plastic limit.

High	Considerable time is required to reach the plastic limit and lump can be formed without crumbling when drier than plastic limit

Moisture condition should be recorded as dry (absence of moisture), moist (damp but no visible water) or wet (visible free water).

Cementation should be recorded (carbonates or silicates) along with the results of HCL reaction testing. The reaction with HCL should be described as none (no visible reaction), weak (some reaction with slowly forming bubbles) or strong (violent reaction with bubbles forming immediately).

Particle description information for coarse-grained soil should be recorded where appropriate per ASTM D 2488 including maximum particle size, angularity (angular, subangular, subrounded, or rounded), shape (flat, elongated or flat and elongated), and color.

Structure (along with orientation) should be reported using the following ASTM D 2488 descriptions:

Description	Criteria
Stratified	Alternating layers of varying material or color with layers greater than 6 millimeters thick
Laminated	Alternating layers of varying material or color with layers less than 6 millimeters thick
Fissured	Breaks along definite planes of fracture with little resistance
Slickensided	Fracture planes that appear polished or glossy, can be striated
Blocky	Inclusion of small pockets of different soils
Homogeneous	Same color and appearance throughout

3.7 ROCK CORE PARAMETERS FOR LOGGING

In general, the following parameters should be included on the boring log when rock coring is conducted:

- Rock type;
- Formation;
- Modifier denoting variety;
- Bedding/banding characteristics;
- Color;
- Hardness;
- Degree of cementation;
- Texture;
- Structure and orientation;
- Degree of weathering;
- Solution or void conditions;
- Primary and secondary permeability including estimates and rationale; and
- Lost core interval and reason for loss.

A scaled graphic sketch of the core should provided on or attached to the log, denoting by depth, location, orientation, and nature (natural, coring-induced, or for fitting into core box) of all core breaks. Where fractures are too numerous to be shown individually, their location may be drawn as a zone.

The RQD values for each core interval (run) should be calculated and included on the boring log. The method of calculating the RQD is as follows per ASTM D 6032:

RQD = [Σ length of intact core pieces > 100 mm (4-inches)] x 100%/total core length.

3.8 PROCEDURES FOR ROCK CLASSIFICATION

For rock classification record mineralogy, texture, and structural features (e.g., biotite and quartz fine grains, foliated parallel to relict bedding oriented 15 to 20 degrees to core axis, joints coated with iron oxide). Describe the physical characteristics of the rock that are important for engineering considerations such as fracturing (including minimum, maximum, and most common and degree of spacing), hardness, and weathering.

1. The following is to be used as a guide for assessing fracturing:

AEG Fracturing	Spacing
Crushed	up to 0.1 foot
Intense	0.1–0.5 foot
Moderate	0.5 foot–10 feet
Slight	1.0 foot–3.0 feet
Massive	>3.0 feet

2. Record hardness using the following guidelines:

Hardness	Criteria
Soft	Reserved for plastic material
Friable	Easily crumbled by finger pressure
Low	Deeply gouged or carved with pocketknife
Moderate	Readily scratched with knife; scratch leaves heavy trace of dust
Hard	Difficult to scratch with knife; scratch produces little powder and is often faintly visible
Very Hard	Cannot be scratched with knife

3. Describe weathering using the following guidelines:

Weathering	Decomposition	Discoloration	Fracture Condition
Deep	Moderate to complete alteration of minerals feldspars altered to clay, etc.	Deep and thorough	All fractures extensively coated with oxides, carbonates, or clay
Moderate	Slight alteration of minerals, cleavage	Moderate or localized and	Thin coatings or stains

	surface lusterless and stained	intense	
Weak	No megascopic alteration of minerals	Slight and intermittent and localized	Few strains on fracture surfaces
Fresh	Unaltered, cleavage, surface glistening		

3.9 PROCEDURE FOR LOGGING REFUSE

The following procedure applies to the logging of subsurface samples composed of various materials in addition to soil as may be collected from a landfill or other waste disposal site.

1. Observe refuse as it is brought up by the hollow stem auger, bucket auger, or backhoe.

2. If necessary, place the refuse in a plastic bag to examine the sample.

3. Record observations according to the following criteria:

   - Composition (by relative volume), e.g., paper, wood, plastic, cloth, cement, or construction debris. Use such terms as "mostly" or "at least half." Do not use percentages;
   - Moisture condition: dry, moist, or wet;
   - State of decomposition: highly decomposed, moderately decomposed, slightly decomposed, etc.;
   - Color: obvious mottling and/or degree of mottling;
   - Texture: spongy, plastic (cohesive), friable;
   - Odor;
   - Combustible gas readings (measure down hole and at surface); and
   - Miscellaneous: dates of periodicals and newspapers, ability to read printed materials, degree of drilling effort (easy, difficult, and very difficult).

3.10 SUBMITTAL REQUIREMENTS

Each original boring log should be submitted to the Contracting Officer Representative (CRO) after completion of the boring. When a monitoring well will be installed in a boring, the boring log and well installation diagram should be submitted together.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Not applicable.

6.0 REFERENCES

ASTM Standard D 422-63 (2002)e1. 2002. *Standard Test Method for Particle-Size Analysis of Soils.*

ASTM Standard D 1586–99 (1999). 1999. *Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.*

ASTM Standard D 2488-06. 2006. *Standard Practice for Description and Identification of Soils Visual-Manual Procedure).*

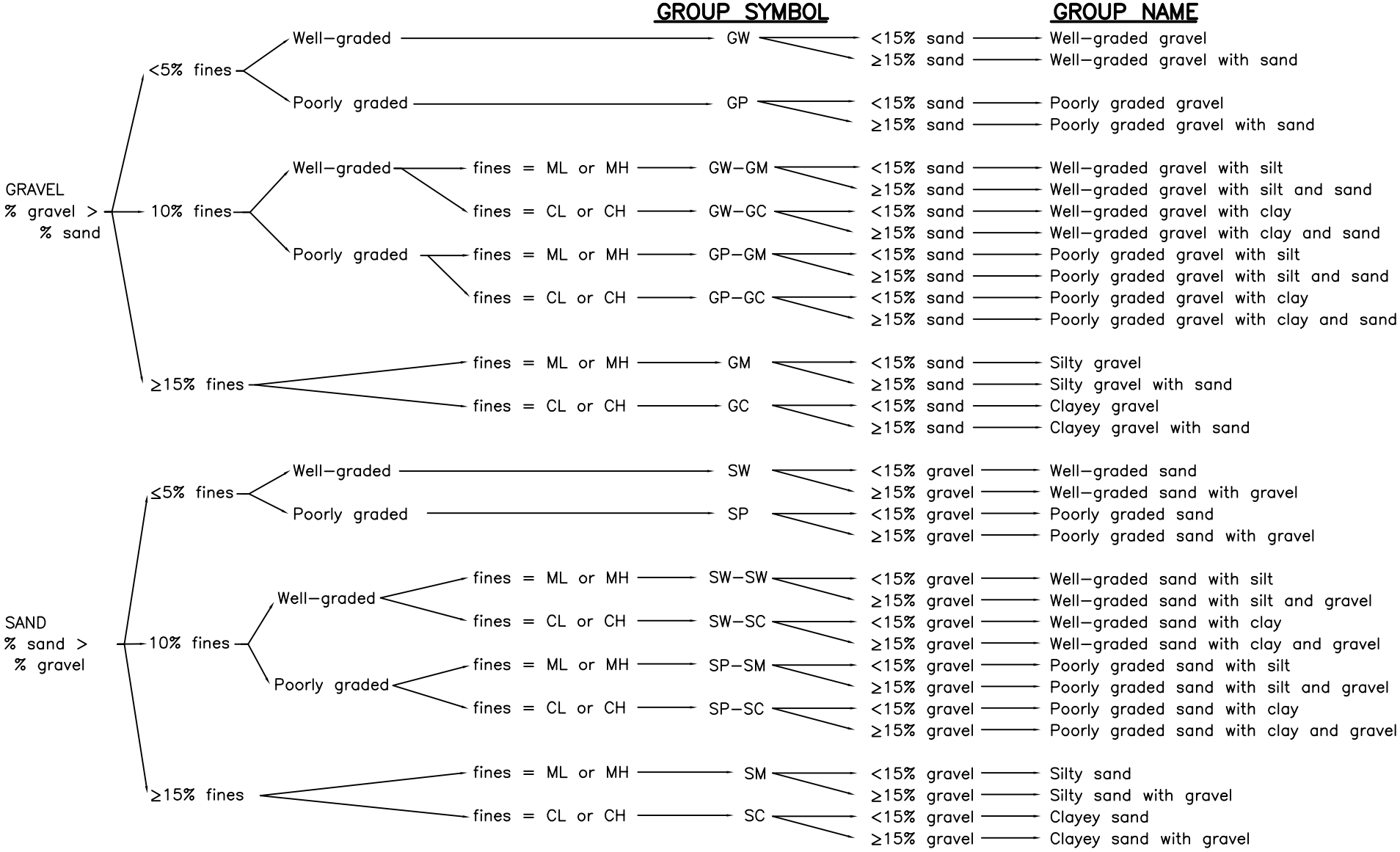
ASTM Standard D 5434-03. 2003. *Guide for Field Logging of Subsurface Explorations of Soil and Rock.*

ASTM Standard D 6032-02 (2006). 2006. *Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Core.*

Compton, R. R. 1962. *Manual of Field Geology.* John Wiley & Sons, Inc., New York.

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000, 1, November.

U.S. Department of the Interior. 1989. *Earth Manual.* Water and Power Resources Service, Washington, DC.



NOTE: PERCENTAGES ARE BASED ON ESTIMATING AMOUNTS OF FINES, SAND, AND GRAVEL TO THE NEAREST 5%.

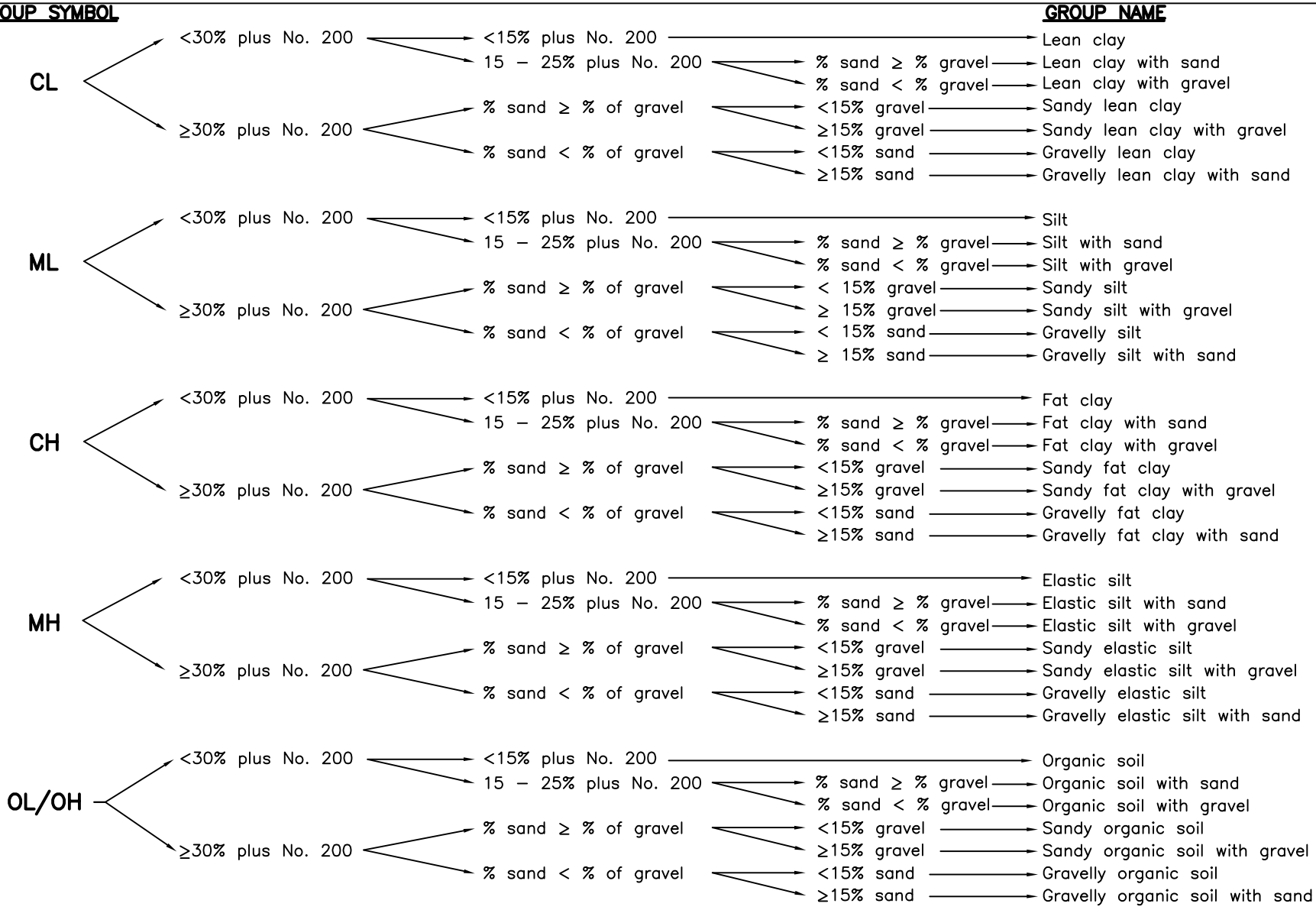
SOURCE: ASTM D 2488

Radford Army Ammuntion Plant

FIGURE 10.03a

FLOW CHART FOR IDENTIFYING COARSE-GRAINED SOILS

Date: *October 2007*	**Prepared By:** *DBC/TLD*
Scale: *N.T.S.*	**File Name:** *SOP Figure 10.03a_Coarse*



NOTE: PERCENTAGES ARE BASED ON ESTIMATING AMOUNTS OF FINES, SAND, AND GRAVEL TO THE NEAREST 5%.

SOURCE: ASTM D 2488

Radford Army Ammuntion Plant	
Date: *October 2007*	**Prepared By:** *DBC/TLD*
Scale: *N.T.S.*	**File Name:** *SOP Figure 10.03b_Fine*

FIGURE 10.03b

FLOW CHART FOR IDENTIFYING FINE-GRAINED SOILS

STANDARD OPERATING PROCEDURE 10.4
CHAIN-OF-CUSTODY FORM

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for use of the chain-of-custody form. An example is provided as part of this SOP. Other formats with similar levels of detail are acceptable.

2.0 MATERIALS

- Chain-of-custody form; and
- Indelible ink pen.

3.0 PROCEDURE

1. Record the project name and number.
2. Record the project contact's name and phone number.
3. Print sampler's names in "Samplers" block.
4. Enter the Field Sample No.
5. Record the sampling dates for all samples.
6. List the sampling times (military format) for all samples.
7. Indicate, "grab" or "composite" sample with an "X."
8. Record matrix (e.g., aqueous, soil).
9. List the analyses/container volume across top.
10. Enter the total number of containers per Field Sample No. in the "Subtotal" column.
11. Enter total number of containers submitted per analysis requested.
12. State the carrier service and airbill number, analytical laboratory, and custody seal numbers.
13. List any comments or special requests in the "Remarks" section.
14. Sign, date, and time the "Relinquished By" section when the cooler is relinquished to the next party.
15. Upon completion of the form, retain the shipper copy and place the forms and the other copies in a zip seal bag to protect from moisture. Affix the zip seal bag to the inside lid of the sample cooler to be sent to the designated laboratory.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

USEPA. 1990. *Sampler's Guide to the Contract Laboratory Program.* EPA/540/P-90/006, Directive 9240.0-06, Office of Emergency and Remedial Response, Washington, DC, December 1990.

USEPA. 1991. *User's Guide to the Contract Laboratory Program..* EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response, January 1991.

USEPA. 1998. *EPA Requirements for Quality Assurance Project Plans.* EPA/600/R-98/018, QA/R5, Final, Office of Research and Development, Washington, D.C.

FIGURE 10.4-a
EXAMPLE CHAIN-OF-CUSTODY FORM

Project Number	Project Name				Matrix	A N A L Y S E S									LAB :
Project Contact (Name and Phone Number)															AIRBILL No:
Samplers:															Courier:
Field Sample No.	Date (MM-DD-YY)	Time	Comp	Grab										Subtotal	REMARKS
TOTAL															

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Relinquished by:	Date/time	Received by: (for lab)	Date/Time	Remarks	

STANDARD OPERATING PROCEDURE 20.1
MONITORING WELL INSTALLATION

1.0 SCOPE AND APPLICATION

The installation of monitoring wells is contingent upon the existing conditions at the project site. The purpose of this standard operating procedure (SOP) is to delineate the quality control measures required to ensure the accurate installation of monitoring wells. For a particular site investigation, the associated work plan addenda should be consulted for specific installation instructions. The term "monitoring wells", as used herein is defined to denote any environmental sampling well.

2.0 MATERIALS

2.1 DRILLING EQUIPMENT

- Appropriately sized drill rig adequately equipped with augers, bits, drill stem, etc;
- Steam cleaner and approved source water for decontamination of drilling equipment, etc.;
- Source of approved water;
- Photoionization detector or other appropriate monitoring instrument per the site-specific Health and Safety plan;
- Water level indicator (electrical);
- Weighted steel tape measure;
- Steel drums and other appropriate containers for investigation-derived materials (drill cuttings, contaminated PPE, decontamination solutions, etc.);
- Absorbent pads and/or logs;
- Personal protective equipment and clothing (PPE) per site-specific health and safety plan; and
- Decontamination supplies, pad with heavy plastic sheeting (SOP 80.1).

2.2 WELL INSTALLATION MATERIALS

Technical information on all installed materials (screens, riser pipe, filter pack, bentonite, cement, etc.) and representative samples of the proposed filter pack will be supplied to the Contracting Officer's Representative (COR) before initiating well installation.

Well screen slot size and filter pack gradation will be determined based on existing site geology before initiating site-specific investigations.

- Well screen :

  Polyvinyl Chloride (PVC): JOHNSON (or equivalent); PVC commercially slotted continuous slot, wire wrapped screen; 4-in. diameter.; SCH 40; SCH 80; flush-threaded (leak-proof) joints; PVC should conform to National Sanitation Foundation (NSF) Standard 14 for potable water usage or ASTM Standard Specification F 480 and bear the appropriate rating logo. PVC should be free of ink markings, cleaned, and prepackaged by manufacturer;

Stainless Steel: JOHNSON (or equivalent); stainless steel Vee-Wire continuous slot, wire wrapped screen; 304 stainless steel (unless the sum concentration of Cl^-, F^-, and Br^- is <1000 ppm, case type 316 should be used); ASTM F 480 flush threads; cleaned, wrapped, and heat-sealed by manufacturer;

- Riser pipe:
  - — PVC: JOHNSON (or equivalent); STD. PVC; 4-in. diameter.; SCH 40; SCH 80; flush-threaded (leak-proof) joints; PVC should conform to NSF Standard 14 or F 480; free of ink markings; cleaned and prepackaged by manufacturer;
  - — Stainless Steel: JOHNSON (or equivalent); SCH 5; 304 stainless steel; ASTM type A312 material; 4-in. diameter.; cleaned, wrapped and heat-sealed by manufacturer;
- Plugs/Caps: JOHNSON (or equivalent); standard PVC or stainless steel;
- Filter pack: MORIE, clean sorted gravel (or equivalent);
- Bentonite seal: BAROID, bentonite pellets (3/8-in. diameter.);
- Cement: Type II Portland Cement; if sulfate concentrations are higher than 1500 ppm, Type IV Portland Cement will be used;
- Bentonite powder: BAROID, Aquagel Gold Seal;
- Steel Protective Casing: BRAINARD-KILMAN (or equivalent) zinc-plated steel, lockable, painted;
- Containers for purged water, as required;
- Submersible pump or bailer of appropriate capacity, and surge block sized to fit well;
- Hach DREL 2000 portable laboratory (or equivalent);
- Multiprobe Electronic Water Quality Recorder (Hydrolab);
- Electric well sounder and measuring tape;
- Portland Type II cement (see footnote); and
- Steel Posts (pickets), painted (see footnote).

2.3 DOCUMENTATION

- Copy of work plans and health and safety plan;
- Copy of USACE EM 110-1-4000 Monitoring Well Requirements;
- Copies of permits (area entry, hot work, well, and utility clearance);
- Boring log forms;
- Well completion diagram form; and
- Field logbook.

2.4 GEOLOGIST'S PERSONAL EQUIPMENT

- Boring log materials per SOP 10.3; and
- Personal protective equipment and clothing (PPE) as required by the site-specific health and safety plan.

3.0 PROCEDURE

3.1 MATERIALS APPROVAL

3.1.1 Source Water

Water sources for drilling, grouting, sealing, filter pack placement, well installation, and equipment decontamination must be approved by the COR before arrival of the drilling equipment. Information required for the water source includes:

- Water source;
- Manufacturer/owner and their address and telephone number;
- Type of treatment and filtration prior to tap;
- Time of access;
- Cost per gallon (if applicable); and
- Dates and results associated with all available chemical analyses over the past 2 years, and the name and address of the analytical laboratory (if applicable).

3.1.2 Bentonite

Pure sodium bentonite with no additives (bentonite) will be the only drilling fluid additive allowed, and its use must be approved by the COR before the arrival of the drilling equipment. The information required for evaluation includes brand name, manufacturer, manufacturer's address and telephone number, product description, and intended use for the product, and potential effects on chemical analysis of water samples.

3.1.3 Granular Filter Pack

Granular filter pack material must be approved by the COR before drilling. A one-pint representative sample must be supplied to the COR. Information required includes lithology, grain size distribution, brand name, source, processing method, and size of intended screen.

3.1.4 Cement

Portland Type II cement will be used for grout (or Type IV, as noted in Section 2.2).

3.2 DRILLING

The objective of the selected drilling technique used at given site is to ensure that the drilling method provides representative data while minimizing subsurface contamination, cross contamination, and drilling costs.

Drilling methods that are appropriate for boring or monitoring well installation will depend on the subsurface geology most likely to be encountered in the boring. The geology for each site should be determined by reviewing previous investigation data (boring data, geophysics, etc.) from the site or nearby areas. Specific drilling methods that will be used to support site activities will be incorporated into work plan addenda.

Section 5.2.2 of the Master Work Plan discusses the different drilling methods that may be appropriate for installation of monitoring wells at the Radford Army Ammunition Plant (RFAAP) based on the different types of conditions encountered. The different drilling methods discussed in this section of the Master Work Plan including:

- Hollow Stem Auger (for soil);

- Air Rotary (soil and rock);
- Water Rotary and wire-line casing advancement (soil and rock);
- Drill-Through-Casing Driver (soil and rock); and
- Sonic (soil and rock).

3.2.1 Responsibilities of the Site Geologist

A Site Geologist will be present during all well drilling and installation activities and will fully characterize all tasks performed in support of these activities in the monitoring well logbook. The Site Geologist will be responsible for the logging samples, monitoring drilling operations, recording water losses/gains and groundwater data, preparing the boring logs and well diagrams, and recording the well installation procedures for one operating rig. The Site Geologist will have sufficient equipment in operable condition on-site to perform efficiently his/her duties.

3.2.2 Additives

No lubricants will be used on down hole drilling equipment. Additives containing either lead or copper will not be allowed. In addition, polychlorinated biphenyls will not be permitted in hydraulic fluids or other fluids used in the drilling rig, pumps, or other field equipment and vehicles.

Surface runoff or other fluids will not be allowed to enter any boring or well during or after drilling/construction.

Antifreeze used to keep equipment from freezing will not contain rust inhibitors and sealants. Antifreeze is prohibited in any areas in contact with drilling fluid. Absorbent pillows will be placed to catch any obvious leaks from the drill rig.

3.2.3 Boring Logs and Field Notes

Borings for monitoring wells will be logged by a geologist as described in SOP 10.3. Logs will be recorded on USACE HTRW ENG Form 5056-R and 5056A-R boring log forms.

Daily investigation activities at the site related to drilling should be recorded in field logbooks as described in SOPs 10.1 and 10.2.

3.3 WELL CONSTRUCTION AND INSTALLATION

Specifications for monitoring well construction and installation for a given site being investigated are to be included in work plan addenda. In case the previously defined criteria have not been met before the depth range for a given hole is reached, the geologist will stop the drilling and confer with the supervisor. The current boring conditions (depth, nature of the stratigraphic unit, and water-table depth) will be compared to those of other wells nearby to decide whether to continue drilling or to terminate and complete the well.

3.3.1 Overburden Wells

Overburden wells at the RFAAP are typically designed as a 4-inch diameter, single cased well (see Figure 20-1a) installed into a surficial aquifer, which is present above bedrock. For this type of well, the well boring would be terminated before penetrating any underlying confining unit and/or bedrock.

Section 5.2.2 of the Master Work Plan discusses the different drilling methods that may be appropriate for installation of overburden wells.

If dense, non-aqueous liquid (DNAPL) is encountered during drilling, the well boring will be terminated and completed at the base of the overburden aquifer being monitored.

3.3.2 Bedrock Wells

Multi-cased wells or wells with an outer casing installed into competent bedrock should be specified for wells that are designed to monitor groundwater within bedrock (see Figure 20-1c). The installation of a multi-cased well or outer casing will isolate the zone(s) monitored from overburden and will minimize the potential for cross-contamination during and after drilling.

The general procedure to be followed for installation of a multi-cased well is as follows. This procedure assumes the installation of a 4-inch diameter monitoring well. Specific procedures, drilling techniques and design of monitoring wells will be presented in work plan addenda for site-specific investigations.

1. If soil sampling is required within overburden, use appropriate drilling techniques to advance the boring and collect the soil samples.

2. A minimum 10-inch drill bit should be advanced from the surface into competent bedrock a distance not less than 2 feet. A drilling technique appropriate for penetrating overburden and bedrock should be used such as air rotary.

3. After the borehole has been advanced to the target depth within competent bedrock, a 6-inch diameter steel or Schedule 80 PVC outer casing should be lowered to the bottom of the boring.

4. Once the outer casing has been lowered to the bottom of the boring, the casing should be grouted in-place using a decontaminated tremie pipe equipped with a side discharge. The annulus between the outer casing and borehole wall will be injected with grout until undiluted grout reaches the surface.

5. The grouting mixture, specification, and placement should be consistent with the requirements identified in Section 3.3.8.

6. The grout should be allowed to cure a minimum of 24 hours before further drilling.

7. After adequate curing time for outer casing, drilling with a 5-5/8-inch bit until the desired total depth is reached should complete the well boring.

8. Once the well boring is completed, an appropriate bedrock well will be constructed based on site-specific conditions. The types of wells that may be installed may include a constructed well with screen, casing, filter pack, seal, and grout; an open-bedrock well; or a lined open bedrock well (see Section 3.3.3).

3.3.3 Well Screen Usage

Well screen usage for a given site should be specified in work plan addenda based on expected site conditions.

In general, wells installed within overburden will be installed with a screen as per Figure 20.01-a or 20.01-b. Bedrock wells may be installed with or without a screen depending on site specific conditions such as the depth of water bearing zones, stability of bedrock, occurrence of karst zones, and construction of existing wells at the site being investigated.

In general, bedrock wells installed within karst zones will be completed as open-hole construction (see Figure 20.01c). If evidence of potential or severe borehole collapse (unstable bedrock) is indicated during drilling, casing and screen will be installed in the borehole as a removable lining. If desired, multiple flow zones may be monitored in an open bedrock well by installing a multiport well, which has monitoring/sampling intervals sealed off from the rest of the boring and from each other by packers.

3.3.4 Beginning Well Installation

Schedule

Monitoring well installation should begin within 12 hours of boring completion for holes that are uncased or partially cased with temporary drill casing. In the case where a partially cased hole into bedrock is to be partially developed prior to well insertion, the well installation should begin within 12 hours of this initial development. For holes that are fully cased, installation should begin within 48 hours. Once begun, well installation should not be interrupted.

Placement of Materials

Temporary casing and hollow stem augers may be removed from the boring prior to well installation if the potential for cross contamination is low and if the borehole will remain stable during the time required for installation.

Where borehole conditions are unstable, some or all of the well materials may need to be installed prior to removal of the temporary casing or hollow stem augers. The casing or hollow stem augers should have an inside diameter sufficient to allow the installation of the screen and casing plus annular space for a pipe through which to place filter pack and grout.

Any materials blocking the bottom of the drill casing or hollow stem auger should be dislodged and removed from the casing prior to well insertion.

3.3.5 Screens, Casing, and Fittings

Borehole Specifications

The borehole for each well should be of sufficient diameter to provide for at least 2 inches of annular space between the borehole wall and all sides of the casing.

Well Screens

Material specifications for well screens, casings, and fittings are discussed in Section 2.2.
Screen bottoms should be securely fitted with a threaded cap or plug of the same composition as the screen. The cap/plug should be within 0.5 feet of the open portion of the screen. A sediment trap/sump will not be used.

Screen slot size will be appropriately sized to retain 90%–100% of the filter pack material, the size of which will be determined by sieve analysis of formation material.

Well screen lengths should be specified in work plan addenda and will be based on various site-specific factors such as environmental setting, subsurface conditions, analytes of concern, regulatory considerations, etc.

Assembly and Placement of Well Screen and Casing

Personnel should take precautions to assure that grease, oil, or other contaminants do not contact any portion of the well screen and casing assembly. Clean latex or nitrile gloves should be worn when handling the screen and casing assembly. Flush, threaded joints usually can be tightened by hand. If necessary, steam cleaned wrenches may be used to tighten joints.

In general, each section of the well assembly is lowered into the borehole, one section at a time, screwing each section securely into the section below it. No grease, lubricant, polytetrafluoroethylene (PTFE) tape, or glue may be used in joining the sections of screen and casing.

The assembly should be lowered to its predetermined level and held in position for placement of the filter pack. It is essential that the assembly be installed straight (with centralizers as appropriate) to allow for appropriate sampling. Buoyant forces associated with fluids in the borehole may require that the assembly be installed with the aid of hydraulic rams of the drill rig. When the well assembly is placed to predetermined level, a temporary cap should be place on the well to prevent foreign material from entering the well.

The bottoms of well screens should be placed no more than 3 feet above the bottom of the drilled borehole. If significant overdrilling is required, a pilot boring should be used. Sufficient filter pack should be placed at the bottom of the borehole

The well casing should be pre-cut (square) to extend 2 to 2.5 feet above the ground surface. Before placement of the last piece of well casing, a notch or other permanent reference point will be cut, filed, or scribed into the top edge of the casing.

The tops of all well casing will be capped with covers composed of materials compatible with the products used in the well installation. Caps will be loose fitting, constructed to preclude binding to the well casing caused by tightness of fit, unclean surfaces, or weather conditions. In either case, it should be secure enough to preclude the introduction of foreign material into the well, yet allow pressure equalization between the well and the atmosphere.

The top of each well casing should be level so that the maximum difference in elevation between the highest and lowest points of the casing is less than or equal to 0.02 ft.

3.3.6 Filter Pack

The volume of filter pack that is required to fill the annular between the well screen/casing and borehole should be computed, measured, and recorded.
Granular filter packs will be chemically and texturally clean, inert, and siliceous. The gradation of filter packs will be selected based on the screen size used and will be specified in the work plan addenda for the site being investigated.

Primary Filter Pack

Filter pack material should be placed in the borehole using a decontaminated tremie pipe. An appropriate amount of primary filter pack should be placed in the borehole prior to final positioning of the well screen to provide an appropriate barrier between the bottom of the borehole and the bottom of the screen. Once the initial filter pack has been placed and the well assembly is appropriately positioned and centered in the borehole, the remaining primary filter pack should be placed in increments (and tamped) as the tremie pipe is gradually raised.

As the primary filter pack is placed, approved source water may need to be added to help move the filter pack. A weighted tape should be used to measure the top of the filter pack as it is being placed. If bridging of the filter pack occurs, then this bridging should be broken mechanically prior to adding additional filter pack.

When temporary casing or hollow stem augers are used, the casing or augers should be removed in increments such that lifting of the well assembly is minimal. After removal of each increment, it should be confirmed by direct measurement that the primary filter pack has not been displaced during the removal.
The primary filter pack should extend from the bottom of the borehole to 3 to 5 ft above the top of the screen.

Secondary Filter Pack

The primary filter pack may be capped with 1 to 2 feet of feet of secondary filter pack to prevent the intrusion of the bentonite seal into the primary filter pack. The need for this filter pack (and specifications) should be addressed in work plan addenda for the site being investigated. Such factors as the gradation of the primary filter pack, the potential for grout extrusion, and site hydrogeology should be considered when evaluating the need for this filter pack.

3.3.7 Bentonite Seal

A bentonite seal, consisting of hydrated 3/8-inch diameter. bentonite pellets, will be installed immediately above the filter pack. The seal may be installed with a tremie pipe, which is lowered to the top of the filter pack and slowly raised as the pellets fill the annular space. In deep wells, the pellets may bridge and block the tremie pipe; in this case, pellets may be placed by free fall into the borehole. A weighted tape should be used to measure the top of seal as it is installed.

When cement grout is to be used above the bentonite seal, a minimum of 3 to 4 hours should be allowed for hydration of the pellets.

When installing a seal above the water table, water should be added to the bentonite for proper hydration. In this case, the seal should be placed in lifts of 0.5 to 1 foot with each lift hydrated for a period of 30 minutes.
If the bentonite seal is to be installed far below the water table, a bentonite slurry seal will be installed. Cement-bentonite grout will not be used below the water table. The slurry will be mechanically blended aboveground to ensure a lump-free mixture. The slurry will consist of bentonite powder and approved water mixed to a minimum of 20 percent solids by weight of pumpable slurry with a density of 9.4 pounds per gallon or greater. The slurry will be pumped into place through a tremie pipe and measured as installed.
Bentonite seals should be 3 to 5 ft thick as measured immediately after placement. The final depth to the top of the bentonite seal will be measured and recorded before grouting.

3.3.8 Grout

Cement grout used in construction will be composed of the following:

- Type II Portland Cement (or Type IV as noted in Section 2.2);
- Bentonite (2 to 5% dry bentonite per 94-lb sack of dry cement); and
- A maximum of 6 to 7-gallons of approved water per 94-lb sack of cement

Neither additives nor borehole cuttings will be mixed with the grout. Bentonite will be added after the required amount of cement is mixed with the water.

All grout material will be combined in an aboveground container and mechanically blended to produce a thick, lump-free mixture. The mixed grout will be recirculated through the grout pump before placement.
Grout placement should be performed as follows:

1. Grout should be placed from a rigid tremie pipe located just over the top of the bentonite seal. The tremie pipe should be decontaminated prior to use.
2. The tremie pipe should be kept full of grout from start to finish with the discharge end of the pipe completely submerged as it is slowly and continuously lifted.
3. The annulus between the drill casing and well casing should be filled with sufficient grout to allow for the planned drill casing removal. Grout should not penetrate the well screen or filter pack.
    - For incremental removal of drill casing, grout should be pumped to maintain at least 10 ft of grout in the drill casing remaining in the borehole after removing the selected length of casing. After each

section of casing is removed, the tremie pipe may be reinserted to the base of the casing not yet removed.

- In the case where drill casing will be removed all at once, grout should be pumped from the tremie pipe until undiluted grout flows from the annulus at the ground surface.

4. If the un-grouted portion of a borehole is less than 15 feet and without fluids after drill casing removal, then the un-grouted portion may be filled by pouring grout from the surface.
5. If drill casing was not used for well installation, grouting should proceed to the surface in one continuous operation.
6. For grout placement in a dry and open hole less than 15 ft deep, grout may be manually mixed and poured in from the surface providing that integrity of the bentonite seal is maintained.
7. Protective casing should be installed immediately after completion of grouting.
8. Grout settlement should be checked within 24 hours of the initial grout placement. Additional grout should be added grout should be added to fill any observed depressions.

The following will be noted in the boring logs: (1) exact amounts of cement, bentonite, and water used in mixing grout and (2) actual volume of grout placed in the hole.

3.3.9 Well Protection

The major elements of well protection will include:

- A protective casing;
- Protective concrete pad around the well; and
- Protective steel posts set around the well outside of the concrete pad.

Well Protective Casing

Well protective casings will be installed around all monitoring wells immediately after grouting. The protective casing should consist of a minimum 5-ft long, steel pipe (protective casing) installed over the well casing and into the grout. The protective casing should be installed to a depth of approximately 2.5-feet below ground surface (extending approximately 2.5 feet above ground surface). The internal well casing (riser) and protective casing will not be separated by more than 0.2 feet of height.

An internal mortar collar will be placed within the protective steel casing and outside the well casing to a height of 0.5 above ground surface.

After placement and curing of the mortar collar, an internal drainage hole will be drilled through the protective casing, which is centered no more than 1/8 inch above the grout filled annulus between the well riser and the protective casing.

Any annulus formed between the outside of the protective casing and the borehole will be filled to ground surface with cement.

Concrete Pad

After the grout has thoroughly set and the well protective casing has been installed, a protective concrete pad will be installed around the well. This pad will be at least 4 inches thick and 4 feet square and sloped away from the well to provide for adequate drainage.

Protective Posts

Additional protection will be provided at each well location by the installation of four steel posts outside of each corner of the concrete pad. The installation of protective posts should occur before the well is sampled. The posts should have a minimum diameter of 3 inches, be placed 2 to 3 feet below ground surface, and extend at least 3 feet above ground surface. Posts should be painted orange using a brush.

Posts should be set in post holes, which are backfilled with concrete. For additional protection, the posts can be filled with concrete.

3.3.10 Well Construction Diagram and Field Notes

The construction of each well will be depicted as built in a well construction diagram (see Figure 20.1a). The diagram will be attached to the boring log and the following will be graphically denoted:

- Bottom of boring;
- Screen location, length, and size;
- Coupling locations;
- Granular filter pack;
- Seal;
- Grout;
- Cave-in;
- Centralizers;
- Height of riser;
- Protective casing detail;
- Water level 24 hours after completion with date and time of measurement;
- Quantity and composition of materials used; and
- Material between bottom of boring and bottom of screen.

Daily activities at the site related to monitoring well installation should be recorded in the field logbooks as described in SOPs 10.1 and 10.2.

3.4 GENERAL SEQUENCE OF MONITORING WELL COMPLETION

The following is a general sequence of monitoring well completion with reference to the specific details included in Section 3.3.

1. Completion of borehole;
2. Assembly and placement of well assembly as described in Section 3.3.5;
3. Placement of the appropriate filter pack(s) as discussed in Section 3.3.6;
4. Installation of an appropriate bentonite seal as discussed in Section 3.3.7;
5. Grouting the remaining annular space of the borehole as discussed in Section 3.3.8;
6. Set the protective casing for the well as discussed in Section 3.3.9;
7. Complete the protective concrete pad as discussed in Section 3.3.9; and
8. Install the protective posts as discussed in Section 3.3.9.

3.5 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addenda for the site being investigated and SOP 70.1.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

6.0 REFERENCES

ASTM Standard D 5092-04e1. 2004. *Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers.*

ASTM Standard F 480-06b. 2006. *Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80.*

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000, 1, November.

EXAMPLE WELL DEVELOPMENT FORM

WELL DESIGNATION:_____ DATE(S) OF INSTALLATION:_____/_____/_____

SITE GEOLOGIST:_____ DEVELOPMENT DATE(S):_____/_____/_____

STATIC WATER LEVELS BEFORE AND AFTER DEVELOPMENT * :

BEFORE _____ DATE _____ 24 HR. AFTER _____ DATE_____

DEPTH TO SEDIMENT BEFORE AND AFTER DEVELOPMENT * :

BEFORE _____ DATE _____ 24 HR. AFTER _____ DATE_____

DEPTH TO WELL BOTTOM *: _____ SCREEN LENGTH _____

HEIGHT OF WELL CASING ABOVE GROUND SURFACE: _____

QUANTITY OF MUD/WATER:

LOST DURING DRILLING	(+)_____gallons
REMOVED PRIOR TO WELL INSERTION	(-)_____gallons
LOST DURING THICK FLUID DISPLACEMENT	(+)_____gallons
ADDED DURING FILTER PACK PLACEMENT	(+)_____gallons
TOTAL LOSSES	_____gallons

(a) Water column ht. (ft.) _____ (b) Well radius (in.)_____

(c) Screen length (ft.) _____ (d) Borehole radius (in.)_____

(e) QUANTITY OF FLUID STANDING IN WELL

Install Equation Editor and double-click here to view equation.

1 _____ gallons
(Show Calculation)

(f) QUANTITY OF FLUID IN ANNULUS Install Equation Editor and double-click here to view equation. 1_____gallons
(Show Calculation)

DEVELOPMENT VOLUME = (5 * TOTAL LOSSES) + [5 * (e + f)] = _____ gallons
(Show Calculation)

* **ALL DEPTHS MEASURED FROM TOP OF WELL CASING**

EXAMPLE WELL DEVELOPMENT RECORD

WELL DESIGNATION _____ DATE(S) OF DEVELOPMENT: _____/_____/_____

TYPE AND SIZE OF PUMP:_____

TYPE AND SIZE OF BAILER:_____

DESCRIPTION OF SURGE TECHNIQUE:_____

RECORD OF DEVELOPMENT

DATE & TIME	QUANTITY REMOVED	TIME REQ'D	pH	Cond	Temp	ORD	Turb	DO	Character of water (color/clarity/ odor/partic.)
(before)									
(during)									
(during)									
(during									
(after)									

TYPICAL PUMPING RATE_____ GAL./HR. EST. RECHARGE RATE_____

TOTAL QUANTITY OF WATER REMOVED_____ TIME REQUIRED_____

REMARKS_____

SIGNATURE OF SITE GEOLOGIST_____

Facility/Project Name

Facility License, Permit or Monitoring Number

Type of Protective Cover: Above-Ground ☐ Flush-To-Ground ☐

Well Distance From Waste/Source Boundary

Maximum Depth of Frost Penetration (estimated)

Local Grid Location of Well ☐N. ____ m. ☐S. ☐E. ____ m. ☐W.

Grid Origin Location
Lat. ____ ____ ____ Long ____ ____ ____ or
St. Plane ____ m. N. ____ m. E.

Section Location of Waste/Source
____1/4 of ____1/4 of Sec. ____ T. ____ N.R. ____ ☐E. ☐W.

Location of Well Relative to Waste/Source
u ☐ Upgradient s ☐ Sidegradient
d ☐ Downgradient n ☐ Not Known

Well Number

Date Well Installed (Start)

Date Well Installed (Completed)

Well Installed By: (Person's Name & Firm)

Note: Use top of casing (TOC) for all depth measurments.

A. Protective casing, top elevation ____ m. MSL

B. Well casing, Top elevation ____ m. MSL

C. Land surface elevation ____ m. MSL

D. Surface seal, bottom ____ m. TOC or ____ m. MSL

16. USCS classification of sell near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

17. Sieve analysis attached? ☐ Yes ☐ No

18. Drilling method used: Rotary ☐ Hollow Stem Auger ☐ ____ Other ☐

19. Drilling fluid used Water ☐ Air ☐ Drilling mud ☐ None ☐

20. Drilling additives used? ☐ Yes ☐ No
Describe ____

21. Source of water (attach analysis): ____

E. Secondary filter, top ____ m. TOC or ____ m. MSL

F. Bentonite seal, top ____ m. TOC or ____ m. MSL

G. Secondary filter, top ____ m. TOC or ____ m. MSL

H. Primary filter, top ____ m. TOC or ____ m. MSL

I. Screen joint ____ m. TOC or ____ m. MSL

J. Well bottom ____ m. TOC or ____ m. MSL

K. Filter pack, bottom ____ m. TOC ____ m. MSL

L. Borehole, bottom ____ m. TOC or ____ m. MSL

M. Borehole, diameter ____ mm.

N. O.D. well casing ____ mm.

O. I.D. well casing ____ mm.

P. 24-hr water level after completion ____ m. TOC or ____ m. MSL

1. Cap and Lock? ☐ Yes ☐ No

2. Protective posts? ☐ Yes ☐ No

3. Protective casing:
a. Inside diameter: ____ mm.
b. Length: ____ m.

4. Drainage port(s) ☐ Yes ☐ No

5. Surface seal:
a. Cap Gravel blanket ☐ Bentonite ☐ Concrete ☐ ____ Other ☐

b. Annular space seal: Bentonite ☐ Cement ☐ ____ Other ☐

6. Material between well casing and protective casing: Bentonite ☐ Cement ☐ ____ Other ☐

7. Annular space seal: A. Granular Bentonite ☐
b. ____ Lbs/gal mud weight.....Bentonite-sand slurry ☐
c. ____ Lbs/gal mud weight.....Bentonite slurry ☐
d. ____ x Bentonite.....Bentonite-cement grout ☐
e. ____ m^3 volume added for any of the above
f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☐

8. Centralizers ☐ Yes ☐ No

9. Secondary Filter ☐ Yes ☐ No
a. Volume added ____ m^3 ____ Bags/Size

10. Bentonite seal: a. Bontonite granules ☐
b. 1/4in. 3/6in. 1/2in. Bentonite pellets ☐
c. ____ Other ☐

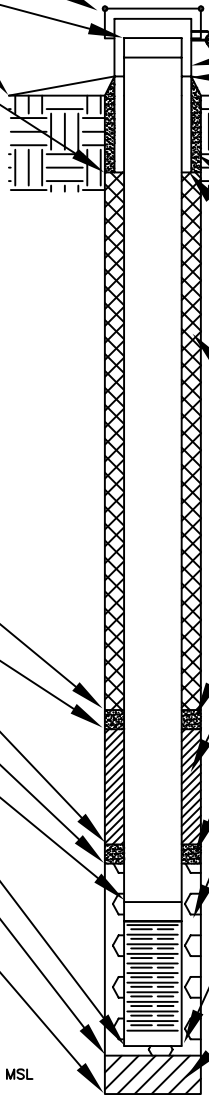
11 Secondary Filter ☐ Yes ☐ No
a. Volume added ____ m^3 ____ Bags/Size

12. Filter pack material: Manufacturer, product name & mesh size
a.
b. Volume added ____ m^3 ____ Bags/Size

13. Well casing: Flush threated PVC schedule 40 ☐ Flush threated PVC schedule 80 ☐ ____ Other ☐

14. Screen material:
a. Screen type: Factory cut ☐ Continous slot ☐ ____ Other ☐
b. Manufacturer
c. Slot size: 0.____ In.
d. Slotted length: ____ In.

15. Backfill material (below filter pack): None ☐
____ Other ☐

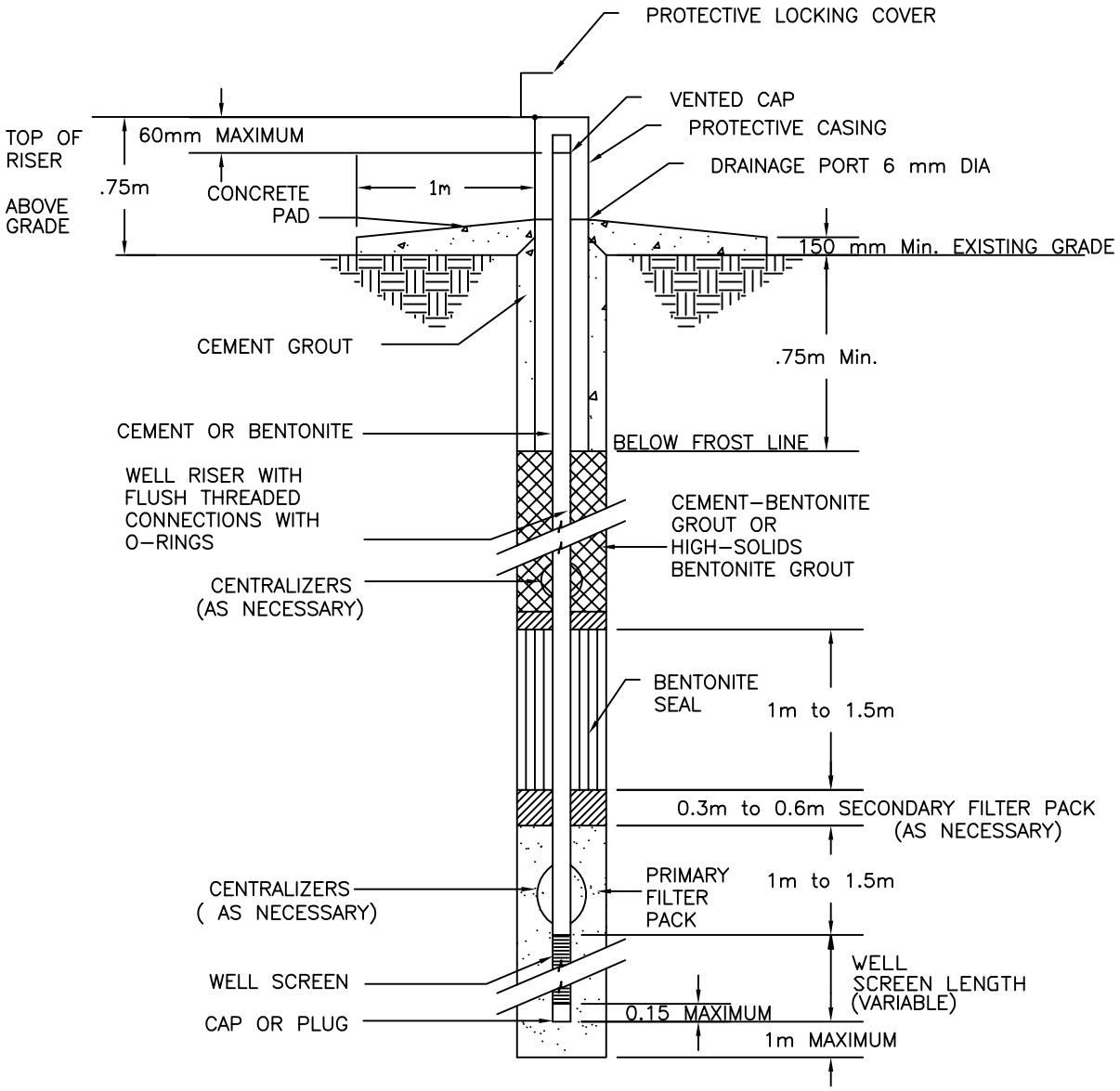


Radford Army Ammuntion Plant

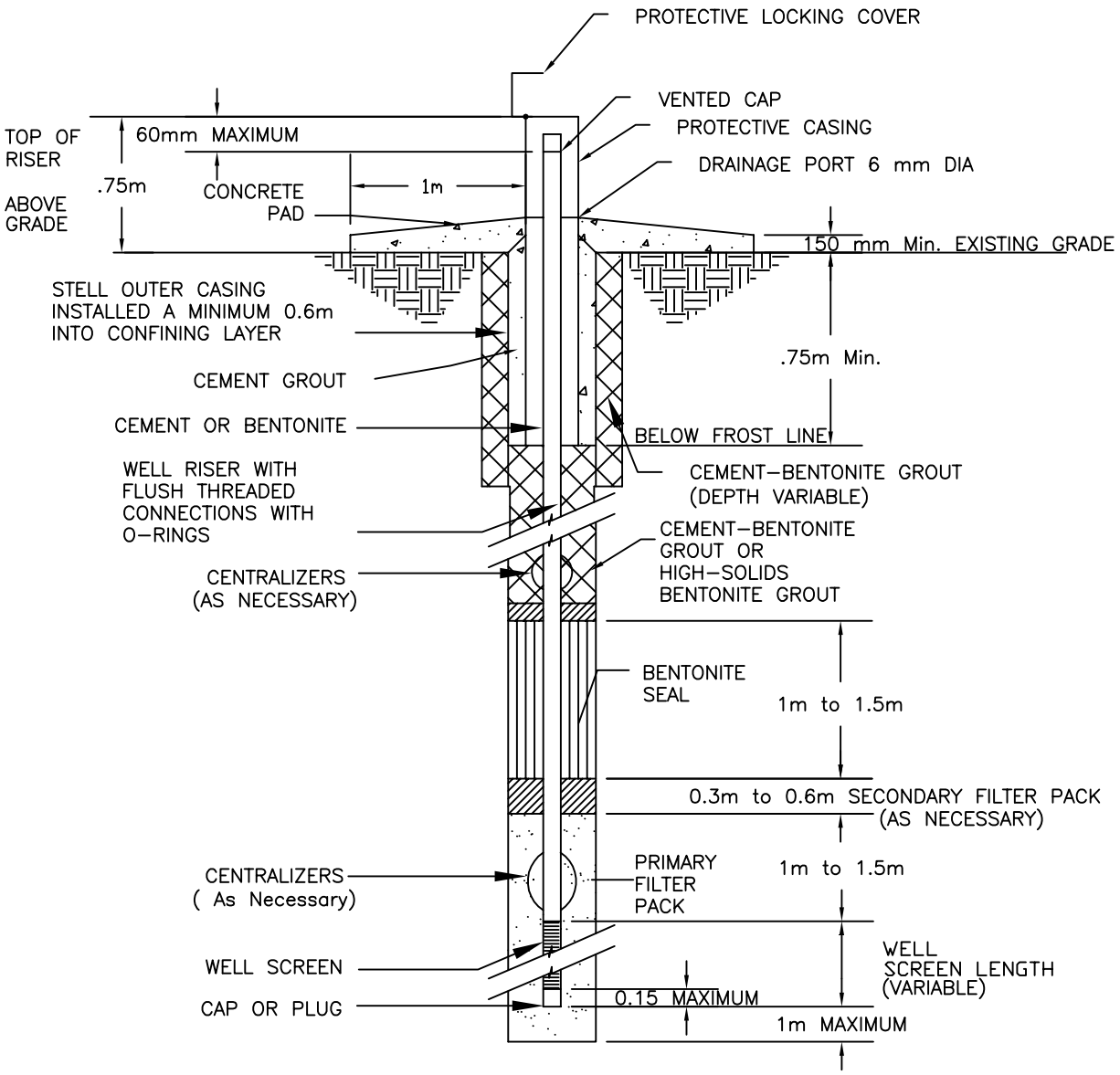
FIGURE 20-1a

SCHEMATIC CONSTRUCTION DIAGRAM OF MONITORING WELL

Date:	Prepared By:
October 2007	*URS Corp./DBC*
Scale:	**File Name:**
NO SCALE	*SOP Figure 20-1a*



Radford Army Ammuntion Plant		FIGURE 20-1b
Date: *October 2007*	**Prepared By:** *URS Corp./DBC*	**SCHEMATIC CONSTRUCTION OF SINGLE-CASED WELL WITH STICKUP COMPLETION**
Scale: *NO SCALE*	**File Name:** *SOP Figure 20-1b*	



Radford Army Ammuntion Plant		FIGURE 20-1c
Date: *October 2007*	**Prepared By:** *URS Corp./DBC*	**SCHEMATIC CONSTRUCTION OF MULTI-CASED WELL WITH CONCRETE PAD**
Scale: *NO SCALE*	**File Name:** *SOP Figure 20-1c*	

STANDARD OPERATING PROCEDURE 20.2
MONITORING WELL DEVELOPMENT

1.0 SCOPE AND APPLICATION

Well development is the process by which drilling fluids, solids, and other mobile particulates within the vicinity of the newly installed monitoring well are removed, while ensuring proper hydraulic connection to the aquifer. Development stabilizes the formation and filter pack sands around the well screen to ensure aquifer water moves freely to the well.

Well development will be initiated not less than 48 consecutive hours but no longer than 7 calendar days following grouting and/or placement of surface protection.

2.0 MATERIALS

- Work Plans;
- Well Development Form;
- Field Logbook;
- Boring Log and Well Completion Diagram for the well;
- Submersible pump, control box, associated equipment, etc;
- Photoionization detector or other appropriate monitoring instrument as specified in site-specific health and safety plan;
- Personal protective equipment and clothing (PPE) as specified in site-specific health and safety plan;
- Flow-through-cell and probes measuring specific conductance, pH, temperature, oxidation/reduction potential, dissolved oxygen, and turbidity;
- Decontamination supplies (SOP 80.1);
- Electric well level indicator and measuring tape;
- Appropriate containers for purged water and other investigation-derived material, as required; and
- Drilling tools for reverse-air circulation development, as appropriate.

3.0 PROCEDURE

3.1 SELECTING METHOD OF DEVELOPMENT

The type of subsurface conditions encountered should determine the method of well development used at a particular site at the Radford Army Ammunition Plant (RFAAP).

When monitoring wells are installed within overburden material, fractured bedrock or karst aquifers producing little sediment, a combination of mechanical surging and pumping (over pumping) or bailing is generally appropriate for well development. In general, over-pumping is the method of pumping the well at a rate higher than recharge occurs. Moving a tight-fitting surge block along the inside of the well screen to create a vacuum completes surging.

When monitoring wells are installed with solution features containing excessive amounts of sediment, reverse-circulation airlifting should be used as the initial step of development. Because reverse-circulation tools airlift methods avoid forcibly exposing the annular space to air, reverse-circulation tools can be run throughout the entire water column in the wells being developed.

After the excessive sediment has been removed by reverse-circulation airlifting, conventional pumping techniques may be used as appropriate to complete the well development.

3.2 DEVELOPMENT AND SAMPLING TIMING

Final development of monitoring wells should not be initiated any sooner than 48 hours after or more than 7 days beyond the final grouting of the well. Pre-development or preliminary development may be initiated before this 48-hour minimum period. Preliminary development may be conducted for open wells or for screened wells after installation of the well screen, casing, and filter pack but before installation of the annular seal. Pre-development is recommended when the natural formation will be used as a filter pack.
Well development should be completed at least 14 days prior to sampling.

3.3 SUMMARY OF PROCEDURES

In general, the following procedure should be followed when developing a well using the pump and surge technique:

1. Prepare the work area outside the well by placing plastic sheeting on the ground to avoid cross-contamination.
2. Calibrate water quality meters (refer to SOP 40.1).
3. Determine the depth to water and total depth of well (refer to SOP 40.2).
4. Calculate the equivalent volume (EV) of water in well to be developed (refer to SOP 30.2).
5. Pump or bail the well to ensure that water flows into it and to remove some of the fine materials from the well. Removal of a minimum of one EV is recommended at this point. The rate of removal should be high enough to stress the well by lowering the water level to approximately one-half its original level.
6. Remove pump or bailer, slowly lower a close-fitting surge block into the well until it rests below the static water level but above the screened interval. (NOTE: The latter is not required in the case of an LNAPL well.)
7. Begin a gentle surging motion along top on-third length of the screen, which will allow any material blocking the screen to break up, go into suspension, and move into the well. Note that development should always begin above or at the top of the screen and move progressively downward to prevent the surge block from becoming sand locked in the well casing. Continue surging for 5-10 minutes, remove surge block, and pump or bail the well, rapidly removing at least one EV.
8. Repeat previous step at successively lower levels within the well screen, until the bottom of the well is reached. As development progresses, successive surging can be more vigorous and of longer duration as long as the amount of sediment in the screen is kept to a minimum.
9. Development should continue until the well development criteria listed in Section 3.1.3 have been achieved.
10. All water removed must be managed as directed by the site investigation plan.

3.3.1 Well Development Criteria

In general, well development should proceed until the following criteria are met:

1. At a minimum, removal of three EV of water from the well.
2. Removal of three times of the amount of fluid (mud and/or water) lost during drilling.
3. Removal of three times the fluid used for well installation.
4. The following indicator parameters should be stabilized as indicated by three successive readings within:
    - ± 0.2 for pH;
    - ±3% for specific conductance;
    - ±10 mV for oxidation/reduction potential;
    - ± 1 degree Celsius for temperature; and
    - ±10% for turbidity and dissolved oxygen (except for wells installed in karst aquifers).
5. Well water is clear to the unaided eye (except for wells installed in karst aquifers).
6. The sediment thickness remaining within the well is less than one percent of the screen length or less than 0.1 ft for screens equal to or less than 10 feet.
7. Site specific factors should be evaluated to determine appropriate well development criteria have been if:
    - Well recharge is so slow that the required volume of water cannot be removed during 48 consecutive hours of development;
    - Water discoloration persists after the required volumetric development; and
    - Excessive sediment remains after the required volumetric development.

3.4 WELL DEVELOPMENT RECORD

Record all data as required on a Well Development Record Form (see example), which becomes a part of the complete Well Record. These data include the following:

- Project name, location;
- Well designation, location;
- Date(s) and time(s) of well installation;
- Static water level from top of well casing before and 24 hours after development;
- Depths and dimensions of the well, the casing, and the screen, obtained from the Well Diagram;
- Water losses and uses during drilling, obtained from the boring log for the well;
- Water contained in the well, obtained from calculations using the depth of the water column and the well radius, plus the radius and height of the filter pack and an assumed 30% porosity;
- Measurements of the following indicator parameters: pH, conductivity, oxidation/reduction potential, temperature, and turbidity before and after development and once during each EV;
- Notes on characteristics of the development water;
- Data on the equipment and technique used for development; and
- Estimated recharge rate and rate/quantity of water removal during development.

Well development records shall be submitted to the COR after the development has been completed.

3.5 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addendum for the site being investigated and SOP 70.1.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

6.0 REFERENCES

Aller, Linda, et al. 1989. *Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells.* National Water Well Association.

ASTM Standard D 5092-04e1. 2004. *Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers*.

EPA Groundwater Handbook. 1989.

Nielsen, David M. 1993. *Correct Well Design Improves Monitoring,* in "Environmental Protection," Vol. 4, No.7, July, 1993.

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000, 1 November.

EXAMPLE WELL DEVELOPMENT FORM

WELL DESIGNATION:_____ DATE(S) OF INSTALLATION:_____/_____/_____

SITE GEOLOGIST:_____ DEVELOPMENT DATE(S):_____/_____/_____

STATIC WATER LEVELS BEFORE AND AFTER DEVELOPMENT :

BEFORE _____ DATE _____ 24 HR. AFTER _____ DATE_____

DEPTH TO SEDIMENT BEFORE AND AFTER DEVELOPMENT * :

BEFORE _____ DATE _____ 24 HR. AFTER _____ DATE_____

DEPTH TO WELL BOTTOM *: _____ SCREEN LENGTH _____

HEIGHT OF WELL CASING ABOVE GROUND SURFACE: _____

QUANTITY OF MUD/WATER:

LOST DURING DRILLING	(+)_____	gallons
REMOVED PRIOR TO WELL INSERTION	(-)_____	gallons
LOST DURING THICK FLUID DISPLACEMENT	(+)_____	gallons
ADDED DURING FILTER PACK PLACEMENT	(+)_____	gallons
TOTAL LOSSES	_____	gallons

(a) Water column ht. (ft.) _____ (b) Well radius (in.)_____

(c) Screen length (ft.) _____ (d) Borehole radius (in.)_____

(e) QUANTITY OF FLUID STANDING IN WELL

Install Equation Editor and double-click here to view equation. 1 _____ gallons
(Show Calculation)

(f) QUANTITY OF FLUID IN ANNULUS Install Equation Editor and double-click here to view equation. 1_____gallons
(Show Calculation)

DEVELOPMENT VOLUME = (3 * TOTAL LOSSES) + [5 * (e + f)] = _____ gallons
(Show Calculation)

* **ALL DEPTHS MEASURED FROM TOP OF WELL CASING**

EXAMPLE WELL DEVELOPMENT RECORD

WELL DESIGNATION _____ DATE(S) OF DEVELOPMENT: _____/_____/_____

TYPE AND SIZE OF PUMP:_____

TYPE AND SIZE OF BAILER:_____

DESCRIPTION OF SURGE TECHNIQUE:_____

RECORD OF DEVELOPMENT

DATE & TIME	QUANTITY REMOVED	TIME REQ'D	pH	Cond	Temp	ORD	Turb	DO	Character of water (color/clarity/ odor/partic.)
(before)									
(during)									
(during)									
(during									
(after)									

TYPICAL PUMPING RATE_____ GAL./HR. EST. RECHARGE RATE_____

TOTAL QUANTITY OF WATER REMOVED_____ TIME REQUIRED_____

REMARKS_____

SIGNATURE OF SITE GEOLOGIST_____

STANDARD OPERATING PROCEDURE 20.3
WELL AND BORING ABANDONMENT

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to establish the protocols by which all borings and wells will be abandoned. The primary objective of boring or well abandonment activities is to permanently abandon the boring or well so that the natural migration of groundwater or soil vapor is not significantly influenced.

2.0 MATERIALS

- Well abandonment equipment including appropriate grout mixing/placement equipment, and heavy equipment as appropriate (drill rig, crane, backhoe, etc.);
- Pure sodium bentonite powder with no additives (bentonite);
- Bentonite pellets (seal);
- Cement (Portland Type II); and
- Approved source water.

3.0 PROCEDURE

The volume of grout required for borehole or well abandonment should be calculated prior to proceeding with abandonment. These calculations should consider loss of material to the formation, changes in borehole diameter, potential zones of washout, and shrinkage of material. Calculations should be recorded on an abandonment record (see Section 3.1.4).

In general, cement grout should be used for boring and well abandonment per the specifications in Section 3.1 and procedures identified in the following sections. Specialized narrow diameter soil borings (3-inches or less) associated with direct push methods or hand augers may be abandoned using bentonite pellets or chips (see Section 3.5).

Any replacement borings or wells associated with the abandonment should be offset at least 20 feet from any abandoned site in a presumed up- or cross-gradient direction.

3.1 GROUT

Grout used in construction will be composed by weight of the following:

- Type II Portland cement (Type IV Portland Cement if sulfate concentrations are greater than 1,500 ppm);
- Bentonite (2 to 5% dry bentonite per 94-lb sack of dry cement); and
- A maximum of 6 to 7 gallons of approved water per 94-lb sack of cement.

Neither additives nor borehole cuttings will be mixed with the grout. Bentonite will be added after the required amount of cement is mixed with the water.

All grout material will be combined in an aboveground container and mechanically blended to produce a thick, lump-free mixture. The mixed grout will be recirculated through the grout pump before placement.

Grout placement will be performed using a commercially available grout pump and a rigid tremie pipe. Removal and grouting will be accomplished in stages, aquifer by aquifer, sealing the boring from the bottom to ground surface. This will be accomplished by placing a grout pipe to the bottom and pumping grout through the pipe until undiluted grout reaches the bottom of the next higher section of casing or, for the top-most section, until grout flows from the boring at ground surface.

After 24 hours, the abandoned drilling site will be checked for grout settlement. Any settlement will be filled with grout and rechecked 24 hours later. This process will be repeated until firm grout remains at the ground surface.

3.2 BORINGS

The term "borings" as used in this SOP applies to any drilled hole made that is not completed as a well. This includes soil test borings, soil sampling borings, and deep stratigraphic borings. Whether completed to the planned depth or aborted for any reason before reaching that depth, borings will be grouted and will be normally closed within 12 hours.

To achieve an effective seal, the borehole to be abandoned should be free of debris and foreign matter that may restrict the adhesion of the grout to the borehole wall. Borehole flushing with a tremie pipe may be required to remove such materials prior to grouting.

Each boring to be abandoned should be sealed by grouting from the bottom of the boring to the ground surface. This will be accomplished by placing a tremie pipe to the bottom of the borehole and pumping grout through the pipe at a steady rate. The grouting should be completed slowly and continuously to prevent channeling of material. The tremie pipe should be raised when pumping pressure increases significantly or when undiluted grout reaches the surface.

After 24 hours of completing the abandonment, the abandoned boring or well should be checked for any grout settlement. The settlement depression should be filled with grout and rechecked 24 hours later. Grout should be placed with a tremie pipe if the open hole is 15 feet or deeper or if the hole is not dry. Otherwise, the grout may be poured from the surface.

3.3 NARROW BORINGS

Narrow borings, those with diameter less than 3 inches, advanced by hand auger or direct push methods, may be sealed using bentonite pellets or chips rather than a grout mixture. Often times a grout pump is not available to mix the grout when these methods have been used. Bentonite pellets or chips will be poured into the boring from the ground surface. Then bentonite will hydrate by absorbing moisture from the ground; unapproved water should not be added to the boring. After 24 hours, the abandoned boring will be checked, and any grout settlement will be topped off with more bentonite. The process will be repeated until bentonite remains at ground surface unless site condition indicates otherwise.

3.4 WELLS

The following procedure applies to wells aborted before completion and existing wells determined to be ineffective or otherwise in need of closure.

General Considerations

A number of techniques are available for abandoning monitoring wells and other monitoring devices including:

- Abandonment in place by grouting the well screen and casing in place;
- Removal of the well by pulling; and

- Overdrilling.

The particular method used for abandonment should be specified in the work plan addenda developed for a site-specific investigation. Several factors must be considered when selecting the appropriate abandonment technique including well construction, well condition, and subsurface conditions.
In general the preferred method for abandonment of wells is to remove all existing well materials to:

- Reduce the potential for the formation of a vertical conduit to occur at the contact between the casing and annular seal;
- Reduce the potential for well materials interfering with the abandonment procedures; and
- Decrease the potential for reaction between the well materials and grout used for abandonment.

In general, all well materials will be removed during abandonment (including screen and casing) by either pulling out the casing, screen, and associated materials or by overdrilling using a rotary or hollow stem auger drilling procedure.

Abandonment with Well Materials In Place

In the event that it is not possible to remove the casing and screen, the casing and screen will be perforated using a suitable tool. A minimum of four rows of perforations several inches long and a minimum of five perforations per linear foot of casing or screen is recommended.

After the screen and casing have been appropriately perforated, the well should be abandoned by grouting from the bottom of the well to the ground surface using a tremie pipe as described in Section 3.2. The tremie pipe should be raised when pumping pressure increases significantly or when undiluted grout reaches the surface.

After 24 hours of completing the abandonment, the abandoned well should be checked for any grout settlement. The settlement depression should be filled with grout and rechecked 24 hours later. Grout should be placed with a tremie pipe if the open hole is 15 feet or deeper or if the hole is not dry. Otherwise, the grout may be poured from the surface.

Abandonment by Removal

Site conditions permitting, relatively shallow monitoring wells may be successfully abandoned by removal providing that the well is generally good condition and sections of casing (including screen) can be successfully removed with materials intact.

This method of abandonment is generally accomplished by removing (pulling) sections of casing and screen out of the subsurface using a drill rig, backhoe, crane, etc. of sufficient capacity. Materials with lower tensile strength such as polyvinyl chloride (PVC) generally cannot be removed by pulling if they have been appropriately cemented in place.

Once the well materials have been removed from the borehole, the borehole should be abandoned by grouting in the same manner discussed for borings in Section 3.2. If the borehole collapses after removal of well materials, then the borehole should be over drilled to remove all material and then grouted to the surface.

Overdrilling

With this method of abandonment, the well materials are removed by overdrilling (overreaming) the well location. Overdrilling using rotary techniques may be accomplished using an overreaming tool. This tool consists of a pilot bit that is approximately the same size as the inner diameter of well casing and a reaming bit that is slightly larger than the diameter of the borehole. As drilling proceeds, all well materials are destroyed and returned to the surface. After completion of the overdrilling, the borehole should be immediately grouted with a tremie pipe as described in Section 3.2.

In the case of overburden wells, a hollow stem auger may be used for overdrilling providing that this method of drilling appropriate for the subsurface conditions. The hollow stem auger should be equipped with outward facing carbide-cutting teeth with a diameter 2 to 4 inches larger than the well casing. With this method, the casing guides the cutting head and remains inside the auger. When the auger reaches the bottom of the well boring and the well materials have been removed, the borehole may be grouted with a tremie pipe (Section 3.2) through the augers as the augers are gradually withdrawn.

Considerations for Fractured Bedrock and Karst Wells

Multi-cased wells completed into bedrock as screened wells, open wells, or open-lined wells may be abandoned with the outer casing left in place providing that the integrity of this casing and associated annular seal is good. A cement bond log (acoustic amplitude boring geophysical log) may be used to evaluate the integrity of the casing and annular seal, if the outer casing is to be left in place.

Borings or wells completed in karst zones may be difficult to abandon because of the potential presence of large conduits, which may make it difficult to grout. Where large conduits exist or difficulties are encountered when abandoning a boring or well, fill the portion of the borehole penetrating the solution cavity with inert gravel (quartz, claystone, etc.). Packers can be used to isolate critical intervals for filling with grout above and below these zones.

3.5 RESTORATION

All work areas around the borings or wells abandoned should be restored to a condition essentially equivalent to that before the borings and wells were installed.

3.6 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material should be managed in accordance with the requirements of SOP 70.1 and the work plan addenda associated with the site investigation

3.7 DOCUMENTATION

For each abandoned boring or well, a record should be prepared to include the following as appropriate:

- Project and boring/well designation;
- Location with respect to replacement boring well (if any);
- Open depth of well/annulus/boring prior to grouting;
- Casing or items left in hole by depth, description, composition, and size;
- Copy of the boring log;
- Copy of construction diagram for abandoned well;
- Reason for abandonment;
- Description and total quantity of grout used initially;

- Description and daily quantities of grout used to compensate for settlement;
- Disposition of investigation-derived material;
- Water or mud level prior to grouting and date measured; and
- Remaining casing above ground surface, height above ground surface, size, and disposition of each.

Daily investigation activities at the site related to boring and well abandonment should be recorded in field logbooks as described in SOPs 10.1 and 10.2.

4.0 PRECAUTIONS

Refer to the health and safety plan associated with the Work Plan Addenda and the Master Health and Safety Plan.

5.0 REFERENCES

ASTM Standard D 5299-99 (2005). 2005. *Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities.*

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000, 1 November.

STANDARD OPERATING PROCEDURE 20.11
DRILLING METHODS AND PROCEDURES

1.0 SCOPE AND APPLICATION

The use of an appropriate drilling procedure is contingent upon the existing conditions at the project site. The purpose of this standard operating procedure (SOP) is to outline procedures for the various methods of soil and rock drilling identified in the Master Work Plan. In addition it provides procedures for using sampling devices commonly used during soil and rock drilling such as split-barrel sampling, thin walled tube sampling, direct push samplers, and rock coring. For a particular site investigation, the associated work plan addendum will identify the appropriate drilling method and method of sampling, along with proposed sampling depths and intervals and any special procedures or methods.

2.0 MATERIALS

The following types of materials are generally appropriate for drilling:

2.1 SPLIT-BARREL SAMPLING

- Split barrel sampler;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.2 THIN WALLED TUBE SAMPLING

- Thin walled tubes;
- Sealing materials for sample such as sealing wax, metal disks, wood disks, tape, cheesecloth, caps, etc;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.3 DIRECT PUSH SAMPLING

- Direct push unit with hydraulic ram, hammer, etc;
- Sample collection devices, associated equipment and expendable supplies such as sample liners, sample retainers, appropriate lubricants, etc;
- Hollow extension rods;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;

- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.4 HOLLOW-STEM AUGER DRILLING

- Drill rig and associated equipment;
- Hollow stem auger assemblies for drilling to appropriate depth including auger heads, drive assembly, pilot assembly, and hollow-stem auger sections;
- Auxiliary devices such as wrenches, auger forks, hoisting hooks, swivels, and adaptors;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.5 DIRECT AIR ROTARY DRILLING

- Drill rig with rotary table and Kelly or top-head drive unit;
- Drill rods, bits, and core barrels (as appropriate);
- Casing;
- Sampling devices and equipment, as appropriate;
- Air compressor and filters, pressure lines, discharge hose, swivel, dust collector, and air-cleaning device (cyclone separator);
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.6 DRILL-THROUGH CASING DRIVER

- Drill rig equipped with a mast-mounted, percussion driver;
- Casing, drill rods, and drill bits or hammers;
- Air compressor and filters, pressure lines, discharge hose, swivel, dust collector, and air-cleaning device (cyclone separator);
- Sampling devices and equipment, as appropriate;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Welding equipment and materials for installation of casing;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and

- Decontamination supplies and equipment per SOP 80.1.

2.7 DIRECT WATER-BASED ROTARY DRILLING

- Drill rig with derrick, rotary table and Kelly or top-head drive unit;
- Drill rods, bits, and core barrels (as appropriate);
- Casing;
- Water based drilling fluid, with approved additives as appropriate;
- Mud tub, suction hose, cyclone de-sander(s), drilling fluid circulation pump, pressure hose, and swivel;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1.
- Decontamination supplies and equipment per SOP 80.1.

2.8 DIRECT ROTARY WIRELINE-CASING ADVANCEMENT DRILLING

- Drill rig with either hollow spindle or top-head drive;
- Drill rods, coring or casing bits, overshot assembly, pilot bit, and core barrel;
- Water based drilling fluid, with approved additives as appropriate;
- Mud tub, suction hose, drilling fluid circulation pump, pressure hose, and swivel;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.9 DIAMOND CORE DRILLING

- Direct rotary drill rig and associated equipment (see Sections 2.4, 2.5 or 2.6);
- Core barrels and core bits;
- Core lifters;
- Core boxes, engineers scale, permanent marking pen, and camera for photographing cores;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

3.0 PROCEDURES

3.1 PENETRATION TEST AND SPLIT-BARREL SAMPLING OF SOILS

The following general procedure may be followed as outlined in ASTM Standard Test Method D 1586.

1. Advance the boring to the desired sampling depth using an appropriate drilling method (see sections below) and remove excessive cuttings from the borehole.
2. Attach the split-barrel sampler to the sampling rods and lower into the borehole. Do not allow the sampler to drop onto the soil to be sampled.
3. Position the hammer above and attach the anvil to the top of the drilling rods.
4. Rest the dead weight of the sampler, rods, anvil, and drive weight on the bottom of the boring and apply a seating blow. If excessive cuttings are encountered at the bottom of the borehole, remove the sampler and rods from borehole and remove the cuttings.
5. Mark the drill rods in three successive 6-inch increments so that the advance of the sampler can be observed.
6. Drive the sampler with blow from the 140 pound hammer and count the number of blows applied in each 6-inch increment until:
   a. Fifty (50) blows have been applied during one of the three 6-inch increments.
   b. A total of 100 blows have been applied.
   c. There is no observed advance of the sampler during the application of 10 successive blows of the hammer.
7. The sampler is advanced the complete 18-inches without the limiting blow counts occurring as described above.
8. Record the number of blows that is required to achieve each 6-inch increment of penetration or fraction of this increment on the boring.
   a. The first 6 inches is considered the seating driver.
   b. The sum of the second and third 6-inch penetration intervals is termed the “standard penetration resistance” or “N-value.”
   c. If the sampler is driven less than 18 inches as discussed in No. 6, then the number of blow for each partial increment will be recorded.
   d. For partial increments, the depth of penetration should be recorded to the nearest 1-inch on the boring log.
   e. If the sampler advances below the bottom of the boring under the weight of rods (static) and/or hammer, then this information will be recorded on the boring log.
9. The raising and dropping of the 140 pound hammer may be accomplished by:
   a. Using a trip, automatic, or semi-automatic hammer drop system that lifts the hammer and allows it to drop 30± 1 inches.
   b. Using a cathead shall be essentially free of rust, oil, or grease and have a diameter in the range of 6 to 10 inches. The cathead should be operated at a minimum speed of rotation of 100 revolutions per minute. No more than 2-1/4 rope turns on the cathead may be used when conducting the penetration test.

10. For each hammer blow, a 30-inch lift and drop shall be used.
11. After completing the penetration test, retrieve the sampler and open. Record the percent recovery or the length of sample recovered. Following the procedures outlined in SOP 30.1 when collecting environmental soil samples.
12. Borehole logging should be completed per SOP 10.3.
13. Split-barrel samples must be decontaminated before and after each use per the requirements of SOP 80.1.

3.2 THIN WALLED TUBE SAMPLING

The following general procedure may be followed for collection of relatively undisturbed, thin walled tube samples (e.g., Shelby tube) as outlined in ASTM Standard Practice D 1587.

1. Clean out the borehole to targeted sampling depth using most appropriate method, which avoids disturbing the material to be sampled. If groundwater is encountered, maintain the liquid level in the borehole at or above the groundwater level during sampling.
2. Place the sample tub so that its bottom rests on the bottom of the borehole.
3. Advance the sampler without rotation by a continuous relatively rapid motion.
4. Determine the length of the advance by the resistance and condition of the formation, the length of the advance should never exceed 5 to 10 diameters of the tube in sands and 10 to 15 diameters of the tube in clay.
5. When the formation is too hard for push type of sampling, the tube may be driven or the practice used for ring-lined barrel sampling may be used per ASTM Standard D 3550. When a sample is driven, the weight and fall of the hammer must be recorded along with the penetration achieved.
6. The maximum length of sample advance will be no longer than the sample-tube length minus an allowance for the sample head and a minimum of 3-inches for sludge-end cuttings.
7. Upon removal of the tube, measure the length of the sample in the tube. Remove the disturbed material in the upper end of the tube and re-measure the sample length.
8. Remove at least one-inch of material from the lower end of the tube for soil description and identification per SOP 10.3. Measure the overall sample length. Seal the lower end of the tube. If directed, the material from the end of the tube will not be removed for soil identification and description; in this case the tube will be sealed promptly.
9. Prepare sample labels and affix (or markings) on the tube.

3.3 DIRECT PUSH SOIL BORING

The following general procedures outlined in this section may be followed as described in ASTM Standard Test Method D 6282.

General considerations for this method include the following:

- A variety of direct push drive systems may be used to advance soil borings based on the intended sampling depths and subsurface conditions and include the following:

Shallower Depths and Less Difficult Conditions

- Percussive driving systems – use hydraulically operated hammers and mechanically operated hammers.
- Static push drive systems – use hydraulic rams to apply pressure and exert static pull (e.g., cone penetrometer systems).
- Vibratory/sonic systems – use a vibratory device, which is attached to the top of the sampler extension rods.

Greater Depths and More Difficult Conditions

- Sonic or resonance drilling systems – use a high power vibratory system to advance larger diameter single or dual tube systems.
- Rotary drilling equipment – use hydraulic system of drill rig for direct push.

- The equipment used for direct push must be capable of apply sufficient static force, or dynamic force, or both, to advance the sampler to the required depth of collection. Additionally, this equipment must have adequate retraction force to remove the sampler and extension/drive rods once the sample has been collected.
- Avoid using excessive down pressure when advancing the drilling tools/sampler. Excessive pressure may cause the direct push unit to offset from the boring location and may damage drilling tools and samplers.
- Sample liners should be compatible with the material being sampled and the type of analysis to be conducted on the sample. Sealing of liners for submittal to the laboratory for physical testing should be accomplished according to ASTM Standard D 4220 (Standard Practice for Preserving and Transporting Soil Samples).
- The general procedure for completing direct push soil borings is the following:

1. Stabilize direct push unit and raise mast at desired location.
2. Attach the hammer assembly to the drill head if not permanently attached. Attach the anvil assembly in the prescribed manner, slide the direct push unit the position over the borehole, and ready the tools for insertion.
3. Inspect the direct push tools before and after use. Decontaminate all down hole tools before and after use per SOP 80.1.
4. Inspect drive shoes for damaged cutting edges, dents or thread failures and these conditions could cause loss of sample recovery and slow the rate of advancement.
5. Assemble samplers and install where required, install sample retainers where needed, and install and secure sampler pistons to ensure proper operation where needed (see Steps 14 through 20 for the various sampler assembly procedures, etc.).
6. After sampler has been appropriately installed (see Steps 14 through 20 for installation procedures, etc.) advance the boring to the target sampling depth using an appropriate direct push technique, as identified above under general considerations.
7. Collect the soil sample from the target sampling depth using one of the methods identified in Steps 14 through 20.
8. Retrieve the sampler and appropriately process the soil sample as identified in Steps 14 through 20 below and in SOP 30.1.
9. Log the borehole per the requirements of SOP 10.3.
10. If collecting another soil sample, decontaminate the sampler for reuse per the requirements of SOP 80.1 or use another decontaminated sampler.

11. Appropriately manage investigation-derived material (discarded samples, decontamination fluids, etc.) per SOP 70.1.
12. Upon completion of the boring and collection of the desired soil samples, abandon the boring per the requirements of SOP 20.2.
13. The following single tube sampling systems (generally piston rod) may be used to collect soil samples (see Steps 14 through 16 below):
    a. Open Solid Barrel Sampler;
    b. Closed Solid Barrel Sampler (e.g. Geoprobe Macro-Core® Piston Rod Sampler); and
    c. Standard Split Barrel Sampler (see Section 3.1).
14. The following two tube sampling systems may be used to collect soil samples (see Steps 17 through 20 below):
    a. Split Barrel Sampler;
    b. Thin Wall Tubes;
    c. Thin Wall Tube Piston Sampler; and
    d. Open Solid Barrel Samplers.
15. Sampling with the single tube, open solid barrel sampler:
    a. Attach the required liner to the cutting shoe by insertion into the machined receptacle are or by sliding over the machined tube.
    b. Insert the liner and shoe into the solid barrel and attach the shoe.
    c. Attach the sampler head to the sampler barrel.
    d. Attach the sampler assembly to the drive rod and the drive head to the drive rod.
    e. Position the sampler assembly under the hammer anvil and advance the sampler assembly into the soil at a steady rate slow enough to allow the soil to be cut by the shoe and move up into the sample barrel.
    f. At the completion of the sampling interval, removal the sampler from the borehole. Remove the filled sampler liner from the barrel by unscrewing the shoe. Cap the liner for laboratory testing or split open for field processing (see SOP 30.1).
    g. Log the borehole per the requirements of SOP 10.3.
16. Sampling with the closed, solid barrel sampler (e.g., Macro-Core® sampler).
    a. Insert or attach the sample liner to the shoe and insert the assembly into the solid barrel sampler. Install the sample, retaining basket, if desired.
    b. Attach the latch coupling or sampler head to the sampler barrel, and attach the piston assembly with point and "O" rings if free water is present, to the latching mechanism.
    c. Insert the piston or packer into the liner to its proper position so that the point leads the sampler shoe. Set latch, charge packer, or install locking pin, and attach assembled sampler to drive rod.
    d. Add drive head and position under the hammer anvil. Apply down pressure, and hammer if needed, to penetrate the soil strata above the targeted sampling interval.
    e. When the sampling interval is reached, insert the piston latch release and recovery tool, removing the piston, or insert the locking pin removal/extension rods through the drive rods, turn counter clockwise, and remove the piston locking pin so the piston can float on top of the sample, or release any other piston holding device.
    f. Direct push or activate the hammer to advance the sampler the desired interval.

g. Retrieve the sampler from the borehole by removing the extension/drive rods. Remove the shoe, and withdraw the sample line with sample for processing (see SOP 30.1).

h. Clean and decontaminate the sampler, reload as described above and repeat the same procedure for collection of addition samples.

i. Log the borehole per the requirements of SOP 10.3.

17. Sampling with standard split barrel (split spoon) sampler generally consists of the following:

a. Attach the split barrel sampler to an extension rod or drill rod.

b. Using a mechanical or hydraulic hammer drive the ampler into the soil the desired interval. The maximum interval that should be driven is equal to the sample chamber length of the split barrel sampler, which is either 18-inches or 24-inches.

c. Retrieve the sampler from the borehole by removing the extension/drive rods.

d. Split the sampler open for field processing (see SOP 30.1).

e. Clean and decontaminate the sampler (SOP 80.1), re-attach and repeat the same procedure for collection of additional samples.

f. Log the borehole per the requirements of SOP 10.3.

18. Sampling with a two tube, split barrel sampler generally consists of the following:

a. Assemble the outer casing with the drive shoe on the bottom, attach the drive head to the top of the outer casing, and attach the sampler to the extension rods.

b. Connect the drive head to the top of the sampler extension rods, and insert the sampler assembly into the outer casing.

c. The cutting shoe of the sampler should contact the soil ahead of the outer casing to minimize sample disturbance.

d. The sample barrel should extend a minimum of 0.25 inches ahead of the outer casing.

e. Mark the outer casing to identify the required drive length, position the outer casing and sampler assembly under the drill head.

f. Move the drill head downward to apply pressure on the tool string. Advance the casing assembly into the soil at a steady rate, which is slow enough to allow the soil to be cut by the shoe and move up inside the sample barrel.

g. Occasional hammer action during the push may assist recovery.

h. If smooth push advancement is not possible because of subsurface conditions, use the hammer to advance the sampler.

i. Stop the application of pressure or hammering when target interval has been sampled. Move the drill head off the drive head. Attach a pulling device to the extension rods or position the hammer bail and retrieve the sampler from the borehole.

j. At the surface, remove the sampler from the extension rods and process the sample per Section 3.01 and SOP 30.1.

k. Log the borehole per the requirements of SOP 10.3.

19. Sampling with a two tube, thin wall tube sampler generally consists of the following:

a. Attach the tube to the tube head using removable screws.

b. Attach the tube assembly to the extension rods and position at the base of the outer casing shoe protruding a minimum of 0.25 inches to contact the soil ahead of the outer casing.

c. Advance the tube with or without the outer casing at a steady rate.

d. After completing the sampling interval, let the tube remain stationary for one minute. Rotate the tube slowly two revolutions to shear off the sample.

e. Remove the tube from the borehole and measure the recovery, and log the borehole per the requirements of SOP 10.3.

f. For field processing, extrude the sample from the tube sampler and process per SOP 30.1. Alternatively, the tube may be sealed and shipped to the laboratory.

20. Sampling with two tube, thin wall tube, piston sampler generally consists of the following:

    a. Check the fixed piston sampling equipment for proper operation of the cone clamping assembly and the condition of the "O" rings.

    b. Slide the thin wall tube over the piston, and attach it to the tube head. Position the piston at the sharpened end of the thin wall tube just above the sample relief bend.

    c. Attach the tube assembly to the extension rods and lower the sampler into position through the outer casing. Install the actuator rods through the extension rod, and attach to the actuator rod in the sampler assembly.

    d. Attach a holding ring to the to top of the actuator rod string and hook the winch cable or other hook to the holding ring to hold the actuator rods in a fixed position.

    e. Attach the pushing fork to the drill head/probe hammer and slowly apply downward pressure to the extension rods advancing the thin wall tube over the fixed piston into the soil for the length of the sampling interval.

    f. After completing the sampling interval, let the tube remain stationary for one minute. Rotate the tube slowly one revolution to shear off the sample.

    g. Remove the tube sampler from the borehole and measure the recovery, and log the borehole per the requirements of SOP 10.3.

    h. For field processing, extrude the sample from the tube sampler and process per SOP 30.1.

21. Sampling with an two tube, open solid barrel sampler generally consists of the following:

    a. This sampling technique may be used when soil conditions prevent advancement of a split barrel sampler or advancement of an outer casing.

    b. The solid, single, or segmented barrel sampler requires the use of a liner.

    c. Use sampler in advance of outer casing when this casing cannot be advanced.

    d. Follow the procedures outlined for two tube, split barrel sampling.

3.4 HOLLOW-STEM AUGER DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5784.

1. Stabilize drill rig and raise mast at desired location.
2. Attach an initial assembly of hollow-stem auger components (hollow stem auger, hollow auger head, center rod and pilot assembly, as appropriate) to the rotary drive of the drill rig.
3. Push the auger assembly below the ground surface and initiate rotation at a low velocity.
4. Decontamination of auger head may be necessary after this initial penetration if this surface soil is contaminated.
5. Continue drilling from the surface, usually at a rotary velocity of 50 to 100 rotations per minute to the depth where sampling or in-situ testing is required or until the drive assembly is within approximately 6- to 18 inches of the ground surface.
6. As appropriate, collect a soil sample from the required depth interval. The sample may be conducted by

a. Removing the pilot assembly, if used, and inserting and driving a sampler through the hollow stem auger of the auger column; or

b. Using a continuous sampling device within the lead auger section, where the sampler barrel fills with material as the auger is advanced.

7. Additional sections of hollow stems augers may be added to drill to a greater depth. After these auger sections are added, rotation of the hollow-stem auger assembly may be resumed.

8. When drilling through material suspected of being contaminated, the installation of single or multiple (nested) outer casings may be required to isolate zones suspected contamination (see SOP 20.1). Outer casings may be installed in a pre-drilled borehole or using a method in which casing is advanced at the same of drilling.

   Monitoring wells or piezometers may be installed using hollow-stem augers by:

   a. Drilling with or without sampling to the target depth.

   b. Removal of the pilot assembly, if used, and insertion of the monitoring well (or piezometer) assembly.

   c. The hollow stem auger column should be removed incrementally as the monitoring well (or piezometer) completion materials are placed (see SOP 20.1 for grouting).

9. If materials enter the bottom of the auger hollow stem during the removal of the pilot assembly, it should be removed with a drive sampler or other appropriate device.

10. If sampling or *in-situ* testing is not required during completion of the boring, the boring may be advanced with an expendable knock out plate or plug of an appropriate material instead of a pilot assembly.

11. Drill cuttings should be appropriately controlled and contained as IDM per SOP 70.1. It may be necessary to drill through a hole of sheet of plywood or similar material to prevent cuttings from contacting the ground surface.

12. The hollow-auger assembly and sampling devices must be decontaminated before and after each use per the methods specified in SOP 80.1.

13. Borehole logging should be completed per SOP 10.3.

14. Borehole abandonment, when required, should be conducted according to SOP 20.3.

3.5 DIRECT AIR ROTARY DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5784.

1. Stabilize drill rig and raise mast at desired location. Appropriately position the cyclone separator and seal it to the ground surface considering the prevailing wind direction (exhaust).

2. Establish point for borehole measurements.

3. Attach an initial assembly of a bit, down hole hammer, or core barrel with a single section of drill rod, below the rotary table or top-head drive unit, with the bit placed below the top of the dust collector.

4. Activate the air compressor to circulate air through system.

5. Initiate rotation of bit.

6. Continue with air circulation and rotation of the drill-rod column to the depth where sampling or in-situ testing is required or until the length of the drill rod section limits further penetration.

7. Monitor air pressure during drilling operations. Maintain low air pressure at bit to prevent fracturing of surrounding material.

8. Stop rotation and lift the bit slightly off the bottom of the hole to facilitate removal of drill cuttings and continue air circulation until the drill cuttings are removed from the borehole annulus.

9. Open reaching a desired depth of sampling, stop the air circulation and rest bit on bottom of hole to determine the depth. Record the borehole depth and any resultant caving in. If borehole caving is apparent set a decontaminated casing to protect the boring.
10. When sampling, remove the drill rod column from the borehole or leave the drill rod assembly in place if the sampling can be performed through the hollow axis of the drill rods and bit.
11. Compare the sampling depth to clean-out depth by first resting the sampler on the bottom of the hole and compare that measurement with the clean-out depth measurement.
12. If bottom-hole contamination is apparent (indicated by comparison of sample depth to clean-out depth), it is recommended that the minimum depth below the sampler/bit be 18 inches for testing. Record the depth of sampling or in-situ testing and the depth below the sampler/bit.
13. The procedure described in Steps 8 through 12 should be conducted for each sampling or testing interval.
14. Drilling to a greater depth may be accomplished by attaching an additional drill rod section to the top of the previously advanced drill-rod column and resuming drilling operations as described above.
15. When drilling through material suspected of being contaminated, the installation of single or multiple (nested) outer casings may be required to isolate zones suspected contamination (see SOP 20.1 for grouting requirements). Outer casings may be installed in a pre-drilled borehole or using a method in which casing is advanced at the same of drilling.
16. Monitoring wells or piezometers may be installed by:
    a. Drilling with or without sampling to the target depth.
    b. Removal of the drill rod assembly and insertion of the monitoring well (or piezometer) assembly.
    c. Addition of monitoring well (or piezometer) completion materials (see SOP 20.1).
17. Drill cuttings should be appropriately controlled and contained as IDM per SOP 70.1.
18. The drill rod assembly, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
19. Borehole logging should be completed per SOP 10.3.
20. Borehole abandonment, when required, should be conducted according to SOP 20.3

3.6 DRILL-THROUGH CASING DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5872.

1. Stabilize drill rig and raise mast at desired location. Appropriately position the cyclone separator and seal it to the ground surface considering the prevailing wind direction (exhaust).
2. Establish point for borehole measurements.
3. Attach an initial assembly of a bit or down hole hammer with a single section of drill rod and casing to the top-head drive unit.
4. Activate the air compressor to circulate air through system.
5. Drilling may be accomplished by
    a. Method 1- the casing will fall, or can be pushed downward behind the bit.
    b. To drill using Drive the casing first followed by drilling out the plug inside the casing.
    c. Method 2 - Advancing the casing and bit as a unit, with the drill bit or hammer, extending up to 12-inches below the casing.
6. Method 3 - Under reaming method where bit or hammer pens a hole slightly larger than the casing so that Method 1, drive the casing first and drill out the plug in the casing by moving the bit or hammer beyond

the casing and then withdrawing it into the casing. Air exiting the bit will remove the cuttings up the hole. Separate cuttings from the return air with a cyclone separator or similar device.

7. To drill using Method 2, advance casing and bit as unit with the bit or hammer extending up to 12-inches beyond the casing depending on the conditions. While drilling, occasionally stop the casing advancement, retract the bit or hammer inside the casing to clear and maintain air circulation to clear cuttings.
8. To drill using Method 3, use a special down hole bit or hammer to open a hole slightly larger than the outside diameter of the casing so that the casing will fall or can be pushed downward immediately behind the bit. After advancing the casing, retract the radial dimension of the drill bit to facilitate removal of the down hole bit or hammer and drill tools inside the casing. Cuttings are removed from the borehole with the air that operates the bit or hammer and can be separated from the air with a cyclone separator or similar device.
9. Monitor air pressure during drilling operations. Maintain low air pressure at bit or hammer to prevent fracturing of surrounding material.
10. Continue air circulation and rotation of the drill rod column until drilling is completed to the target depth (for sampling, in-situ sampling, etc.) or until the length of the drill-rod section limits further penetration.
11. Stop rotation and lift bit or hammer slightly off the bottom of the hole to facilitate removal of drill cuttings and continue air circulation until the drill cuttings are removed from the borehole annulus.
12. After reaching a desired depth of sampling, stop the air circulation and rest the bit on bottom of hole to determine the depth. Record the borehole depth and any resultant caving in. If borehole caving is apparent set a decontaminated casing to protect the boring.
13. When sampling, remove the drill rod column from the borehole. Compare the sampling depth to clean-out depth by first resting the sampler on the bottom of the hole and compare that measurement with the clean-out depth measurement.
14. If bottom-hole contamination is apparent (indicated by comparison of sample depth to clean-out depth), it is recommended that the minimum depth below the sampler/bit be 18 inches for testing. Record the depth of sampling or in-situ testing and the depth below the sampler/bit.
15. The procedure described in Steps 11 through 14 should be conducted for each sampling or testing interval.
16. Drilling to a greater depth may be accomplished by attaching an additional drill rod section and casing section to the top of the previously advanced drill-rod column/casing and resuming drilling operations as described above.
17. Monitoring wells or piezometers may be installed by:
    a. Casing advancement in increments, with or without sampling to the target depth.
    b. Removal of the drill rods and the attached drill bit while the casing is temporarily left in place to support the borehole wall.
    c. Insertion of the monitoring well (or piezometer) assembly.
    d. Addition of monitoring well (or piezometer) completion materials (see SOP 20.1).
18. Drill cuttings should be appropriately controlled and contained as IDM per SOP 70.1.
19. The drill rod assembly, casing, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
20. Borehole logging should be completed per SOP 10.3.
21. Borehole abandonment, when required, should be conducted according to SOP 20.3.

3.7 DIRECT WATER-BASED ROTARY DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5783.

1. Stabilize drill rig and raise mast at desired location. Appropriately position the mud tub and install surface casing and seal at the ground surface.
2. Establish point for borehole measurements.
3. Attach an initial assembly of a bit or core barrel with a single section of drill rod, below the rotary table or top-head drive unit, with the bit placed with the top of the surface casing.
4. Activate the drilling-fluid circulation pump to circulate drill fluid through the system.
5. Initiate rotation of bit and apply axial force to bit.
6. Document drilling conditions and sequence (fluid loss, circulation pressures, depths of lost circulation, etc.) as described in SOP 10.3.
7. Continue with drill fluid circulation as rotation and axial force are applied to the bit until drilling to the depth
    a) Where sampling or in-situ testing is required;
    b) Until the length of the drill rod section limits further penetration; or
    c) Until core specimen has completely entered the core barrel (when coring) or blockage has occurred.
8. Stop rotation and the lift bit slightly off the bottom of the hole to facilitate removal of drill cuttings and continue fluid circulation until the drill cuttings are removed from the borehole annulus.
9. After reaching a desired depth of sampling, stop the fluid circulation and rest the bit on bottom of hole to determine the depth. Record the borehole depth and any resultant caving in. If borehole caving is apparent set a decontaminated casing to protect the boring.
10. When sampling, drill rod removal is not necessary if the sampling can be performed through the hollow axis of the drill rods and bit.
11. Compare the sampling depth to clean-out depth by first resting the sampler on the bottom of the hole and compare that measurement with the clean-out depth measurement.
12. If bottom-hole contamination is apparent (indicated by comparison of sample depth to clean-out depth), it is recommended that the minimum depth below the sampler/bit be 18 inches for testing. Record the depth of sampling or in-situ testing and the depth below the sampler/bit.
13. The procedure described in Steps 8 through 11 should be conducted for each sampling or testing interval.
14. Drilling to a greater depth may be accomplished by attaching an additional drill rod section to the top of the previously advanced drill-rod column and resuming drilling operations as described above.
15. When drilling through material suspected of being contaminated, the installation of single or multiple (nested) outer casings may be required to isolate zones suspected contamination (see SOP 20.1 for grouting requirements). Outer casings may be installed in a pre-drilled borehole or using a method in which casing is advanced at the same of drilling.
16. Monitoring wells or piezometers may be installed using hollow-stem augers by:
    a. Drilling with or without sampling to the target depth.
    b. Removal of the drill rod assembly and insertion of the monitoring well (or piezometer) assembly.
    c. Addition of monitoring well (or piezometer) completion materials (see SOP 20.1).
17. Drill cuttings and fluids should be appropriately controlled and contained as IDM per SOP 70.1.

18. The drill rod assembly, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
19. Borehole logging should be completed per SOP 10.3.
20. Borehole abandonment, when required, should be conducted according to SOP 20.3.

3.8 DIRECT ROTARY WIRELINE CASING ADVANCEMENT DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5876.

1. Stabilize drill rig and raise mast at desired location. Appropriately position the mud tub (for water based rotary) and install surface casing and seal at the ground surface.
2. Record the hole depth by knowing the length of the rod-bit assemblies and comparing its position relative to the established surface datum.
3. Attach an initial assembly of a lead drill rod and a bit or core barrel below the top-head drive unit, with the bit placed with the top of the surface casing.
4. Activate the drilling-fluid circulation pump to circulate drill fluid through the system.
5. Initiate rotation of bit and apply axial force to bit.
6. Document drilling conditions and sequence (fluid loss, circulation pressures, depths of lost circulation, down feed pressures etc.) as described in SOP 10.3.
7. In general, the pilot bit or core barrel can be inserted or removed at any time during the drilling process and the large inside diameter rods can act as a temporary casing for testing or installation of monitoring devices.
8. Continue with drill fluid circulation as rotation and axial force are applied to the bit until drilling to the depth
    a) Where sampling or in-situ testing is required;
    b) Until the length of the drill rod section limits further penetration; or
    c) Until core specimen has completely entered the core barrel (when coring) or blockage has occurred.
9. Stop rotation and lift the bit slightly off the bottom of the hole to facilitate removal of drill cuttings and continue fluid circulation until the drill cuttings are removed from the borehole annulus.
10. After reaching a desired depth of sampling, stop the fluid circulation and rest the bit on bottom of hole to determine the depth. Record the borehole depth and any resultant caving in. If borehole caving is apparent set a decontaminated casing to protect the boring.
11. When sampling, drill rod removal is not necessary if the sampling can be performed through the hollow axis of the drill rods and bit.
12. Compare the sampling depth to clean-out depth by first resting the sampler on the bottom of the hole and compare that measurement with the clean-out depth measurement.
13. If bottom-hole contamination is apparent (indicated by comparison of sample depth to clean-out depth), it may be necessary to further clean the hole by rotary recirculation.
14. Continuous sampling may be conducted with a soil core barrel or rock core barrel (see Section 1.7).
15. The pilot bit or core barrel may need to be removed during drilling such as when core barrels are full or there is evidence of core blocking. Before the drill string is reinserted, the depth of the boring should be rechecked to evaluate hole quality and determine whether casing may be required.

16. Water testing may be performed in consolidated deposits by pulling back on the drill rods and passing inflatable packer(s) with pressure fitting to test the open borehole wall (see ASTM Standards D 4630 and D 4631).
17. Drilling to a greater depth may be accomplished by attaching an additional drill rod section to the top of the previously advanced drill-rod column and resuming drilling operations as described above.
18. When drilling through material suspected of being contaminated, the installation of single or multiple (nested) outer casings might be required to isolate zones suspected contamination (see SOP 20.1 for grouting requirements). Outer casings may be installed in a pre-drilled borehole or using a method in which casing is advanced at the same of drilling.
19. Monitoring wells or piezometers may be installed by:
    a. Drilling with or without sampling to the target depth.
    b. Removal of the pilot bit or core barrel and insertion of the monitoring well (or piezometer) assembly.
    c. Addition of monitoring well (or piezometer) completion materials (see SOP 20.1).
20. Drill cuttings and fluids should be appropriately controlled and contained as IDM per SOP 70.1.
21. The drill rod assembly, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
22. Borehole logging should be completed per SOP 10.3.
23. Borehole abandonment, when required, should be conducted according to SOP 20.3.

3.9 DIAMOND CORE DRILLING

The following general procedure may be followed as outlined in ASTM Standard Practice D 2113.

1. Use core-drilling procedures, such as the water-rotary drilling method outlined in Section 3.6.
2. Seat the casing on bedrock or firm formation to prevent raveling of the borehole and to prevent loss of drilling fluid. Level the formation that the casing will be seated on as needed.
3. Begin core drilling using an N-size double-tube, swivel-type core barrel or other approved size or type. Continue core drilling until core blockage occurs or until the net length of the core has been drilled.
4. Remove the core barrel from the borehole, and dis-assemble the core barrel as necessary to remove the core.
5. Reassemble the core barrel and return it to hole.
6. Continue core drilling.
7. Place the recovered core in the core box with the upper (surface) end of the core at the upper-left corner of the core box. Wrap soft or friable cores, etc. as needed or required. Use spacer blocks or slugs properly marked to indicate any noticeable gap in recovered core that might indicate a change or void in the formation. Fit fracture, bedded, or jointed pieces of core together as they naturally occurred.
8. The core within each completed box should be photographed after core surface has been cleaned or peeled, as appropriate, and wetted. Each photo should be in sharp focus and contain a legible scale in feet and tenths of feet (or metric if appropriate). The core should be oriented so that the top of the core is at the top of the photograph. A color chart should be included in the photograph frame as a check on photographic accuracy. The inside lid of the box should also be shown.
9. The inside of the box lid should be labeled at a minimum with the facility name, project name, boring number, box number, and core interval.

10. A preliminary field log of the core must be completed before the core box has been packed for transport (see SOP 10.3). Detailed logging may be conducted at a later time providing the core is appropriately handled and transported.
11. Four levels of sample protection may be used depending on character of the rock and the intended use of the rock core including:
    a. *Routine care* – for rock cored in 5 to 10 foot runs. Consists of placing in structurally sound boxes. Lay flat tubing may be used prior to placing the core.
    b. *Special care* – for rock samples to be tested that are potentially moisture sensitive, such as shale. This care consists of sealing with a tight fitting wrapping of plastic film and application of wax at the ends of the sample.
    c. *Critical care* – for rock samples that may be sensitive to shock and vibration and/or temperature. Protect by encasing each sample in cushioning material, such as sawdust, rubber, polystyrene, foam, etc. A minimum one-inch thick layer of cushioning material should be used. Thermally insulate samples that are potentially sensitive to changes in temperature.
    d. *Soil-Like care* – handle per ASTM Standard D 4220.
12. Drilling conditions and sequence (fluid loss, circulation pressures, depths of lost circulation, down feed pressures, core blockage etc.) should be documented on the boring log as described in SOP 10.3.
13. Drill cuttings and fluids should be appropriately controlled and contained as investigation-derived material per SOP 70.1.
14. The drill rod assembly, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
15. Borehole logging should be completed per SOP 10.3.
16. Borehole abandonment, when required, should be conducted according to SOP 20.3.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to site-specific health and safety plan included in work plan addenda.

6.0 REFERENCES

ASTM Standard D 2113-06 (2006). 1993. *Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation.*

ASTM Standard D 1586-99. 1999. *Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.*

ASTM Standard D 1587-00 (2007) e1. 2007. *Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes.*

ASTM Standard D 3550-01 (2007). 2007. *Standard Practice for Think Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils.*

ASTM Standard D 4220-95 (2007). 2007. *Standard Practices for Preserving and Transporting Soil Samples.*

ASTM Standard D 4630-96 (2002). 2002. *Standard Test Method for Determining Transmissivity and Storage Coefficient of Low-Permeability Rocks by In Situ Measurements Using the Constant Head Injection Test.*

ASTM Standard D 4631-95 (2000). 2000. *Standard Test Method for Determining Transmissivity and Storativity of Low-Permeability Rocks by In Situ Measurements Using Pressure Pulse Technique.*

ASTM Standard D 5079-02 (2006). 2006. *Standard Practices for Preserving and Transporting Rock Core Samples.*

ASTM Standard D 5782-95 (2006). 2006. *Standard Guide for Use of Direct Air-Rotary Drilling for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 5783-95 (2006). 2006. *Standard Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 5784-95 (2006). 2006. *Standard Guide for Use of Hollow-Stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 5872-95 (2006). 2006. *Standard Guide for Use of Casing Advancement Drilling Methods for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 5876-95 (2005). 2005. *Standard Guide for Use of Direct Rotary Wireline Casing Advancement Drilling Methods for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 6282-98 (2005). 2005. *Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations.*

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000. 1, November.

STANDARD OPERATING PROCEDURE 30.1
SOIL SAMPLING

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for sampling surface and subsurface soils.

2.0 MATERIALS

- Stainless steel scoop, spoon, trowel, knife, spatula, (as needed);
- Split-spoon, Shelby tube, or core barrel sampler;
- Hand auger or push tube sampler;
- Drill rig and associated equipment (subsurface soil);
- Stainless steel bowls;
- Photoionization detector or other appropriate instrument as specified in site-specific health and safety plan;
- Sampling equipment for collection of volatile organic samples;
- Appropriate sample containers;
- Appropriate sample labels and packaging material.;
- Personal protective equipment and clothing (PPE) per site-specific health and safety plan; and
- Decontamination equipment and supplies (SOP 80.1).

3.0 PROCEDURE

3.1 DOCUMENTATION

Soil sampling information should be recorded in the field logbooks as described in SOPs 10.1 and 10.2.

3.2 SURFICIAL SOIL SAMPLES

The targeted depths for surficial soil samples (surface and near surface) will be specified in the work plan addenda developed for site-specific investigations.

1. All monitoring equipment should be appropriately calibrated before beginning sampling according to the requirements of the work plan addenda and SOP 90.1 or 90.2.
2. All sampling equipment should be appropriately decontaminated before and after use according to the requirements of the work plan addendum and SOP 80.1.
3. Use a spade, shovel, or trowel or other equipment (manufactured from material, which is compatible with the soil to be sampled) to remove any overburden material present (including vegetative mat) to the level specified for sampling.
4. Measure and record the depth at which the sample will be collected with an engineers scale or tape.

5. Remove the thin layer that was in contact with the overburden removal equipment using a clean stainless steel scoop or equivalent and discard it.
6. Begin sampling with the acquisition of any discrete sample(s) for analysis of volatile organic compounds (VOCs), with as little disturbance as possible. VOC samples will not be composited or homogenized.
7. When a sample will not be collected with a core type of sampler (push tube, split spoon, etc.), the sample for VOC analysis will be collected from freshly exposed soil. The method of collection will follow the procedures specified in SOP 30.8 (Methanol Preservation Method) or 30.9 (En Core® Method) based on the requirements of the work plan addenda.
8. Field screen the sample with properly calibrated photoionization detector (PID) or other appropriate instrument. Cut a cross-sectional slice from the core or center of the sample and insert the monitoring instrument(s). Based on the screening results, collect the VOC fraction, as applicable.
9. Collect a suitable volume of sample from the targeted depth with a clean stainless steel scoop (or similar equipment), push tube sampler, or bucket auger
10. For core type of samplers, rough trimming of the sampling location surface should be considered if the sampling surface is not fresh or other waste, different soil strata, or vegetation may contaminate it. Surface layers can be removed using a clean stainless steel, spatula, scoop, or knife. Samples collected with a bucket auger or core type of sampler should be logged per the requirements of SOP 10.3.
11. If homogenization or compositing of the sampling location is not appropriate for the remaining parameters, the sample should be directly placed into appropriate sample containers with a stainless steel spoon or equivalent.
12. If homogenization of the sample location is appropriate or compositing of different locations is desired, transfer the sample to a stainless steel bowl for mixing. The sample should be thoroughly mixed with a clean stainless steel spoon, scoop, trowel, or spatula and then placed in appropriate sample containers per the requirements for containers and preservation specified in work plan addenda. Secure the cap of each container tightly.
13. Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
14. Return any remaining unused soil to the original sample location. If necessary, add clean sand to bring the subsampling areas back to original grade. Replace the vegetative mat over the disturbed areas.

3.3 SUBSURFACE SAMPLES

All sampling equipment should be appropriately decontaminated before and after use according to the requirements of the work plan addendum and SOP 80.1.

1. All monitoring equipment should be appropriately calibrated before sampling according to the requirement of the work plan addendum and SOP 90.1 or SOP 90.2.
2. All sampling equipment should be appropriately decontaminated before and after use according to the requirements of the work plan addendum and SOP 80.1.
3. Collect split-spoon; core barrel, Shelby tube, sonic core or other similar samples during drilling.
4. Upon opening sampler or extruding sample, immediately screen soil for VOCs using a PID or appropriate instrument. If sampling for VOCs, determine the area of highest concentration; use a

stainless steel knife, trowel, or lab spatula to cut the sample; and screen for VOCs with monitoring instrument(s).

5. Log the sample on the boring log before extracting from the sampler per the requirements of SOP 10.3.
6. Any required VOC samples will be collected first followed by the other parameters. VOC samples will not be composited or homogenized and will be collected from the area exhibiting the highest screening level. The method of VOC sample collection will follow the procedures specified in SOP 30.8 (Methanol Preservation Method) or 30.9 (En Core® Method) based on the requirements of the work plan addenda.
7. Field screen the sample with properly calibrated photoionization detector (PID) or other appropriate instrument. Cut a cross-sectional slice from the core or center of the sample and insert the monitoring instrument(s). Based on the screening results, collect the VOC fraction, as applicable.
8. Rough trimming of the sampling location surface should be considered if the sampling surface is not fresh or other waste, different soil strata, or vegetation may contaminate it. Surface layers can be removed using a clean stainless steel, spatula, scoop, or knife.
9. If homogenization or compositing of the sampling location is not appropriate for other parameters, the sample should be directly placed into appropriate sample containers with a stainless steel spoon or equivalent.
10. If homogenization of the sample location is appropriate or compositing of different locations is desired, transfer the sample to a stainless steel bowl for mixing. The sample should be thoroughly mixed with a clean stainless steel spoon, scoop, trowel, or spatula and placed in appropriate sample containers per the requirements for containers and preservation specified in work plan addenda. Secure the cap of each container tightly.
15. Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
16. Discard any remaining sample into the drums used for collection of cuttings.
17. Abandon borings according to procedures outlined in SOP 20.2.

3.4 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addenda for the site being investigated and SOP 70.1.

NOTES: If sample recoveries are poor, it may be necessary to composite samples before placing them in jars. In this case, the procedure will be the same except that two split-spoon samples (or other types of samples) will be mixed together. The boring log should clearly state that the samples have been composited, which samples were composited, and why the compositing was done. In addition, VOC fraction should be collected from the first sampling device.

When specified, samples taken for geotechnical analysis (e.g., percent moisture, density, porosity, and grain size) will be undisturbed samples, such as those collected using a thin-walled (Shelby tube) sampler, sonic core sampler, etc.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

Soil samples will not include vegetative matter, rocks, or pebbles unless the latter are part of the overall soil matrix.

6.0 REFERENCES

ASTM Standard D 1586-99. 1999. *Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.*

ASTM Standard D 1587-00 (2007) e1. 2007. *Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes.*

ASTM Standard D 5633-04. 2004. *Standard Practice for Sampling with a Scoop.*

USACE. 2001. *Requirements for the Preparation of Sampling and Analysis Plans.* EM 200-1-3. 1 February.

STANDARD OPERATING PROCEDURE 30.2
GROUNDWATER SAMPLING

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for the collection of groundwater samples from monitoring wells.

2.0 MATERIALS

- Work Plans;
- Field logbooks and field parameter forms;
- Plastic sheeting;
- Decontamination equipment and supplies (SOP 80.1);
- Variable-speed, low-flow submersible pump with safety drop cable;
- Nylon stay-ties;
- Generator;
- Dedicated Teflon tubing or Teflon lined polyethylene tubing;
- Flow-through-cell and probes for measuring pH, temperature, specific conductance, oxidation/reduction potential, dissolved oxygen, and turbidity (SOP 40.1);
- Electronic water-level indicator;
- Appropriate sample bottles, labels, chain-of-custody forms, and sample shipping supplies etc;
- Cooler with ice;
- Silicone tubing;
- 0.45-micron disposable filters (as appropriate).
- Personal protective equipment and clothing (PPE) per site-specific health and safety plan;
- Photoionization detector (PID) or other appropriate monitoring instrument per the site-specific health and safety plan; and
- Appropriate containers for investigation-derived material.

3.0 PROCEDURE

3.1 DOCUMENTATION

Groundwater sampling information should be recorded in the field logbooks as described in SOPs 10.1 and 10.2.

The following are general rules for the field parameter logbook for groundwater, as described in SOP 10.2:

- Only information for one site or installation per logbook. The same book maybe used for more than one sampling event.

- The first five pages will be reserved for index, general notes, etc. Sign and date each entry.
- Fill in the forms.
- Duplicate copies, index pages, and calibration sheets remain intact.

3.2 OVERVIEW OF SAMPLING TECHNIQUES

In general, two different techniques may be used to sample groundwater from monitoring wells at Radford Army Ammunition Plant (RFAAP):

- Low flow purging and sampling (Type I); and
- Conventional purging and low-flow sampling (Type II).

These two sampling techniques are intended to address the different groundwater conditions that may be encountered at RFAAP.

The Type I sampling technique will be used in the following situations:

- In wells where only one discrete water-producing zone is encountered;
- In wells with no discrete water bearing zone and a low yield (generally < 0.5 liters per minute); and
- In wells sampled during seasonal low groundwater conditions with greatly reduced yield.

The Type II sampling technique will be used in the following situations:

- In a well with potential or documented multiple flow zones and where individual flow zones will not be evaluated;
- In moderately producing wells (> 0.5 liters per minute) where no discrete flow zones were documented during drilling; and
- In wells sampled during seasonal high groundwater conditions with enhanced yield (and potentially additional flow zones).

Groundwater samples should be collected no sooner than 14 days after well development. Information from the boring logs, well completion records, and well development records should be reviewed before sampling a well to determine the most appropriate sampling technique. Pertinent information for each well to be sampled includes:

- Well construction;
- Depth and nature of water producing zones;
- Sustainable pumping rate of the well to be sampled;
- Well recharge characteristics; and
- Baseline turbidity.

Because of the heterogeneous nature of the fracture and solution-enhanced fractured bedrock at RFAAP, monitoring well purging and sampling techniques will need to be flexible. This flexibility is necessary to obtain representative samples that meet the data quality objectives (DQOs) specified in site-specific work plan addenda.

In general, when using the pumps specified in the following sections, situate any gasoline-powered generator on level ground approximately 15 ft downwind from the well. All generator maintenance (oil and fueling) is to be performed off site. If the hose(s) and/or power cord of the pump is not on a reel, place the pump with its hose and power cord on the plastic sheeting downhill from the well.

3.3 TYPE I SAMPLING PROCEDURES

Type I low flow purging and sampling procedures include the following:

- The work area outside the well will be prepared by placing plastic sheeting on the ground around the well casing to avoid cross-contamination.
- All equipment used to purge and sample the wells will be thoroughly decontaminated before and after use according to the requirements of the work plan addenda and SOP 80.1.
- All equipment to be used for monitoring water quality parameters will be calibrated before beginning purging according to the requirements of the work plan addenda and SOP 40.1.
- Note the condition of the well and well head.
- Monitor the headspace of the well with a photoionization detector as the well cap is removed.
- Measure and record the depth to water with an electronic water level indicator. The measurement of well depth will not be taken until after sampling is completed so that potential re-suspension of any settled solids at the bottom of the well is avoided.
- Well depth at the time of purging will be obtained from well construction and existing data.
- Slowly lower a clean, stainless steel, adjustable flow rate, submersible pump and dedicated Teflon or Teflon-lined polyethylene tubing to the desired depth. As the pump is slowly lowered into the well, secure the safety drop cable, tubing, and electrical lines to each other using nylon stay-ties.
- For wells with very low sustainable pumping rates ($\leq$ 0.5 liters per minute), the pump should be set in the middle of the saturated screen section of the well or middle of the water column for open wells. The pump should be set 12 hours prior to purging so that the depth to water equilibrates and sediments disturbed during pump placement have time to settle.
- For wells with sustainable pumping rates ($>$ 0.5 liters per minute), the pumps will be set at a desired depth prior to purging, allowing for the depth to water to equilibrate before sampling. The desired depth will be specified in work plan addenda based on site-specific conditions and DQOs.
- Connect the pump tubing to an in-line flow-through cell(s) and connect the multi-parameter probe to the cell(s). The end of the tubing exiting the in-line flow-through cell should be placed to discharge into a appropriate container(s) to collect purge water.
- Immediately prior to purging, the depth to water will be measured and record. Start pumping the water at a rate of 100 to 400 milliliters per minute. Avoid surging. The pumping rate should cause minimal drawdown (less than 0.2 ft). Water level measurements should be collected continuously to document stabilization of the water level. Pumping rates should, if needed, be reduced to the minimal capabilities of the pump to avoid dewatering the screen interval and ensure stabilization of indicator parameters.
- During purging, water quality indicator parameters will be monitored at the in-line flow-through cell(s) every 3 to 5 minutes. The parameters to be monitored include pH, specific conductance, oxidation/reduction potential (Eh), dissolved oxygen, and turbidity.

- Continue purging until stabilization of indicator parameters is achieved. Stabilization is defined as three consecutive readings that are within the following criteria:
  - ± 0.1 for pH;
  - ±3% for specific conductance;
  - ±10 mV for oxidation/reduction potential (Eh); and
  - ±10% for turbidity and dissolved oxygen.
- If the parameters have stabilized, but the turbidity is not in the range of 5 to 10 NTU, then both filtered and unfiltered samples should be collected for any metals analysis. Filter metal samples should be collected with an in-line filter using a high capacity 0.45-micron particulate filter. This filter should be pre-rinsed according to the manufacturer's instructions.
- Once purging is completed, reduce the pumping rate to its lowest steady rate and disconnect the tubing from the in-line flow-though cell(s).
- Collect groundwater samples directly from the end of the tubing into clean containers provided by the laboratory. The container requirements and preservatives for groundwater samples are specified in work plan addenda. Allowing the pump discharge to flow gently down the inside of the container with minimal turbulence should fill all sample containers. Volatile organic compound (VOC) and gas sensitive parameter samples should be collected first followed by other parameters.
- In general, samples should be collected and containerized in the order of the volatilization sensitivity of the parameters. A preferred collection order for some common parameters is VOCs, extractable organics, metals, cyanide, sulfate and chloride, turbidity, and nitrate and ammonia. The parameters to be collected at any well location are site-specific and are specified in work plan addenda.
- Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
- After the sample collection is complete, remove the pump, tubing, and associated lines. Note: sample tubing will be dedicated to each well.
- Measure and record the total depth of the well.
- Secure the well be replacing and locking the lid.

3.4 TYPE II SAMPLING PROCEDURES

- The work area outside the well will be prepared by placing plastic sheeting on the ground around the well casing to avoid cross-contamination.
- All equipment used to purge and sample the wells will be thoroughly decontaminated before and after use according to the requirements of the work plan addenda and SOP 80.1.
- All equipment to be used for monitoring water quality parameters will be calibrated before beginning purging according to the requirements of the work plan addenda and SOP 40.1.
- Note the condition of the well and well head.
- Monitor the headspace of the well with a photoionization detector as the well cap is removed.
- Measure and record the depth to water with an electronic water level indicator. The measurement of well depth will not be taken until after sampling is completed so that potential re-suspension of any settled solids at the bottom of the well is avoided.

- Well depth at the time of purging will be obtained from well construction and existing data.
- Calculate the standing water column in the well by subtracting the depth to water from the total depth of the well as recorded during completion of the well.
- From the water depth, well diameter, sand pack length, etc., calculate the equivalent volume (1 EV) of water in the well.

  1 EV = volume in casing + volume in saturated sand pack. Therefore; if the water table lies below the top of the sand pack, use the following equation:

  $1\ EV = (pR_w^2h_w) + (0.30p(R_s^2-R_w^2)h_w) * (0.0043)$

  If the water table lies above the top of the sand pack use this equation:

  $1\ EV = [(pR_w^2h_w) + (0.30p(R_s^2-R_w^2)h_s)] * (0.0043)$

  Where: R_s = radius of sand pack in inches
  R_w = radius of well casing in inches
  h_s = height of sand pack in inches
  h_w = water depth in inches

  $0.0043\ gal/in^3$
  Assumed filter pack porosity = 30%

Tables and graphs showing equivalent volumes for typical well constructions are available.

- Slowly lower a clean, stainless steel, adjustable flow rate, submersible pump and dedicated Teflon or Teflon-lined polyethylene tubing to the middle of the saturated screen interval or water column in an open borehole. As the pump is slowly lowered into the well, secure the safety drop cable, tubing, and electrical lines to each other using nylon stay-ties.
- Connect the pump tubing to an in-line flow-through cell(s) and connect the multi-parameter probe to the cell(s). The end of the tubing exiting the in-line flow-through cell should be placed to discharge into an appropriate container to collect purge water.
- Start purging the well at the minimally achievable pumping rate. Gradually increase the pumping rate to achieve the maximum flow rate of the pump or the maximum sustainable flow rate that does not draw down the static water level to a point below the top of the first water bearing zone, whichever is achieved first.
- During purging, water level measurements should be collected periodically to verify water levels in the well.
- During purging, water quality indicator parameters will be monitored at the in-line flow-through cell(s) every 3 to 5 minutes. The parameters to be monitored include pH, specific conductance, oxidation/reduction potential (Eh), dissolved oxygen, and turbidity.
- Note when each indicator parameter stabilizes. Stabilization is defined as three consecutive readings that are within the following criteria:
  - ± 0.1 for pH;
  - ±3% for specific conductance;
  - ±10 mV for oxidation/reduction potential (Eh); and
  - ±10% for turbidity and dissolved oxygen.

- Three calculated eVs of water in the will be purged prior to sampling. It will be documented if stabilization of the indicator parameters has not occurred after three calculated well volumes have been removed and sampling procedures begin.
- If the turbidity is not in the range of 5 to 10 NTU when purging has been completed, then both filtered and unfiltered samples should be collected for any metals analysis. Filter metal samples should be collected with an in-line filter using a high capacity 0.45-micron particulate filter. This filter should be pre-rinsed according to the manufacturer's instructions.
- Once purging is completed, reduce the pumping rate to its lowest steady rate and disconnect the tubing from the in-line flow-though cell(s).
- Collect groundwater samples directly from the end of the tubing into clean containers provided by the laboratory. The container requirements and preservatives for groundwater samples are specified in work plan addenda. Allowing the pump discharge to flow gently down the inside of the container with minimal turbulence should fill all sample containers. Volatile organic compound (VOC) and gas sensitive parameter samples should be collected first followed by other parameters.
- Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
- After the sample collection is complete, remove the pump, tubing, and associated lines. Note: sample tubing will be dedicated to each well.
- Measure and record the total depth of the well.
- Secure the well be replacing and locking the lid.

3.5 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addendum for the site being investigated and SOP 70.1.

4.0 MAINTENANCE

Refer to manufacturer's requirements for maintenance of pumps and generators.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

6.0 REFERENCES

ASTM Standard D 5903-96 (2006). 2006. *Planning and Preparing for a Groundwater Sampling Events.*

USACE. 2001. R*equirements for the Preparation of Sampling and Analysis Plans.* EM 200-1-3, 1 February.

USEPA. 1995. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures United States Environmental Protection Agency*, Office of Solid Waste and Emergency Response, EPA/540/S-95/504, December 1995.

USEPA. 1997. *Recommended Procedure for Low-flow Purging and Sampling of Groundwater Monitoring Wells.* Bulletin No. QAD023, October.

STANDARD OPERATING PROCEDURE 30.7
SAMPLING STRATEGIES

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate sampling strategies for sampling various media.

2.0 MATERIALS

- Historical site data;
- Site topography;
- Soil types; and
- Sampled media.

3.0 PROCEDURE

The primary goal of any investigation is to collect samples representative of existing site conditions. Statistics are generally used to ensure samples are as representative as possible. Sampling plans may employ more than one approach to ensure project data quality objectives are adequately addressed. A comparison of sampling strategies is presented in Table 1.

3.1 CLASSICAL STATISTICAL SAMPLING

Classical statistical sampling strategies are appropriately applied to either sites where the source of contamination is known or small sites where the entire area is remediated as one unit. Primary limitations of this sampling approach include (1) inability to address media variability; (2) inadequate characterization of heterogenous sites; and (3) inadequate characterization of sites with unknown contamination characteristics.

3.1.1 Simple Random Sampling

Simple random sampling is generally more costly than other approaches because of the number of samples required for site characterization. This approach is generally used when minimal site information is available and visible signs of contamination are not evident and includes the following features:

- Sampling locations are chosen using random chance probabilities.
- This strategy is most effective when the number of sampling points is large.

3.1.2 Stratified Random Sampling

This sampling approach is a modification to simple random sampling. This approach is suited for large site investigations that encompass a variety of soil types, topographic features, and/or land uses. By dividing the site into homogenous sampling strata based on background and historical data, individual random sampling techniques are applied across the site. Data acquired from each stratum can be used to determine the mean or total contaminant levels and provide these advantages:

- Increased sampling precision results due to sample point grouping and application of random sampling approach.
- Control of variances associated with contamination, location, and topography.

3.1.3 Systematic Grid

The most common statistical sampling strategy is termed either systematic grid or systematic random sampling. This approach is used when a large site must be sampled to characterize the nature and extent of contamination.

Samples are collected at predetermined intervals within a grid pattern according to the following approach:

- Select the first sampling point randomly; remaining sampling points are positioned systematically from the first point.
- Determine the grid design: one or two-dimensional. One-dimensional sample grids may be used for sampling along simple man-made features. Two-dimensional grid systems are ideal for most soil applications.
- Determine the grid type: square or triangular. Sampling is usually performed at each grid-line intersection. Other strategies include sampling within a grid center or obtaining composite samples within a grid.
- Each stratum is sampled based on using the simple random sampling approach but determined using a systematic approach.

3.1.4 Hot-Spot Sampling

Hot spots are small, localized areas of media characterized by high contaminant concentrations. Hot-spot detection is generally performed using a statistical sampling grid. The following factors should be addressed:

- Grid spacing and geometry. The efficiency of hot-spot searches is improved by using a triangular grid. An inverse relationship exists between detection and grid point spacing, e.g., the probability of hot-spot detection is increased as the spacing between grid points is decreased.
- Hot-spot shape/size. The larger the hot spot, the higher the probability of detection. Narrow or semi-circular patterns located between grid sampling locations may not be detected.
- False-negative probability. Estimate the false negative (β-error) associated with hot-spot analysis.

3.1.5 Geostatistical Approach

Geostatistics describe regional variability in sampling and analysis by identifying ranges of correlation or zones of influence. The general two-stage approach includes the following:

- Conducting a sampling survey to collect data defining representative sampling areas.
- Defining the shape, size, and orientation of the systematic grid used in the final sampling event.

3.2 NON-STATISTICAL SAMPLING

3.2.1 Biased Sampling

Specific, known sources of site contamination may be evaluated using biased sampling. Locations are chosen based on existing information.

3.2.2 Judgmental Sampling

This sampling approach entails the subjective selection of sampling locations that appear to be representative of average conditions. Because this method is highly biased, it is suggested that a measure of precision be included through the collection of multiple samples.

4.0 MAINTENANCE

Not applicable.

5.0 REFERENCES

Gilbert, R.O. 1987. *Statistical Methods for Environmental Pollution Monitoring.* John Wiley & Sons, Inc. 320 p.

USACE. 2001. *Requirements for the Preparation of Sampling and Analysis Plans.* EM200-1-3. 1 February.

TABLE 1
SAMPLING STRATEGIES

SAMPLING STRATEGY	DESCRIPTION	APPLICATION	LIMITATIONS
Classical Statistical Sampling Strategies			
Simple Random Sampling	Representative sampling locations are chosen using the theory of random chance probabilities.	Sites where background information is not available and no visible signs of contamination are present.	May not be cost-effective because samples may be located too close together. Does not take into account spatial variability of media.
Stratified Random Sampling	Site is divided into several sampling areas (strata) based on background or site survey information.	Large sites characterized by a number of soil types, topographic features, past/present uses, or manufacturing storage areas.	Often more cost-effective than random sampling. More difficult to implement in the field and analyze results. Does not take into account spatial variability of media.
Systematic Grid Sampling	Most common statistical strategy; involves collecting samples at predetermined, regular intervals within a grid pattern.	Best strategy for minimizing bias and providing complete site coverage. Can be used effectively at sites where no background information exists. Ensures that samples will not be taken too close together.	Does not take into account spatial variability of media.
Hot-Spot Sampling	Systematic grid sampling strategy tailored to search for hot spots.	Sites where background information or site survey data indicate that hot spots may exist.	Does not take into account spatial variability of media. Tradeoffs between number of samples, chance of missing a hot spot, and hot spot size/shape must be weighed carefully.
Geostatistical Approach	Representative sampling locations are chosen based on spatial variability of media. Resulting data are analyzed using kriging, which creates contour maps of the contaminant concentrations and the precision of concentration estimates.	More appropriate than other statistical sampling strategies because it takes into account spatial variability of media. Especially applicable to sites where presence of contamination is unknown.	Previous investigation data must be available and such data must be shown to have a spatial relationship.
Non-Statistical Sampling Strategies			
Biased Sampling	Sampling locations are chosen based on available information.	Sites with known contamination sources.	Contaminated areas can be overlooked if background information or visual signs of contamination do not indicate them. Best used if combined with a statistical approach, depending on the project objectives.
Judgmental Sampling	An individual subjectively selects sampling locations that appear to be representative of average conditions.	Homogenous, well-defined sites.	Not usually recommended due to bias imposed by individual, especially for final investigations.

STANDARD OPERATING PROCEDURE 30.9
COLLECTION OF SOIL SAMPLES BY USEPA SW 846 METHOD 5035 USING DISPOSABLE SAMPLERS

1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) outlines the recommended protocol and equipment for collection of representative soil samples to monitor potential volatile organic contamination in soil samples.

This method of sampling is appropriate for surface or subsurface soils contaminated with low to high levels of volatile organic compounds (VOCs). This sampling procedure may be used in conjunction with any appropriate determinative gas chromatographic procedure, including, but not necessarily limited to, SW-846 Method 8015, 8021, and 8260.

2.0 MATERIALS

- Work Plans;
- Field Logbook;
- Photoionization Detector (PID) or other monitoring instrument(s) per site-specific health and safety plan;
- Personal protective equipment and clothing per site-specific health and safety plan;
- Soil sampling equipment, as applicable (SOP 30.1);
- Disposable sampler;
- T-handle and/or Extrusion Tool; and
- Decontamination equipment and supplies (SOP 80.1).

3.0 PROCEDURE

3.1 METHOD SUMMARY

Disposable samplers are sent to the field to be used to collect soil samples. Three samplers must be filled for each soil sampling location, two for the low-level method (sodium bisulfate preservation) and one for the high level method (methanol preservation). After sample collection, disposable samplers are immediately shipped back to the laboratory for preservation (adding soil sample into methanol and sodium bisulfate solution). The ratio of volume of methanol to weight of soil is 1:1 as specified in SW-846 Method 5035 (Section 2.2.2). The amount of preservative in the solution corresponds to approximately 0.2 g of preservative for each 1 g of sample. Enough sodium bisulfate should be present to ensure a sample pH of ≤ 2.

If quality assurance/quality control (QA/QC) samples are needed, seven samplers will be needed for the original, matrix spike, and matrix spike duplicate analysis. Soil samples are collected in the field using the disposable samplers, sealed and returned to the laboratory. A separate aliquot of soil is collected in a 125-mL container for dry weight determination.

3.2 SAMPLE CONTAINERS, PRESERVATION, HANDLING AND STORAGE

After sample collection, the disposable samplers must be cooled to and maintained at 4°C. The contents of the samplers will be analyzed using EPA methods 8015, 8021, and/or 8260. The **disposable** sampler is a single use device. It cannot be cleaned and/or reused.

Disposable samplers have a 48 hour holding time from sample collection to sample preparation in the laboratory. Return the samplers to the laboratory immediately after sampling.

3.3 SAMPLE PROCEDURES

Before sampling, the disposable sampler should be prepared as follows:

1. Unpack the cooler/sampling kit received from the laboratory. Disposable samplers are packed in sealed aluminized bags. These should be over packed in plastic zip lock bags. A T-Handle will also be needed to collect samples with the disposable sampler.
2. Hold coring body and push plunger rod down until small 0-ring rests against tabs. This will assure that plunger moves freely.
3. Depress locking lever on the sampler T-Handle (or other extraction device). Place coring body, plungers end first, into the open end of the T-Handle, aligning the two slots on the coring body with the two locking pins in the T-Handle. Twist the coring body clockwise to lock the pins in the slots. Check to ensure the sampler is locked in place. Sampler is ready for use.

The following procedure should be followed when using a disposable sampler to sample for VOCs in soil:

1. After the soil-sampling device (split spoon, corer, etc.) is opened, the sampling process should be completed in a minimum amount of time with the least amount of disruption.
2. Visual inspection and soil screening should be conducted after the sampler is opened and a fresh surface is exposed to the atmosphere. Soil screening should be conducted with an appropriate instrument (PID or FID).
3. Rough trimming of the sampling location surface should be considered if the sampling surface is not fresh or other waste, different soil strata, or vegetation may contaminate it. Surface layers can be removed using a clean stainless steel, spatula, scoop, or knife.
4. Orient the T-Handle with the T-up and the coring body down. This positions the plunger bottom flush with bottom of coring body (ensure that plunger bottom is in position). Using T-Handle, push sampler into soil until the coring body is completely full taking care not to trap air behind the sampler. When full, the small o-ring will be centered in the T-Handle viewing hole. Remove sampler from soil. Wipe excess soil from coring body exterior with a clean disposable paper towel.
5. Cap coring body while it is still on the T-Handle. ***Push*** cap over flat area of ridge ***and twist*** to lock cap in place. ***Cap must be seated to seal sampler.***
6. Remove the capped sampler by depressing locking lever on T-Handle while twisting and pulling sampler from T-Handle.
7. Lock plunger by rotating extended plunger rod fully counterclockwise until wings rest firmly against tabs.
8. Fill the 125-mL wide mouth jar for the non-preserved portion of the sample to be used for a moisture determination. These may be in a cardboard box. Retain all packaging to return the samples.
9. The disposable sampler should collect approximately 5 grams of soil (not necessary to weigh in the field). After a sample has been collected and capped, tear off the identification tag found at the bottom of the label on the aluminized bag. This tag is added to the sampler on the cap used to seal the sampler.

10. Place the sampler back in the aluminized bag and seal the top (a zip-lock seal). Make sure all the appropriate information is on the label. Record the sampler ID number on the chain-of-custody. Make sure each sampler and 125-mL container is labeled with the same location identification. The sampler should be placed inside the plastic zip-lock bags.

11. Place the 125-mL wide mouth jars in the cooler with the sampler on top. These should be sandwiched between bags of ice to maintain the correct temperature. If sent with the jars and samplers, a temperature bottle (used to evaluate the temperature on receipt) should be placed in the middle of the jars. The sample temperature should be 4ºC during shipment.

12. Ship the samples so that they will be received within 24 hours of sampling. The laboratory must receive the sampler within 40 hours of the collection so that they can be correctly preserved.

3.4 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

1. All data must be documented on chain-of-custody forms, field data sheets and in the field logbook.

2. An equipment blank is a QA/QC sample that will determine potential contamination from sampling equipment used to collect and transfer samples from the point of collection to the sample container. An equipment blank is performed by pouring demonstrated analyte free water from one sample container, over a sampler, and into a separate set of identical sample containers. The equipment blank is optional when sampling with the methanol preservation technique. It may be required on a site-specific basis if elevated analytical results are suspected to be due to cross contamination from sampling equipment.

3. A trip blank is a QA/QC sample, which will determine additional sources of contamination that may potentially influence the samples. The sources of the contamination may be from the laboratory, sample containers, or during shipment. The laboratory prepares a trip blank at the same time and in the same manner as the sample containers. The trip blank must accompany the sample containers to the field and back to the laboratory along with the collected samples for analysis. It must remain sealed at all times until it is analyzed at the laboratory. The frequency of collection for the trip blank must be at a rate of one per sample shipment.

3.5 LIMITATIONS IN SAMPLING

This sampling protocol will not be applicable to all solid environmental matrices, such as those that cannot be cored including non-cohesive granular material, gravel, or hard dry clay. In this case, the procedure for collecting VOC samples using Methanol Preservation should be used (see SOP 30.8).

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

En Novative Technologies, Inc. 2000. Users Manual for En Core® Sampler. February 2001.

USACE. 2001. *Requirements for the Preparation of Sampling and Analysis Plans.* EM 200-1-3, 1 February.

USEPA. 1997. *Test Methods for Evaluating Solid Waste, Volume IB: Laboratory Manual Physical/Chemical Methods,* Third Edition, (as updated through update IIIA). Office of Solid Waste and Emergency Response, Washington, DC.

STANDARD OPERATING PROCEDURE 40.1
MULTIPARAMETER WATER QUALITY MONITORING INSTRUMENT

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for field operation with the multiparameter water quality logging system (data transmitter and visual display). This system can monitor up to eleven basic parameters, including dissolved oxygen, percent saturation, temperature, pH, specific conductance, resistivity, salinity, total dissolved solids, redox, level, and depth.

2.0 MATERIALS

- Visual display;
- Data transmitter;
- Underwater cables; and
- Field logbooks.

3.0 PROCEDURE

3.1 CALIBRATION

Calibration will be performed in the field daily before use according to manufacturer's specifications. The following parameters are calibrated to the following standards:

- Temperature—none required;
- Specific conductance—KCl or seawater standards;
- pH—pH 7 buffer plus a slope buffer;
- Dissolved oxygen—saturated air or saturated water;
- Redox—quinhydrone or transfer;
- Depth—set zero in air;
- Level—set zero in air; and
- Salinity—uses calibration for specific conductance.

3.2 OPERATION

1. Attach the cable to the transmitter.
2. Connect the other end of the cable to the display.
3. Press the On/Off key on the display panel. Allow a few seconds for the transmitter to start sending data to the display screen.
4. Calibrate the transmitter.
5. Deploy the sensor into a minimum of 4 in. of water.
6. Write data values from the display screen in the appropriate field logbook.

7. Retrieve sensor and clean the transmitter to prevent cross-contamination.
8. Move to the next sampling location. If travel time is great, turn off display by pressing On/Off key. Check condition of probes after each deployment.
9. Disconnect the transmitter when finished sampling for the day.

4.0 MAINTENANCE

Maintain according to specific manufacturer's specifications.

5.0 PRECAUTIONS

- Check condition of probes frequently between sampling; and
- Do not force pins into the connectors; note the keying sequence.

6.0 REFERENCES

Manufacturer's Handbook.

STANDARD OPERATING PROCEDURE 40.2
WATER LEVEL AND WELL-DEPTH MEASUREMENTS

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for measuring water level and well depth. This procedure is applicable to the sampling of monitoring wells and must be performed before any activities that may disturb the water level, such as purging or aquifer testing.

2.0 MATERIALS

- Work Plans;
- Well construction diagrams;
- Field logbook;
- Photoionization detector (PID) or other monitoring instruments per site-specific health and safety plan;
- Decontamination equipment and supplies (SOP 80.1);
- Electric water level indicator (dipmeter) with cable measured at 0.01 ft increments;
- Oil-water interface probe (if non-aqueous phase liquid (NAPLs) are suspected to be present); and
- Plastic sheeting.

3.0 PROCEDURE

3.1 PRELIMINARY STEPS

1. Locate the well and verify its position on the site map. Record whether positive identification was obtained, including the well number and any identifying marks or codes contained on the well casing or protective casing. Gain access to the top of the well casing.
2. Locate the permanent reference mark at the top of the casing. This reference point will be scribed, notched, or otherwise noted on the top of the casing. If no such marks are present, measure to the top of the highest point of the well casing and so note this fact in field logbook. Determine from the records and record in the notebook the elevation of this point.
3. Record any observations and remarks regarding the completion characteristics and well condition, such as evidence of cracked casing or surface seals, security of the well (locked cap), and evidence of tampering.
4. Keep all equipment and supplies protected from gross contamination; use clean plastic sheeting. Keep the water level indicator probe in its protective case when not in use.

3.2 OPERATION

1. Sample the air in the well head for gross organic vapors by lifting the well cap only high enough for an organic vapor meter (PID or FID) probe to be entered into the well casing. This will indicate the presence of gross volatile contaminants as well as indicating potential sampler exposure.

2. Remove cap. Allow well to vent for 60–90 seconds. Resample headspace. Record both readings. If the second reading is lower than the first, use the second reading to determining whether respiratory protection will be required during subsequent water level and well depth determinations and sampling.
3. Note that all headspace sampling must be performed at arm's length and from the upwind side of the well if possible.
4. If NAPL contamination is suspected, use an interface probe to determine the existence and thickness of NAPLs.
    - Open the probe housing, turn the probe on, and test the alarm. Slowly lower the probe into the well until the alarm sounds. A continuous alarm indicates a NAPL, while an intermittent alarm indicates water. If a NAPL is detected, record the initial level (first alarm). Mark the spot by grasping the cable with the thumb and forefingers at the top of the casing. If a mark is present on the casing, use the mark as the reference point. If no mark is present, use the highest point on the casing as the reference point. Withdraw the cable sufficiently to record the depth.
    - Continue to slowly lower the probe until it passes into the water phase. Slowly retract the probe until the NAPL alarm sounds and record that level in the manner as described above.
    - Record the thickness of the LNAPL (see Section 3.3.1).
    - Continue to slowly lower the interface probe through the water column to check for the presence of DNAPL.
    - Measure and record the thickness of the DNAPL layer (if any) as described above.
    - Slowly raise the interface probe, recording the depth to each interface as the probe is withdrawn. If there is a discrepancy in depths, clean the probe sensors and re-check the depths.
    - NOTE: Air-liquid interface depth is more reliable if probe is lowered into liquid. NAPL-water depths are more accurate if probe is moved from water into NAPL.
    - Always lower and raise interface probe slowly to prevent undue mixing of media.
    - Always perform NAPL check in wells installed in areas with suspected NAPL contamination. Always perform NAPL check if headspace test reveals presence of volatiles. Always perform NAPL check the first time a well is sampled. If a well has been sampled previously and no NAPLs were present and none of the proceeding conditions are met, the NAPL check may be omitted.
5. If no NAPL is present, use an electronic water level detector as follows.
    - Remove the water level indicator probe from the case, turn on the sounder, and test check the battery and sensitivity scale by pushing the red button. Adjust the sensitivity scale until you can hear the buzzer.
    - Slowly lower the probe and cable into the well, allowing the cable reel to unwind. Continue lowering until the meter buzzes. Very slowly, raise and lower the probe until the point is reached where the meter just buzzes. Marking the spot by grasping the cable with the thumb and forefingers at the top of the casing. If a mark is present on the casing, use the mark as the reference point. If no mark is present, use the highest point on the casing as the reference point. Withdraw the cable and record the depth.
6. To measure the well depth, lower electric water level indicator probe or tape until slack is noted. Very slowly raise and lower the cable until the exact bottom of the well is “felt.” Measure (cable) or read the length (tape) and record the depth.

7. Note that if the electric water level indicator is used to determine depth of well, the offset distance between the tip of the probe and the electrode must be added to the reading to determine actual depth.
8. Withdraw the probe or tape.
9. Decontaminate the probe(s) and cable(s), in accordance with SOP 80.1.

3.3 DATA RECORDING AND MANIPULATION

Record the following information in the field logbook and appropriate sampling forms:

- Date and time;
- Weather;
- Method of measurement;
- Casing elevation;
- NAPL surface elevation = casing elevation - depth to NAPL;
- Apparent measured LNAPL thickness = depth to bottom of NAPL - depth to top of NAPL;
- Water level elevation = casing elevation - depth to water; and
- Well bottom elevation = casing elevation - depth to bottom (or read directly from tape).

4.0 CALIBRATION

No calibration is required. Ensure operability of electric water level indicator by testing sounder before use.

5.0 PRECAUTIONS

- Depending upon the device used, correction factors may be required for some measurements;
- Check instrument batteries before each use; and
- Exercise care not to break the seals at the top of the electric water level indicator probe.

6.0 REFERENCES

ASTM Standard D 4750-87 (2001). 2001. *Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well).*

M^{c}Alary, T. A., and Barker, J.F. 1987. "Volatilization Losses of Organics During Ground Water Sampling from Low Permeability Materials" in *Ground Water Monitoring Review.* Fall 1987.

Thornhill, Jerry T. 1989. Accuracy of Depth to Groundwater Measurements; in "EPA Superfund Ground Water Issue" EPA/540/4-89/002.

STANDARD OPERATING PROCEDURE 40.3
SLUG TESTS

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide information and technical guidance for performing falling- and rising-head *in situ* hydraulic conductivity tests and data analyses. The slug test method involves causing a sudden change in head in a control well and measuring the water level response within that control well. Head change may be induced by suddenly injecting into the well or removing from the well a known quantity of water, rapid removal of a mechanical "slug" from below the water level, increasing or decreasing the air pressure in the well casing, or emplacement of a mechanical slug into the water column.

The water level response in the well is a function of the mass of water in the well and the transmissivity and coefficient of storage of the aquifer. The results of the slug test may be used to determine an estimate of the hydraulic conductivity of the aquifer material near the well.

2.0 MATERIALS

- Work Plans;
- Field logbook;
- Well construction information and boring log;
- Photoionization detector (PID) or other monitoring instruments per site-specific health and safety plan;
- Decontamination equipment and supplies (SOP 80.1);
- Aquifer test data sheets;
- Personal protective equipment and clothing (PPE) per site-specific health and safety plan; and
- Slug-inducing equipment (solid slug, line, etc.) large enough to displace groundwater beyond the well filter pack.

3.0 PROCEDURE

Initially, an appropriate test methodology should be chosen. The selection of the appropriate test method (rising or falling head) is dependent primarily on saturated screen length, the well diameter, and the estimated hydraulic conductivity. If the screen extends above the water table, a rising-head test (water removal) should be used. The performance of a falling-head test (water added) in this circumstance would overstate the hydraulic conductivity value, as the measured response would reflect the equilibration rate of previously unsaturated material; unsaturated materials would equilibrate faster than saturated materials. When the measured water level in a monitoring well is above the screened portion of the well, a falling-head test methodology should be employed. A rising-head test may also be performed, but only if the initial water level reading (after the slug is removed) is above the screened interval.

For larger diameter and deeper wells, as a general rule and particularly for high conductivity materials, it is not feasible to remove a large enough slug or water volume to cause a sufficient change in head. In these cases the falling-head test method should be used.

It is recommended that a pressure transducer be used whenever possible to record water levels and time. A pressure transducer is required to record useful data when the hydraulic conductivity is high (greater than 10^{-3} cm/sec). The standard stopwatch and water-level indicator method is adequate for lower conductivity units.

The procedures outlined below assume use of a pressure transducer. Readings should be collected at intervals set on the data logger if used. If manual readings are collected, the following intervals should be applied:

- 0 to 5 minutes, every 10 seconds;
- 5 to 10 minutes, every 30 seconds;
- 10 to 30 minutes, every 1 minute; and
- 30 to 60 minutes, every 2 minutes.

3.1 Falling-Head Tests

1. Install pressure transducer near the total well depth and permit transducer and water levels to equilibrate to ambient conditions. Secure transducer cable to prevent movement during the test. Begin transducer readings.
2. Manually measure the static water level.
3. Insert slug completely below static water level or add a water "slug."
4. Intermittently measure water level and note the time of measurement with reference to the data logger.
5. Continue monitoring until water level is within 90% of the static level.

If a solid slug was used, stop the falling-head test recording at this point and begin a rising-head test by removing the solid slug from the well. If a solid slug was not used, simply end recording by the data logger at the completion of the falling-head test.

3.2 Rising-Head Tests

1. Install pressure transducer near the total well depth and permit transducer and water levels to equilibrate to ambient conditions. Secure transducer cable to prevent movement during testing.
2. Manually measure the static water level.
3. Remove sufficient volume of water to lower the water level a minimum of 1 ft below static water level, or
4. Install the solid slug fully below water level; permit static conditions to return and then remove the solid slug.
5. Begin readings with data logger.
6. Intermittently measure water level and note time of measurement with reference to data logger.
7. Continue monitoring until the water level is within 90% of the static level.

As a check on equipment operation and in the event that test data for a particular well are not usable, the data should be printed out in the field. If there is equipment failure (e.g., a non-attainment of a 1-foot minimum head change, unexplained fluctuations in water levels, etc.), the test can be rerun with minimum time lost.

The well numbers, static and subsequent water levels, programmed test numbers, and general comments should be recorded in the field notebook.

4.0 PRECAUTIONS

Not applicable.

5.0 REFERENCES

ASTM Standard D 4043-96 (2004). *Standard Guide for Selection of Aquifer-Test Method in Determining of Hydraulic Properties of Well Techniques.*

Hvorslev, M.J. 1951. *Time-Lag and Soil Permeability in Ground Water Observations.* U.S. Army Engineers, Bulletin 36 - This method can be applied to both unconfined and confined aquifers but provides only approximate conductivity values (Freezer R.A. and J.A. Cherry, 1979, Groundwater, Prentice-Hall, Inc.).

Cooper, H.H., J.D. Bredehoeft, I.S. Papadopulos. 1967. *Response of a Finite-Diameter Well to an Instantaneous Charge of Water.* Water Resources Division, U.S. Department of the Interior Geological Survey, Vol. 3, No. 1 - This method can be applied to aquifers under confined conditions and requires that the well completely penetrate the aquifer. This method is believed to produce most reliable data when applied to low-permeability materials.

Bouwer, H. 1989. *The Bouwer and Rice Slug Test -- An Update.* Ground Water, Vol. 27, No. 3; and Bouwer, H. and R.C. Rice. 1976. *A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells.* Water Resources Research, Vol. 12, No. 3 - This method takes into account additional well and aquifer configuration data points not considered by Hvorslev's more simplistic method. Computer analyses are available.

Nguyen, V., G.F. Pinder. 1984. *Direct Calculation of Aquifer Parameters in Slug Test Analyses, Groundwater Hydraulics.* American Geophysical Union Water Resources Monograph 9 - This method can be applied to partially penetrating wells in both confined and unconfined aquifers it produces better values for low- to moderate-permeability materials.

STANDARD OPERATING PROCEDURE 50.1
SAMPLE LABELS

1.0 SCOPE AND APPLICATION

Every sample will have a sample label uniquely identifying the sampling point and analysis parameters. The purpose of this standard operating procedure (SOP) is to delineate protocols for the use of sample labels. An example label is included as Figure 50.1-A. Other formats with similar levels of detail are acceptable.

2.0 MATERIALS

- Sample label; and
- Indelible marker.

3.0 PROCEDURE

The use of preprinted sample labels is encouraged and should be requested from the analytical support laboratory during planning activities.
As each sample is collected, fill out a sample label ensuring the following information has been collected:

- Project name;
- Sample ID: enter the SWMU number and other pertinent information concerning where the sample was taken. This information should be included in site-specific work plan addenda;
- Date of sample collection;
- Time of sample collection;
- Initials of sampler(s);
- Analyses to be performed (NOTE: Due to number of analytes, details of analysis should be arranged with lab *a priori*); and
- Preservatives (water samples only).

Double-check the label information to make sure it is correct. Detach the label, remove the backing and apply the label to the sample container. Cover the label with clear tape, ensuring that the tape completely encircles the container.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

USEPA. 2001 (Reissued May 2006). *EPA Requirements for Quality Assurance Project Plans.* EPA/240/B-01/003, QA/R5, Final, Office of Research and Development, Washington, D.C. March 2001

FIGURE 50.1-A
SAMPLE LABEL

PROJECT NAME _____

SAMPLE ID _____

DATE: ____/____/____ TIME: _____:_____

ANALYTES: VOC SVOC P/P METALS CN
PAH D/F HERBs ANIONS TPH
ALK TSS

PRESERVATIVE: [HCl] [HNO_3] [NaOH] [H_2SO_4]

SAMPLER: _____

STANDARD OPERATING PROCEDURE 50.2
SAMPLE PACKAGING

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for the packing and shipping of samples to the laboratory for analysis.

2.0 MATERIALS

- Waterproof coolers (hard plastic or metal);
- Metal cans with friction-seal lids (e.g., paint cans);
- Chain-of-custody forms;
- Chain-of-custody seals (optional);
- Packing material;
- Sample documentation;
- Ice;
- Plastic garbage bags;
- Clear Tape;
- Zip-top plastic bags; and
- Temperature blanks provided by laboratory for each shipment.

3.0 PROCEDURE

1. Check cap tightness and verify that clear tape covers label and encircles container.
2. Wrap sample container in bubble wrap or closed cell foam sheets. Samples may be enclosed in a secondary container consisting of a clear zip-top plastic bag. Sample containers must be positioned upright and in such a manner that they will not touch during shipment.
3. Place several layers of bubble wrap, or at least 1 in. of vermiculite on the bottom of the cooler. Line cooler with open garbage bag, place all the samples upright inside the garbage bag and tie.
4. Double bag and seal loose ice to prevent melting ice from soaking the packing material. Place the ice outside the garbage bags containing the samples.
5. Pack shipping containers with packing material (closed-cell foam, vermiculite, or bubble wrap). Place this packing material around the sample bottles or metal cans to avoid breakage during shipment.
6. A temperature blank (provided by laboratory) will be included in each shipping container to monitor the internal temperature. Samples should be cooled to 4 degrees C on ice immediately after sampling.
7. Enclose all sample documentation (i.e., Field Parameter Forms, Chain-of-Custody forms) in a waterproof plastic bag and tape the bag to the underside of the cooler lid. If more than one cooler is being used, each cooler will have its own documentation. Add the total number of shipping containers included in each shipment on the chain-of-custody form.

8. Seal the coolers with signed and dated custody seals so that if the cooler were opened, the custody seal would be broken. Place clear tape over the custody seal to prevent damage to the seal.
9. Tape the cooler shut with packing tape over the hinges and place tape over the cooler drain.
10. Ship all samples via overnight delivery on the same day they are collected if possible.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

5.1 PERMISSIBLE PACKAGING MATERIALS

- Non-absorbent
  - — Bubble wrap; and
  - — Closed cell foam packing sheets.
- Absorbent
  - — Vermiculite.

5.2 NON-PERMISSIBLE PACKAGING MATERIALS

- Paper;
- Wood shavings (excelsior); and
- Cornstarch “peanuts”.

6.0 REFERENCES

USEPA. 1990. *Sampler's Guide to the Contract Laboratory Program.* EPA/540/P-90/006, Directive 9240.0-06, Office of Emergency and Remedial Response, Washington, D.C., December 1990.

USEPA. 1991. *User's Guide to the Contract Laboratory Program.* EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response. January 1991.

USEPA. 2001 (Reissued May 2006). *EPA Requirements for Quality Assurance Project Plans.* EPA/240/B-01/003, QA/R5, Final, Office of Research and Development, Washington, D.C. March 2001

STANDARD OPERATING PROCEDURE 70.1
INVESTIGATION-DERIVED MATERIAL

1.0 SCOPE AND APPLICATION

Management of investigation-derived material (IDM) minimizes the potential for the spread of waste material onsite or offsite through investigation activities. The purpose of this standard operating procedure (SOP) is to provide general guidelines for appropriate management of potentially contaminated materials derived from the field investigations. Specific procedures related to the transportation and disposal of hazardous waste are beyond the scope of this SOP.

2.0 INTRODUCTION

Investigation derived material (IDM) consists of waste materials that are known or suspected to be contaminated with waste substances through the actions of sample collection or personnel and equipment decontamination. These materials include decontamination solutions, disposable equipment, drill cuttings and fluids, and water from groundwater monitoring well development and purging. To the extent possible, the site manager will attempt to minimize the generation of these materials through careful design of decontamination schemes and groundwater sampling programs. Testing conducted on soil and water investigation-derived material will show if they are also hazardous wastes as defined by RCRA. This will determine the proper handling and ultimate disposal requirements.

The criteria for designating a substance as hazardous waste according to RCRA is provided in 40 CFR 261.3. If IDM meet these criteria, RCRA requirements will be followed for packaging, labeling, transporting, storing, and record keeping as described in 40 CFR 262.34. Those materials that are judged potentially to meet the criteria for a regulated solid or hazardous waste will be placed in DOT-approved 55-gallon steel drums or another type of DOT approved container; based on waste characteristics and volume.
Investigation-derived material will be appropriately placed in containers, labeled, and tested to determine disposal options in accordance with RCRA regulations and Virginia Hazardous Waste Management Regulations.

3.0 INVESTIGATION-DERIVED MATERIAL MANAGEMENT

Procedures that minimize potential for the spread of waste material include minimizing the volume of material generated, material segregation, appropriate storage, and disposal according to RCRA requirements.

3.1 WASTE MINIMIZATION

In the development of work plan addenda, each aspect of the investigation will be reviewed to identify areas where excess waste generation can be eliminated. General procedures that will eliminate waste include avoidance of unnecessary exposure of materials to hazardous material and coordination of sampling schedules to avoid repetitious purging of wells and use of sampling equipment.

3.2 WASTE SEGREGATION

Waste accumulation and management procedures to be used depend upon the type of material generated. For this reason, IDM described below are segregated into separate 55-gallon storage drums or other appropriate DOT containers. Waste materials that are known to be free of potential hazardous waste contamination (such as broken sample bottles or equipment containers and wrappings) must be collected separately for disposal to municipal systems. Large plastic garbage or "lawn and leaf" bags are useful for collecting this trash. Even "clean" sample bottles or Tyvek should be disposed of with care. Although they are not legally a problem, if

they are discovered by the public they may cause concern. Therefore, items that are known to be free from contamination but are also known to represent "hazardous or toxic waste" to the public must not be disposed of in any public trash receptacle, such as found at your hotel or park.

3.2.1 Decontamination Solutions

Solutions considered investigation-derived materials range from detergents, organic solvents, and acids used to decontaminate small hand samplers to steam-cleaning rinsate used to wash drill rigs and other large equipment. These solutions are to be placed in 55-gallon drums with bolt-sealed lids or other appropriate DOT approved containers. Residual liquid IDM from decontamination pads will be removed and appropriately placed in container(s) at the end of each field day.

3.2.2 Soil Cuttings and Drilling Muds

Soil cuttings are solid to semi-solid soils generated during trenching activities or drilling for the collection of subsurface soil samples or the installation of monitoring wells. Depending on the type of drilling, drilling fluids known as "muds" may be used to remove soil cuttings. Drilling fluids flushed from the borehole must be directed into a settling section of a mud pit. This allows reuse of the decanted fluids after removal of the settled sediments. Drill cuttings, whether generated with or without drilling fluids, are to be removed with a flat-bottomed shovel and placed in 55-gallon drums with bolt-sealed lids or other appropriate DOT containers, as conditions or volume of IDM dictate.

3.2.3 Well Development and Purge Water

Well development and purge water is removed from monitoring wells to repair damage to the aquifer following well installation, obtain characteristic aquifer groundwater samples, or measure aquifer hydraulic properties. The volume of groundwater to be generated will determine the appropriate container to be used for accumulation of IDM.

For well development and purging, 55-gallon drums are typically an efficient container for accumulation. When larger volumes of water are removed from wells, such as when pumping tests are conducted, the use of large-volume portable tanks such as "Baker Tanks" should be considered for IDM accumulation.

Analytical data for groundwater samples associated with the well development and purge water will be used to assist in characterizing IDM and evaluating disposal options.

3.2.4 Personal Protective Equipment and Disposable Sampling Equipment

Personal protective equipment and clothing (PPE) may include such items as Tyvek coveralls, gloves, booties, and APR cartridges. Disposable sampling equipment may include such items as plastic sheeting, bailers, disposable filters, disposable tubing and paper towels. PPE and disposable sampling equipment that have or may have contacted contaminated media (soil, water, etc.) will be segregated and placed in 55-gallon drums separate from soil and water IDM. Disposition of this type of IDM will be determined by the results of IDM testing of the media in which the PPE and sampling equipment contacted.

3.3 MATERIAL ACCUMULATION

The IDM in containers must be placed in an appropriate designated RCRA container accumulation area at RFAAP, where it is permissible to accumulate such waste. IDM placed into a designated 90-day accumulation area will be properly sealed, labeled and covered. All drums will be placed on pallets.

A secure and controlled waste staging area will be designated by the installation prior the commencement of field sampling activities. Per the facility's requirements as a RCRA large quantity generator, waste accumulation cannot exceed 90 days for materials presumed or shown to be RCRA-designated hazardous wastes; waste which is known not to be RCRA-designated waste should be promptly disposed to municipal waste systems or appropriate facility.

3.3.1 IDM Accumulation Containers

Containers will be DOT-approved (DOT 17H 18/16GA OH unlined) open-head steel drums or other DOT approved container, as appropriate.

Container lids should lift completely off be secured by a bolt ring (for drum). Order enough containers to accumulate all streams of expected IDM including soil, PPE and disposable sampling equipment, decontamination water, purge water, etc.

Solid and liquid waste streams will not be mixed in a container. PPE and expendable sampling equipment will be segregated from other IDM and placed in different containers than soil. Containers inside containers are not permitted. PPE must be placed directly in a drum not in a plastic bag.

Pallets are often required to allow transport of filled drums to the staging area with a forklift. Normal pallets are 3×4 ft and will hold two to three 55-gallon drums depending on the filled weight. If pallets are required for drum transport or storage, field personnel are responsible for ensuring that the empty drums are placed on pallets before they are filled and that the lids are sealed on with the bolt-tighten ring after the drums are filled. Because the weight of one drum can exceed 500 lbs, under no circumstances should personnel attempt to move the drums by hand.

3.3.2 Container Labeling

Each container that is used to accumulate IDM will be appropriately labeled at the time of accumulation and assigned a unique identification number for tracking purposes. The following information will be written in permanent marker on a drum label affixed on the exterior side at a location at least two-thirds of the way up from the bottom of the drum.

- Facility name.
- Accumulation start date and completion date.
- Site identifier information (SWMU, boring, well, etc.).
- Description of IDM.
- Drum ID No.

4.0 MATERIAL CHARACTERIZATION AND DISPOSAL

IDM will be characterized and tested to determine whether it is a hazardous waste as defined by 40 CFR Part 261 and to determine what disposal options exist in accordance with RCRA regulations and the Virginia Hazardous Waste Management Regulations (VHWMR).

In general, IDM will be considered a hazardous waste if it contains a listed hazardous waste or if the IDM exhibits a characteristic of hazardous waste.

Work plan addenda will identify the appropriate characterization and testing program for IDM based on the following:

- Site-specific conditions related to chemicals of concern, etc.
- The nature and quantity of expected IDM to be generated during site-specific investigations.
- Applicable Federal, State, and local regulations, such as RCRA, VHWMR regulations and policies and procedures, and Army Regulation 200-1.

- RFAAP specific requirements and policies for IDM characterization and disposal at the time of the investigation.

In general, appropriate USEPA SW 846 Test Methods for Evaluating Solid Waste will be used for testing IDM and will be specified in work plan addenda. Other appropriate test methods may be specified by RFAAP in addition to SW 846 Methods that are specific to installation operations, the site of interest (percent explosive content, reactivity, etc.), or requirements for disposal at RFAAP water treatment facilities or publicly owned treatment works.

Responsibility for the final disposal of IDM will be determined before field activities are begun and will be described in work plan addenda. Off-site disposal of IDM will be coordinated with RFAAP (generator) to ensure appropriate disposition. The contractor will coordinate IDM transportation and disposal activities for RFAAP (generator).

At the direction of RFAAP, appropriate waste manifests will be prepared by the USACE contractor or Alliant Techsystems subcontractor for transportation and disposal. Alliant Techsystems or other appropriate RFAAP entity will be listed as the generator and an appointed representative from RFAAP will review and sign the manifest for offsite disposal.

RFAAP will make the final decision on the selection of the transporter, storage, and disposal facility (TSDFs) or recycling facility. RFAAP will provide the contractor a listing of previously used TSDFs for priority consideration. Proposed facilities that are not included on the listing are required to provide a copy of the TSDFs most recent state or federal inspection to the installation. Waste characterization and testing results will be submitted to RFAAP (generator) for review and approval before final disposition of the material.

Hazardous waste: Prior to final disposition, a hazardous waste manifest will be furnished by the TSDF to accompany transport to the disposal facility. Following final disposition, a certificate of disposal will be furnished by the disposal facility. Copies of the manifests and certificates of disposal are to be provided to RFAAP and retained on file by the contractor or subcontractor.

4.0 PRECAUTIONS

- Because the weight of one drum can exceed 500 lbs, under no circumstances should personnel attempt to move drums by hand.
- Refer to the site-specific health and safety plan when managing IDM.

5.0 REFERENCES

Safety Rules for Contractors and Subcontractors, (As Updated). Alliant Techsystems, Incorporated, Radford Army Ammunition Plant.

STANDARD OPERATING PROCEDURE 80.1
DECONTAMINATION

1.0 SCOPE AND APPLICATION

Before leaving the site, all personnel or equipment involved in intrusive sampling or having entered a hazardous waste site during intrusive sampling must be thoroughly decontaminated to prevent adverse health effects and minimize the spread of contamination. Equipment must be decontaminated between sites to preclude cross-contamination. Decontamination water will be free of contaminants as evidenced through either chemical analyses or certificates of analysis. This standard operating procedure (SOP) describes general decontamination requirements for site personnel and sampling equipment. Decontamination procedures for contaminants requiring a more stringent procedure, e.g., dioxins/furans, will be included in site-specific addenda.

2.0 MATERIALS

- Plastic sheeting, buckets or tubs, pressure sprayer, rinse bottles, and brushes;
- U.S. Army Corps of Engineers or installation approved decontamination water source;
- Deionized ultra-filtered, HPLC-grade organic free water (DIUF);
- Non-phosphate laboratory detergent;
- Nitric Acid, 0.1 Normal (N) solution;
- Pesticide-grade solvent, Methanol;
- Aluminum foil;
- Paper towels;
- Plastic garbage bags; and
- Appropriate containers for management of investigation-derived material (IDM).

3.0 PROCEDURE

3.1 SAMPLE BOTTLES

At the completion of each sampling activity the exterior surfaces of the sample bottles must be decontaminated as follows:

- Be sure that the bottle lids are on tight.
- Wipe the outside of the bottle with a paper towel to remove gross contamination.

3.2 PERSONNEL DECONTAMINATION

Review the site-specific health and safety plan for the appropriate decontamination procedures.

3.3 EQUIPMENT DECONTAMINATION

3.3.1 Drilling Rigs

Drilling rigs and associated equipment, such as augers, drill casing, rods, samplers, tools, recirculation tank, and water tank (inside and out), will be decontaminated before site entry, after over-the-road mobilization and immediately upon departure from a site after drilling a hole. Supplementary cleaning will be performed before site entry. There is a likelihood that contamination has accumulated on tires and as spatter or dust en route from one site to the next.

1. Place contaminated equipment in an enclosure designed to contain all decontamination residues (water, sludge, etc.).
2. Steam-clean equipment until all dirt, mud, grease, asphaltic, bituminous, or other encrusting coating materials (with the exception of manufacturer-applied paint) has been removed.
3. Water used will be taken from an approved source.
4. When cross-contamination from metals is a concern, rinse sampling components such as split spoons, geo-punch stems, and augers with nitric acid, 0.1N.
5. Rinse with DIUF water.
6. When semi-volatile and non-volatile organics may be present, rinse the sampling components with pesticide-grade solvent methanol.
7. Double rinse the sampling components with DIUF water.
8. Decontamination residues and fluids will be appropriately managed as IDM per work plan addenda and SOP 80.1.

3.3.2 Well Casing and Screen

Prior to use, well casing and screen materials will be decontaminated. This activity will be performed in the leak proof, decontamination pad, which will be constructed prior to commencement of the field investigation. The decontamination process will include:

- Steam cleaning with approved source water.
- Rinse with DUIF water.
- Air-dry on plastic sheeting.
- Wrap in plastic sheeting to prevent contamination during storage/transit.

3.3.3 Non Dedicated Submersible Pumps Used for Purging and Sampling

1. Scrub the exterior of the pump to remove gross (visible) contamination using appropriate brushes, approved water, and non-phosphate detergent (steam cleaning may be substituted for detergent scrub).
2. Pump an appropriate amount of laboratory detergent solution (minimum 10 gallons) to purge and clean the interior of the pump.
3. Rinse by pumping no less than 10 gallons of approved water to rinse.
4. Rinse the pump exterior with approved decontamination water.

5. When cross-contamination from metals is a concern, rinse the pump exterior with approved nitric acid 0.1N solution.
6. Rinse the pump exterior with DIUF water.
7. When semi-volatile and non-volatile organics may be present, rinse the pump exterior with pesticide-grade solvent methanol.
8. Double rinse the pump exterior with DIUF water.
9. Air-dry on aluminum foil or clean plastic sheeting.
10. Wrap pump in aluminum foil or clean plastic sheeting, or store in a clean, dedicated PVC or PTFE storage container.
11. Solutions and residuals generated from decontamination activities will be managed appropriately as IDM per work plan addenda and SOP 80.1.

3.3.4 Sample Equipment and Measuring Water Level Devices

1. Scrub the equipment to remove gross (visible) contamination using appropriate brush (es), approved water, and non-phosphate detergent.
2. Rinse with approved source water.
3. When cross-contamination from metals is a concern, rinse the sampling equipment with approved nitric acid 0.1N solution.
4. Rinse equipment with DIUF water.
5. When semi-volatile and non-volatile organics may be present, rinse the sampling equipment with pesticide-grade solvent methanol.
6. Double rinse the sampling equipment with DIUF water.
7. Air-dry on aluminum foil or clean plastic sheeting.
8. Wrap in aluminum foil, clean plastic sheeting, or zip top bag or store in a clean, dedicated PVC or PTFE storage container.
9. Solutions and residuals generated from decontamination activities will be managed appropriately as IDM per work plan addenda and SOP 80.1.

3.3.5 Other Sampling and Measurement Probes

Temperature, pH, conductivity, Redox, and dissolved oxygen probes will be decontaminated according to manufacturer's specifications. If no such specifications exist, remove gross contamination and triple-rinse probe with DIUF water.

4.0 PRECAUTIONS

- Manage IDM appropriately according to the requirements specified in work plan addenda.
- Follow appropriate procedures as specified in the site-specific health and safety plan.

5.0 REFERENCES

USACE. 2001. Requirements for the Preparation of Sampling and Analysis Plans. EM 200-1-3. 1 February.

STANDARD OPERATING PROCEDURE 90.1
PHOTOIONIZATION DETECTOR (HNu Model PI–101 and HW–101)

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for field operations with a photoionization detector (HNu Systems Model PI–101 or HW–101). The photoionization detector (PID) detects total ionizables; hence it is used to monitor both organic and inorganic vapors and gases to determine relative concentrations of air contaminants. This information is used to establish level of protection and other control measures such as action levels. The PID cannot effectively detect compounds having ionization potentials above the photon energy level of the lamp used; therefore, methane, which has an ionization potential of 12.98 eV, is undetectable by PIDs because the lamps produce 9.5, 10.2, or 11.7 eV.

Use of brand names in this SOP is in not intended as an endorsement or mandate that a given brand be used. Alternate equivalent brands of detectors, sensors, meters, etc., are acceptable. If alternate equipment is to be used, the contractor shall provide applicable and comparable SOPs for its maintenance and calibration.

2.0 MATERIALS

- HNu Systems Model PI–101 or HW–101 survey probe with 9.5, 10.2, or 11.7 eV lamp;
- Lead-acid gel-cell battery;
- Calibration gas (e.g., isobutylene, 101 ppm) with regulator;
- Tygon tubing;
- Tedlar bag (optional);
- Instrument logbook; and
- Field logbook.

3.0 PROCEDURE

These procedures are to be followed when using the HNu in the field.

3.1 STARTUP

1. Before attaching the probe, check the function switch on the control panel to ensure that it is in the off position. Attach the probe by plugging it into the interface on the top of the readout module.
2. Turn the function switch to the battery check position. The needle on the meter should read within or above the green battery arc on the scale; if not, recharge the battery. If the red indicator light comes on, the battery needs recharging or service may be indicated.
3. Turn the function switch to any range setting. Listen for the hum of the fan motor. Check meter function by holding a solvent-based marker pen near the sample intake. If there is no needle deflection, look briefly into the end of the probe (no more than 1 or 2 sec) to see if the lamp is on; if it is on, it will give a purple glow. Do not stare into the probe any longer than 2 sec. Long-term exposure to UV light can damage the eyes. (See further information in Section 5.)
4. To zero the instrument, turn the function switch to the standby position and rotate the zero adjustment until the meter reads zero. A calibration gas is not needed since this is an electronic zero adjustment. If

the span adjustment setting is changed after the zero is set, the zero should be rechecked and adjusted if necessary. Allow the instrument to warm up for 3–5 min to ensure that the zero reading is stable. If necessary, readjust the zero.

3.2 OPERATIONAL CHECK

Follow the startup procedure in Section 3.1.
With the instrument set on the 0–20 range, hold a solvent-based marker near the probe tip. If the meter deflects upscale, the instrument is working.

3.3 FIELD CALIBRATION PROCEDURE

1. Follow the startup procedures in Section 3.1 and the operational check in Section 3.2.
2. Set the function switch to the range setting for the concentration of the calibration gas.
3. Attach a regulator HNu P/N 101-351 or equivalent (flow = 200 to 300 ml/min) to a disposable cylinder of isobutylene (HNu 101-351 or equivalent). Connect the regulator to the probe of the HNu with a piece of clean Tygon tubing. Turn on the valve of the regulator.
4. After 5 sec, adjust the span dial until the meter reading equals the benzene concentration of the calibration gas used, corrected to its equivalence, which should be marked on the canister (Isobutylene ~0.7X benzene).
5. Record in the field log the instrument ID No., serial No., initial and final span settings, date, time, location, concentration and type of calibration gas used, and the signature of the person who calibrated the instrument.
6. If the HNu does not function or calibrate properly, the project equipment manager is to be notified as soon as possible. Under no circumstances is work requiring monitoring with a PI–101 or HW–101 to be done with a malfunctioning instrument.

3.4 CALIBRATION TO A GAS OTHER THAN ISOBUTYLENE

The HNu may be calibrated to any certified calibration gas. However, after calibration, all subsequent instrument readings will be relative to the calibration gas used. General procedures include the following:

1. Calibrate according to procedure 3.3.
2. Partially fill and flush one-to-two times a gas bag (Tedlar recommended) with the certified National Institute of Standards and Technology (NIST) (formerly NBS) traceable calibration gas. Then fill the bag with 1–3 L of the calibration gas. If the gas is toxic, this must be done in a fume hood.
3. Feed the calibration gas into the probe with the range set for the value of the gas. After 5 sec, adjust the span control until the meter reads the value of the calibration gas.
4. Record the results of the calibration on the calibration/maintenance log and attach a new calibration sticker (if available) or correct the existing sticker to reflect the new calibration data. All subsequent readings will be relative to the new calibration gas.

3.5 OPERATION

1. Follow the startup procedure, operational check, and calibration check (refer to Section 3.1).
2. Set the function switch to the appropriate range. If the concentration of gas vapors is unknown, set the function switch to 0-20 ppm range. Adjust if necessary.

3. Prevent exposing the HNu to excessive moisture, dirt, or contaminant while monitoring the work activity as specified in the Site Health and Safety Plan.
4. When the activity is completed, or at the end of the day, carefully clean the outside of the HNu with a damp disposable towel to remove all visible dirt. Return the HNu to a secure area and place on charge. Charge after each use; the lead acid batteries cannot be ruined by over charging.
5. With the exception of the probe's inlet and exhaust, the HNu can be wrapped in clear plastic to prevent it from becoming contaminated and to prevent water from getting inside in the event of precipitation. If the instrument becomes contaminated, make sure to take necessary steps to decontaminate it. Call the Equipment Administrator if necessary; under no circumstances should an instrument be returned from the field in a contaminated condition.

4.0 MAINTENANCE

Calibration/maintenance logs are to be filled in completely whenever a PI-101 or HW-101 receives servicing. This is true of both contractor-owned and rental instruments.

The equipment manager should be called to arrange for a fresh instrument when necessary. The contractor's equipment facility is responsible for arranging all repairs that cannot be performed by the project equipment manager.

4.1 ROUTINE SERVICE

The PID's performance is affected by a number of factors. These include but are not limited to the decay of the UV lamp output over time and the accumulation of dust and other particulate material and contaminates on the lamp and in the ion chamber. Because of these factors, the PID should not be left in the field for a period of more than 2 weeks before being replaced with a fresh instrument. If a site is going to be inactive for a period of more than a week, all monitoring instruments are to be returned to the project equipment manager or his trained designee for servicing and/or reassignment. The following procedures are to be performed at the designated intervals for routine service.

Procedure	Frequency
Operational check	Before use and at instrument return
Field calibration	Before use and at instrument return
Full calibration	Bi-weekly (return instrument to equipment manager for replacement with a fresh unit)
Clean UV lamp and	Bi-weekly or as needed ion chamber
Replace UV Lamp	As needed

4.1.1 UV Lamp and Ion Chamber Cleaning

During periods of analyzer operation, dust and other foreign materials are drawn into the probe forming deposits on the surface of the UV lamp and in the ion chamber. This condition is indicated by meter readings that are low, erratic, unstable, non-repeatable, or drifting and show apparent moisture sensitivity. These deposits interfere with the ionization process and cause erroneous readings. Check for this condition regularly to ensure that the HNu is functioning properly. If the instrument is malfunctioning, call your equipment manager to arrange to have a fresh replacement.

4.1.2 Lamp eV Change

If different applications for the analyzer would require different eV lamps, separate probes, each with its own eV lamp, must be used. A single readout assembly will serve for any of the probes (9.5, 10.2, and 11.7 eV). A change in probe will require resetting of the zero control and recalibrating the instrument. The 11.7 eV lamp will detect more compounds than either of the two lower eV lamps. However, the 11.7 eV probe needs more frequent calibration; it burns out much faster than the lower eV lamps.

5.0 PRECAUTIONS

- The HNu PI–101 and HW–101 are designed to sample air or vapors only. *Do not allow any liquids or low boiling vapors to get into the probe or meter assembly.*
- High concentrations of any gas can cause erroneous readings. High humidity can also cause the instrument readings to vary significantly from the actual concentration of gases or vapors present. This is true even through the HNu cannot react to water vapor.
- High humidity, dust, and exposure to concentrations of low boiling vapors will contaminate the ion chamber, causing a steady decrease in sensitivity.
- Continued exposure to ultraviolet light generated by the light source can be harmful to eyesight. If a visual check of the UV lamp is performed *do not look at the light source from a distance closer than 6 inches with unprotected eyes.* Use eye protection (UV-blocking sunglasses or safety glasses). Only look briefly—never more than about 2 sec.
- Place the instrument on charge after each use; the lead batteries cannot be ruined by over charging.
- If at any time the instrument does not check out or calibrate properly in the field, the equipment manager is to be notified immediately and a replacement obtained for the malfunctioning instrument. Under no circumstances should fieldwork requiring continuous air monitoring for organic vapors and/or gases be done with a malfunctioning Hnu or without a HNu or an approved comparable instrument.

6.0 REFERENCES

Manufacturer's Equipment Manual.

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APPENDIX C

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APPENDIX C.1

PHYSICAL SOIL SAMPLE RESULTS

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Radford Army Ammunition Plant
LABORATORY TESTING DATA SUMMARY

BORING NO.	DEPTH (ft)	IDENTIFICATION TESTS													PERMEABILITY (cm/sec)	REMARKS
		WATER CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLAS. IND.	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDROMETER % MINUS 2 μm (%)	ORGANIC CONTENT (burnoff) (%)	pH Distilled Water	pH 0.01 M CaCl Solution	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	SPECIFIC GRAVITY		
13SB10	2-3	29.6		np		SM	28.6		3.5	6.9	6.6	115.9	89.4	2.688	1.3E-5	
13SB7	12.7	16.0				GC	13.3		1.1	6.3	6.2	130.0	112.0	2.711		
37SB1	6-6.5	21.8	22	18	4	SC-SM	43.0		1.5	6.3	6.0	130.1	106.8	2.677	1.6E-7	
37SB2	15.5-16	17.0				SM	33.7		1.6	5.1	5.4	122.7	104.9	2.746	2.3E-4	
38SB1	7	20.9				SM	34.8		1.7	7.1	6.6	125.8	104.1	2.713		
38SB2	15.5	3.7				SM	13.8		1.1	6.8	6.3	116.0	111.9	2.702	2.0E-3	
46SB1	14.5	24.5	32	18	14	SC	50.0	23	2.2	5.7	5.9	127.5	102.4	2.729	3.0E-8	
46SB2	9.5-10	20.4				SM	26.9		1.8	6.2	5.7	123.4	102.5	2.735		
57SB2	7.5-8	28.4				CL-ML	70.2		2.6	5.6	3.9	94.1	73.3	2.701		
57SB3	16.5-17	46.4	83	29	54	CH	89.6	46	3.6	5.3	*	106.4	72.7	2.694	1.8E-7	
68SB2	18-18.5	30.4				CL-ML	54.9		1.5	6.8	6.2	100.2	76.8	2.680		
68SB3	7-7.5	35.8	49	29	20	ML	75.9	26	3.6	5.2	3.8	115.4	85.0	2.744	1.9E-6	
69SB1	11-12	34.1	34	19	15	CL	74.1		3.3	9.5	7.8	128.2	95.6	2.688		
69SB3	7.5-8.5	32.7				CL	77.7		3.5	7.1	6.0	117.7	88.7	2.707	6.6E-9	
ASB1	22-24	36.6	63	30	33	CH	58.8		3.6	4.2	3.8	115.6	84.7	2.735		
ASB2	14-16	43.4	56	35	21	MH	78.4		2.5	4.3	3.9	110.2	76.8	2.662	6.7E-7	
FSB1	18.5-19	30.6	47	20	27	CL	79.2	30	1.4	7.1	*	119.2	91.2	2.628	8.6E-8	
FSB2	7.5-8	15.6				SM	19.9		1.4	6.8	6.3	111.0	96.1	2.807		
QSB1	9.5-10	26.4	31	21	10	CL	52.6		1.8	6.4	6.5	123.8	97.9	2.717	1.2E-7	
QSB2	24	6.2				GP	3.9		0.6	6.4	6.2	121.6	114.6	2.692		

Note: (1) CS symbol based on visual observation and Sieve and Atterberg limits reported.

TABLE _____

Radford Army Ammunition Plant

SUMMARY OF LABORATORY PERMEABILITY TESTS PERFORMED ON RECONSTITUTED SAMPLES

BORING NO.	SAMPLE NO.	DEPTH	WATER CONTENTS	TOTAL UNIT WGTS	DRY UNIT WGTS	STRESSES	DURING CONSOL.	DURING TEST	COEFFICIENT OF PERM. K,	REMARKS
			INITIAL	INITIAL	INITIAL	EFFECTIVE	TIME	PERMEANT	(@ 20 C)	
			PRE-TEST	PRE-TEST	PRE-TEST	BACK PRESSURE	VOLUMETRIC STRAIN	INITIAL GRADIENT		
		(ft)	(%)	(pcf)	(pcf)	(psi)	(days, %)		(cm/sec)	
13SB10		2-3	29.6	115.9	89.4	5.0	over night	tap water	1.3E-5	P6775
			33.2	122.9	92.3	100.0	3.2	18		
37SB1		6-6.5	21.8	130.1	106.8	5.0	over night	tap water	1.6E-7	P6776
			20.5	131.7	109.3	100.0	2.3	21		
37SB2		15.5-16	17.0	122.7	104.9	5.0	over night	tap water	2.3E-4	P6779
			23.9	130.3	105.2	100.0	0.3	4		
38SB2		15.5	3.7	116.0	111.9	5.0	over night	tap water	2.0E-3	P6785
			18.2	133.7	113.1	100.0	1.1	1		
46SB1		14.5	24.5	127.5	102.4	5.0	over night	tap water	3.0E-8	P6782
			24.4	127.8	102.8	100.0	0.4	23		
57SB3		16.5-17	46.4	106.4	72.7	5.0	over night	tap water	1.8E-7	P6783
			48.3	108.4	73.0	100.0	0.5	21		
68SB3		7-7.5	35.8	115.4	85.0	5.0	over night	tap water	1.9E-6	P6780
			36.5	116.8	85.6	100.0	0.8	18		not recon.
69SB3		7.5-8.5	32.7	117.7	88.7	5.0	over night	tap water	6.6E-9	P6773
			32.2	121.4	91.8	100.0	3.4	39		
ASB2		14-16	43.4	110.2	76.8	5.0	over night	tap water	6.7E-7	P6774
			42.0	111.4	78.4	100.0	2.1	16		
FSB-1		18.5-19.0	30.6	119.2	91.2	5.0	over night	tap water	8.6E-8	P6784
			28.8	120.8	93.8	100.0	2.7	23		
QSB1		9.5-10	26.4	123.8	97.9	5.0	over night	tap water	1.2E-7	P6781
			24.6	126.7	101.7	100.0	3.7	22		

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 31737767 BORING: 57SB3 Test No.: P6783

Project Name: Radford Army Ammunition Plant SAMPLE: DEPTH (ft): 16.5-17

Specimen - Apparatus set-up - Test Information Cell No. 5 Apparatus No. 4 Stage No.: 2

Preliminary Length/Area Calculations

Lo =	2.691	in	Lo=	6.836	cm
dLc=	0.058	in	Ao =	20.16	cm^2
Lc=	2.633	in	Vo =	137.79	cm^3
			Lc=	6.688	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	8.91	cm^3
			Vc =	128.88	cm^3
Sc =	0.347	cm^{-1}	Ac=	19.269	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or			
	x	with stones or		Stones with filter paper or			top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination			
3) During saturation: Water flushed up sides of specimen to remove ai			x	No		Yes	
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only	
5) Direction of permeant :	x	Up during or		Down during permeation			
6) Permeant: water used	x	Tap		Distilled			
or		Demineralized		0.005 N calcium sulfate (CaSO4)			

Equations Used

Kt = - 0.0000750 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3181

Consol Stage-Trial No.	Temp. ° C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	22.0	11/4/03	09	20	00	105.0	100.0	57.30	46.30	0.98	2.04E-07
final	22.0	11/4/03	09	49	00			55.60	46.85		1.83E-07
1	RT = 0.956	dT =		29.00 min		σ'_c =	0.7 ksf	0.127	0.129	io= 20.7	5%
initial	22.0	11/4/03	09	51	00	105.0	100.0	57.30	46.30	0.97	2.01E-07
final	22.4	11/4/03	10	23	00			55.47	46.90		1.80E-07
2	RT = 0.951	dT =		32.00 min		σ'_c =	0.7 ksf	0.136	0.141	io= 20.7	3%
initial	22.4	11/4/03	10	24	00	105.0	100.0	57.50	46.20	0.95	1.90E-07
final	22.7	11/4/03	10	56	00			55.71	46.80		1.69E-07
3	RT = 0.942	dT =		32.00 min		σ'_c =	0.7 ksf	0.133	0.141	io= 21.2	-4%
initial	22.7	11/4/03	10	57	00	105.0	100.0	57.50	46.20	0.98	1.91E-07
final	23.0	11/4/03	11	32	00			55.56	46.83		1.67E-07
4	RT = 0.935	dT =		35.00 min		σ'_c =	0.7 ksf	0.145	0.148	io= 21.2	-4%

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	6.688	cm	ε_{axial} =	2.2%
Ac =	20.506	cm^2		
Vc=	137.15	cm^3	ε_{vol} =	0.5%
Sc =	0.326	cm^{-1}	Sc = Lc / Ac , final	

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	46.36	106.4	72.7	95.1
PreTest	48.34	108.4	73.0	100.0

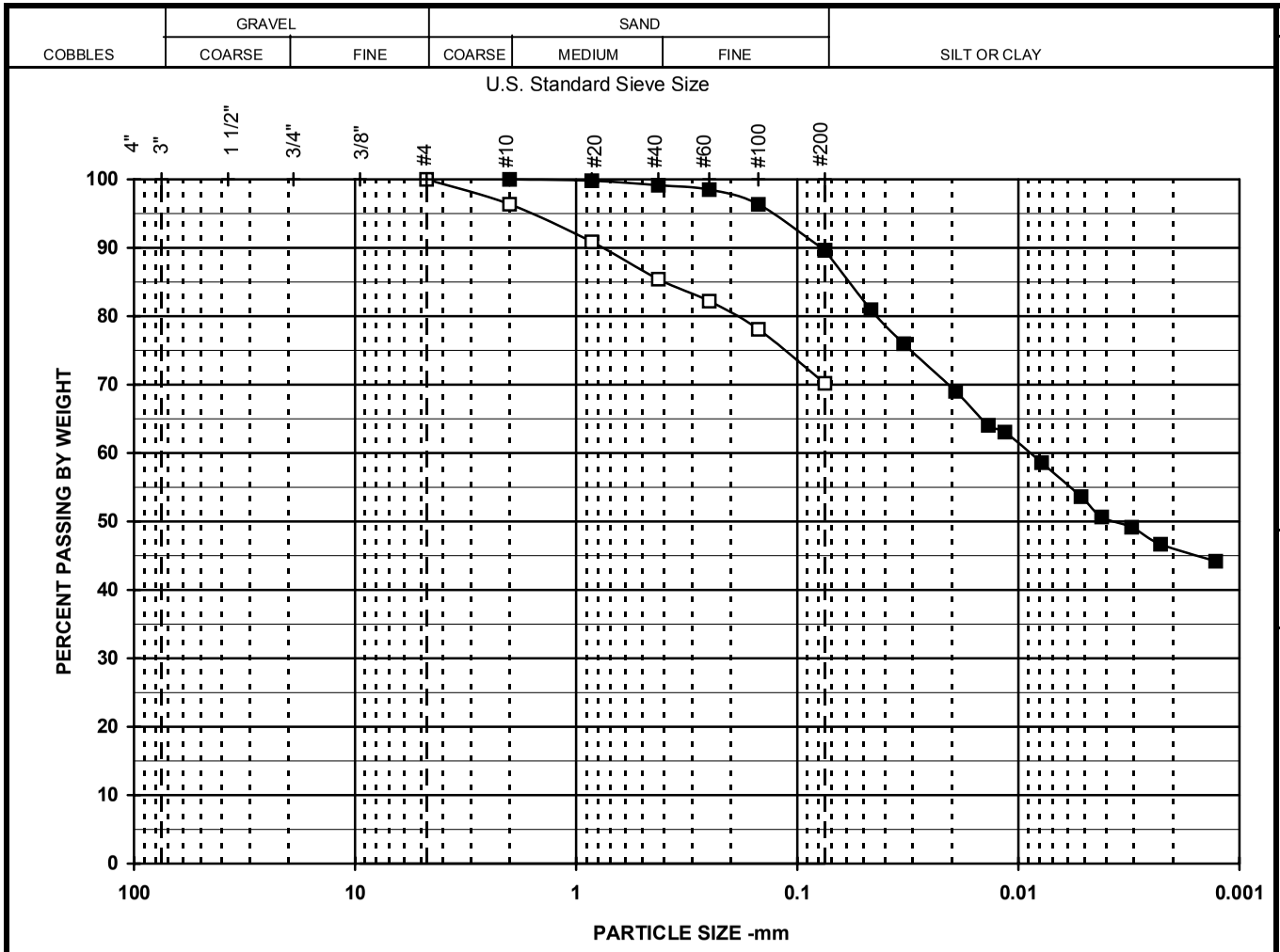
HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **1.75E-07** cm/sec

(i_o)ave = 21.0

Tested By: DT Reviewed By: G. Thomas



SYMBOL	DESCRIPTION AND REMARKS
□	brown silty CLAY, some c-f sand.
■	yellowish brown CLAY, trace f. sand.
○	

Symbol	□	■	○
Boring	57SB2	57SB3	
Sample			
Spec			
Depth	7.5-8	16.5-17	
% +3"			
% Gravel			
% SAND	29.8	10.4	
% FINES	70.2	89.6	
% -2μ		46	
Cc			
Cu			
LL		83	
PL		29	
PI		54	
USCS	CL-ML	CH	
w (%)	28.4		

Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"			
3/8"			
4	100.0		
10	96.4	100.0	
20	90.9	99.8	
40	85.4	99.1	
60	82.2	98.5	
100	78.1	96.3	
200	70.2	89.6	

PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		
31737767	December 2003	Figure

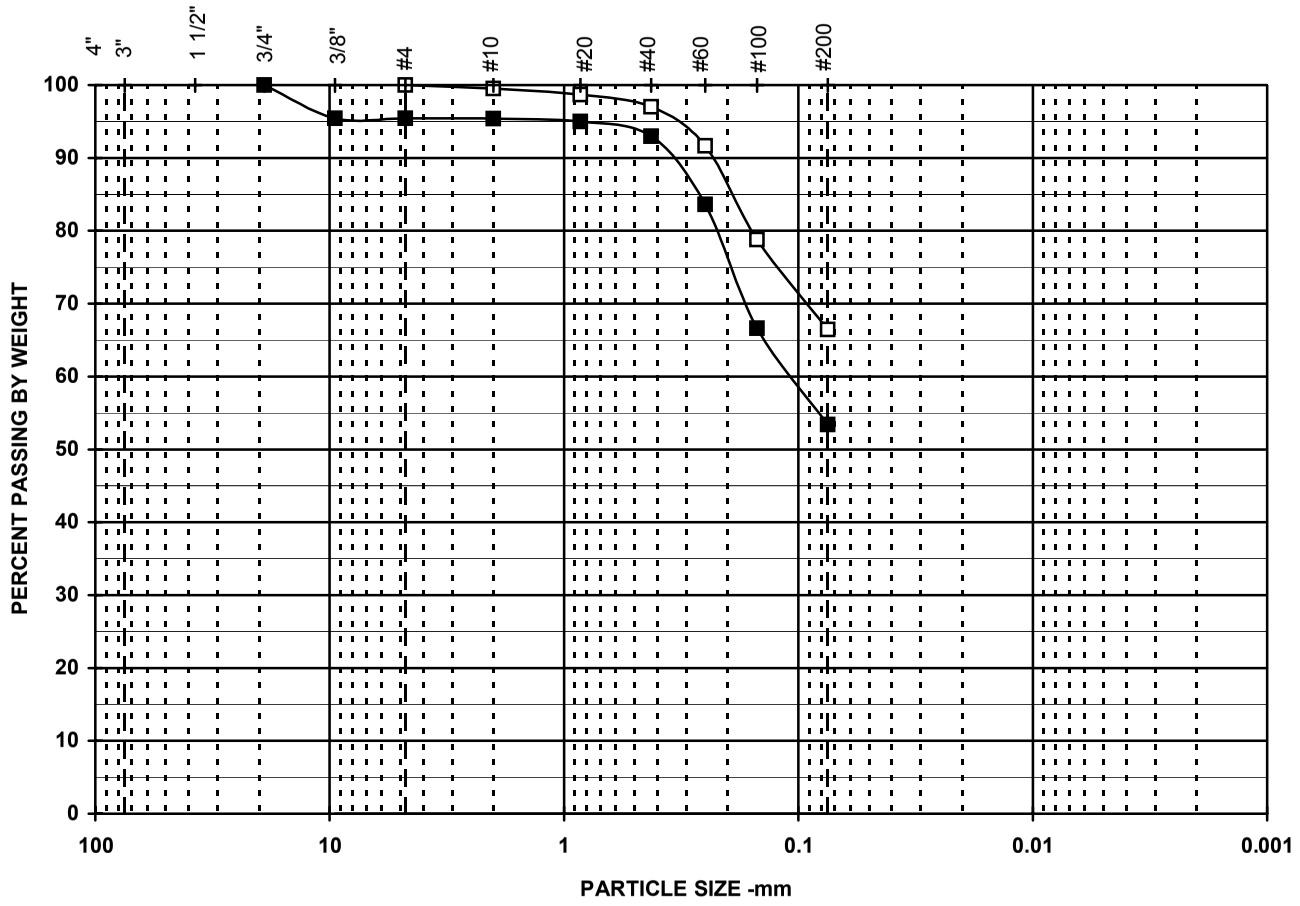
URS Corporation

RFAAP SWMU 57 RFI
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS										REMARKS
			WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	pH Distilled Water	pH 0.01 M CaCl Solution	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	
57SB12		1-2.5									85.8		
57SB12		1.2	19.6										
57SB12		1.45							6.4	6.0			
57SB12		1.75	20.8										
57SB12	B	2.0	21.4	43	17	26	CL	66.5					
57SB5		2-4									102.6		
57SB5		2.2	29.4										
57SB5		2.75	30.9										
57SB5	B	3.0	30.7	55	24	31	CH	53.4					
57SB5		3.3	33.1										
57SB5		3.55							5.2	4.2			

Note: (1) USCS symbol based on visual observation and Sieve and Atterberg limits reported.

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	



SYMBOL	DESCRIPTION AND REMARKS
□	brown sandy CLAY.
■	brown sandy CLAY, trace f. gravel.
○	

Symbol	□	■	○
Boring	57SB12	57SB5	
Sample	B	B	
Spec			
Depth	2.0	3.0	
% +3"			
% Gravel		4.6	
% SAND	33.5	42.0	
% FINES	66.5	53.4	
% -2μ			
Cc			
Cu			
LL	43	55	
PL	17	24	
PI	26	31	
USCS	CL	CH	
w (%)	21.4	30.7	

Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"		100.0	
3/8"		95.4	
4	100.0	95.4	
10	99.5	95.4	
20	98.7	95.0	
40	97.0	93.0	
60	91.7	83.6	
100	78.8	66.6	
200	66.5	53.4	

PARTICLE SIZE DISTRIBUTION
RFAAP SWMU 57 RFI

Project No.		Figure
11656421	April 2008	

URS Corporation

RUTGERS
New Jersey Agricultural Experiment Station

Rutgers Soil Testing Laboratory
P.O. Box 902
Milltown, NJ 08850
(732) 932-9295 x 4231
FAX (732) 932-9292
www.njaes.rutgers.edu/soiltestinglab

Soil Test Report

URS Corporation
Gregory Thomas
45 J Commerce Way
Totowa, NJ 07512

(973) 812-1818
FAX (973) 812-8640

Date received: 03/12/2008
Date reported: 04/03/2008

LabNo	Sample ID	
1002	57 SB 5 @ 3.55	Cation Exchange Capacity = 9.7 meq/100g Exchangeable Cations: Ca = 5.0 meq/100g Mg = 1.2 meq/100g K = 0.3 meq/100g Na = 0.3 meq/100g
1003	57 SB 12 @ 1.45	Cation Exchange Capacity = 7.3 meq/100g Exchangeable Cations: Ca = 4.2 meq/100g Mg = 1.7 meq/100g K = 0.2 meq/100g Na = 0.1 meq/100g

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APPENDIX C.2

BORING LOGS

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APPENDIX C.2.1

PREVIOUS INVESTIGATION BORING LOGS

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Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 57SB1

Sheet 1 of 1

Date(s) Drilled	10-07-03 0945-1035	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	24.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	approximately 21.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						CL	7.5YR 4/3 brown, Clay with fine sand and trace silt, moist, moderately stiff, moderately plastic	Sample 57SB1A collected 0.0-1.0 ft bgs
			1	3.1	ND		ML	7.5YR 4/6 strong brown, Sandy Silt with clay, very fine, moist, low plasticity	
	5		2	4.0	ND		CH/CL	5YR 5/6 yellowish red, Clay, moist, highly plastic, very stiff 6.9 ft bgs, becomes sandy, fine, moderately stiff, plastic Grades to highly silty with depth	
	10		3	4.0	ND		ML	5YR 5/8 yellowish red, Silt with some clay, moist, very soft	Sample 57SB1B collected 10.0-12.0 ft bgs
			4	4.0	ND		ML	7.5YR 5/8 strong brown, Sandy Silt, very fine, moist, soft 12.25-14.8 ft bgs, 7.5YR 6/6 reddish yellow, Sandy Silt, very fine, moist, very soft Grades sandier with depth	
	15						GM/GP	10YR 6/6 brownish yellow, Gravel with silt and sand, moist	
			5	2.7	ND		ML	7.5YR 7/8 reddish yellow mottled with light gray, Silt with claystone fragments, moist, very soft	Sample 57SB1C collected 18.0-20.0 ft bgs
	20		6	3.0	ND		ML	7.5YR 6/8 reddish yellow, increasing claystone fragments, sticky Groundwater at approximately 21.5 ft bgs	
	25							Boring terminated 24.0 ft bgs	
	30								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 57SB1

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 57SB2

Sheet 1 of 2

Date(s) Drilled	10-07-03 1400-1500	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	36.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	35.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments	Initial Boring Refusal 3.0 ft bgs; Offset boring 6 inches		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0							10YR 3/3 dark brown, Sand and Silt, very fine, underlain by Gravel fill	Sample 57SB2A collected 0.0-1.0 ft bgs
			1	3.0	ND		CL	5YR 5/6 yellowish red, Sandy Clay, fine, stiff, very plastic, alternating with sand and clay layers	
							NR	3.0-4.0 ft bgs; No Recovery, presumed Gravel	
							GM/GP	5YR 4/4 reddish brown, Gravel with sand and silt, hard	
	5		2	4.0	ND		ML/CL	7.5YR 6/8 reddish yellow, Silt and Clay, dry, friable, dense Clay grades out	
	10		3	4.0	ND			9.0 ft bgs, Claystone inclusions, slight saprolitic texture 10.0-11.5 ft bgs, Claystone inclusions; weathered, saprolitic texture; black	Sample 57SB2B, MS, MSD collected 8.0-12.0 ft bgs
	15		4	4.0	ND		ML/SM	10YR 6/6 brownish yellow, Silt, trace gravel and claystone inclusions, trace medium to coarse sand, moist 15.0 ft bgs, some very pale brown to gray mottling, trace medium to coarse sand	
			5	4.0	ND				
	20						Siltstone	10YR 6/6 brownish yellow, Siltstone with claystone layers, saprolitic texture, slightly moist	
			6	4.0	ND		ML	10YR 6/6 brownish yellow, Silt, saprolitic texture, slightly moist, very dense, hard Increasing sand and gravel (mudstone/claystone)	
	25		8	4.0	ND				
	30						GP/GM	10YR 5/8 yellowish brown, Silty Gravel with sand, moist, moderately dense; sand, fine to coarse; gravel, medium	

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 57SB2

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	30		9	2.6	ND		GP/GM	10YR 5/8 yellowish brown, Silty Gravel with sand, moist, moderately dense; sand, fine to coarse; gravel, medium	
			10	4.0	ND				Sample 57SB2C collected 33.0-35.0 ft bgs
	35							Groundwater at 35.5 ft bgs ▽	
								Offset Boring terminated 36.0 ft bgs	
	40								
	45								
	50								
	55								
	60								
	65								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 57SB2

URS

Project: Radford Army Ammunition Plant- SSP Project Location: Radford, Virginia Project Number: 09604-317	Log of Borehole 57SB3 Sheet 1 of 2

Date(s) Drilled	10-07-03 1045-1215	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	34.5 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	32.0 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0							5YR 3/3 reddish brown, Sandy Silt, fine, slightly moist	Sample 57SB3A and SBD6 collected 0.0-1.0 ft bgs
			1	4.0	ND		ML	2.5YR 5/8 red, Silt with clay and sand, very fine, moist, micaceous, soft	
	5		2	4.0	ND			Increasing moisture and sand with depth Black sand (weathered rock)	
	10		3	4.0	ND		SC/SM	7.5YR 5/6 strong brown, Clayey Sand with silt, very fine, soft to moderately dense, micaceous 10.0 ft bgs, some black sand	
							SM	7.5YR 6/4 light brown, Silty Sand with some clay, very fine, very moist, soft to moderately stiff, moderately dense	
			4	4.0	ND		CL/CH	7.5YR 6/4 light brown, Sandy Clay/Clayey Sand, moist, dense 13.5-14.0 ft bgs, Clay is very plastic	
	15						CL	7.5YR 7/8 reddish yellow, Clay with silt and trace sand, saprolitic texture Increasing clay	Sample 57SB3B collected 14.0-16.0 ft bgs
			5	4.0	ND		CH	7.5YR 5/8 strong brown, Clay with trace black sand, very plastic 17.6-17.8 ft bgs, Sandy Clay lense, stiff, slightly moist	
	20		6	4.0	ND		ML	7.5YR 6/8 reddish yellow, Silt with claystone inclusions, dense, moist; claystone inclusions have saprolitic texture 21.8 ft bgs, becomes soft with trace black sand, increasing moisture	
	25		7	4.0	ND				
							ML	10YR 5/8 yellowish brown, Silt with some clay, very soft	
	30							10YR 4/6 dark yellowish brown, Silt with some clay and claystone inclusions, soft;	Sample 57SB3C

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 57SB3

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 57SB3

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Recovery (feet)	SAMPLES PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	30		8	2.0	ND			claystone has saprolitic texture Increasing moisture	collected 29.0-31.0 ft bgs
							ML	Groundwater at 32.5 ft bgs	
			9	2.5	ND				
	35							Boring terminated 34.5 ft bgs	
	40								
	45								
	50								
	55								
	60								
	65								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 57SB3

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 57SB4

Sheet 1 of 1

Date(s) Drilled	10-08-03 1000-1600	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Hand Auger	Drilling Contractor	URS Group, Inc.	Total Depth of Borehole	1.5 feet
Drill Rig Type	NA	Drill Bit Size/Type	3-inch Hand Auger	Ground Surface Elevation	
Groundwater Level(s)	Surface Water	Sampling Method	Stainless-Steel 3-inch Hand Auger	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments	Boring located inside Settling Lagoon		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Recovery (feet)	SAMPLES PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0							Highly organic swamp mud, wet	Sample 57SB4A collected 0.5 ft bgs
			1	1.0			CH/SC	2.5Y 5/3 light olive brown, Sandy Clay, fine, wet, very plastic, sticky, stiff	
	1		2	0.5					Sample 57SB4B collected 1.5 ft bgs
	2							Boring Refusal 1.5 ft bgs Note: 2 offset borings, identical lithology, identical refusal	
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 57SB4

APPENDIX C.2.2

RCRA FACILITY INVESTIGATION
BORING LOGS

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Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB1

Sheet 1 of 1

Date(s) Drilled and Installed	**01.10.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**12.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,102.1 E 10,881,902.5**

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
0						Topsoil	Topsoil, dark brown, organic material, gravelly.	
2		1	40	0			7.5YR 5/6 strong brown sandy silt, medium stiff, slight plasticity, dry.	
							7.5YR 5/6 strong brown clayey sandy silt, medium stiff, slight plasticity, moist.	
4							Same as above except color changes to 5YR 5/6 yellowish red.	
6		2	48	0		ML	5YR 5/6 yellowish red sandy silt, soft, low plasticity, moist.	
8							7.5YR 5/4 brown gravelly sandy silt, soft, moist.	
							5YR 5/6 yellowish red clayey sandy silt, soft, low plasticity, moist.	
10		3	42	0				Sample 57SB1AB and Sample DUP-4 were collected from the 10 - 12 ft bgs.
12							Boring was terminated at 12 feet below ground surface (target depth).	
14								
16								
18								
20								

URS

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB1

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB2

Sheet 1 of 1

Date(s) Drilled and Installed	**01.09.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Hand Auger**	Drilling Contractor	**URS**	Total Depth of Borehole	**2.0 feet**
Sampling Method	**Hand Auger - grab samples**	Drill Bit Size/Type	**3 1/4" bucket**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,131.8 E 10,881,926.1**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Recovery (in)	SAMPLES PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Topsoil, dark brown, organic rich.	
								5YR 5/8 yellowish red gravelly sandy CLAY, soft, moist.	
	1		1		0		CL/GC		Sample 57SB2AB was collected from 1.5 - 2 feet bgs.
	2							Boring terminated at 2 feet below ground surface (target depth).	
	3								
	4								
	5								
	6								

URS

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB2

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB4

Sheet 1 of 1

Date(s) Drilled and Installed	**01.11.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Drop hammer driven macrocore.**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**15.5 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,138.0 E 10,881,947.5**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Organic matter, plant litter, saturated.	57SB4A Physical sample collected from 0 - 1 feet below organic material.
							CL	10YR 5/3 brown silty CLAY, soft, wet.	
								Asphalt liner.	
	2		1	30	0			10YR 5/4 yellowish brown gravelly silty CLAY, soft, low plasticity, moist.	Soil sample 57SB4AB and duplicate sample DUP-5 collected from 1.1 - 4 feet bgs.
	4						CL	10YR 4/3 brown silty sandy CLAY, micaceous, soft, medium plasticity, moist.	
	6		2	48	0			Same as above except gravelly. Same as above except color changes to 10YR 5/6 yellowish brown.	Soil sample 57SB4B collected from 6 - 8 feet bgs.
	8							7.5YR 6/8 reddish yellow clayey silty fine SAND, micaceous, loose, moist.	
	10		3	48	0		SM		
	12							Same as above except color changes to 10YR 6/8 brownish yellow (40%) and 10R 3/4 rusky red (60%).	Soil sample 57SB4C collected from 13 - 15.5 feet bgs.
	14		4	42	0				
	16							Boring was terminated at 15.5 feet below ground surface (refusal).	
	18								
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB4

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB5

Sheet 1 of 1

Date(s) Drilled and Installed	**01.14.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Drop hammer driven macrocore.**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**15.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,153.5 E 10,881,930.7**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Organic matter, plant litter, saturated.	Soil sample 57SB5A collected from 0 - 1 feet below organic material.
							CL	10YR 5/3 brown silty CLAY, soft, wet.	
								Asphalt liner.	
	2		1	30	0			10YR 5/3 brown silty CLAY, soft, slight plasticity, wet.	Soil sample 57SB5AB and duplicate sample DUP-6 collected from 1.25 - 4 feet bgs.
	4						CL		
	6		2	36	0			Same as above except gravelly.	Soil sample 57SB5B collected from 6 - 8 feet bgs.
	8							10YR 6/8 brownish yellow fine sandy SILT, soft, moist.	
	10		3	40	0		ML		
	12								
	14		4	36	0				Soil sample 57SB5C collected from 13 - 15 feet bgs.
	16							Boring was terminated at 15 feet below ground surface (refusal).	
	18								
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB5

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB6

Sheet 1 of 1

Date(s) Drilled and Installed	**01.10.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Drop hammer driven macrocore.**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**15.5 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,152.9 E 10,881,951.2**

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
0							Organic matter, plant litter, saturated.	Soil sample 57SB6A collected from 0 - 1 feet below organic material.
						ML	7.5YR 5/6 strong brown clayey SILT, soft, wet.	
							Asphalt liner.	
2		1	38	0		ML	7.5YR 5.6 strong brown (~10% mottled black) clayey SILT, medium stiff, moist.	Soil sample 57SB6AB collected from 1.7 - 4 feet bgs.
4							7.5YR 5/6 strong brown gravelly silty CLAY, very soft, slight plasticity, wet.	
6		2	48	0				Soil sample 57SB6B collected from 6 - 9 feet bgs.
							7.5YR 5/6 strong brown silty CLAY, soft, medium plasticity, moist.	
8						CL		
10		3	30	0				
12							10YR 6/6 brownish yellow gravelly sandy clayey SILT, medium stiff, moist.	
14		4	36	0		ML		Soil sample 57SB6C collected from 13 - 15.5 feet bgs.
16							Boring was terminated at 15.5 feet below ground surface (refusal).	
18								
20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB6

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB7

Sheet 1 of 1

Date(s) Drilled and Installed	**01.11.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Drop hammer driven macrocore.**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**16.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,152.4 E 10,881,970.1**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Organic matter, plant litter, saturated.	Soil sample 57SB7A collected from 0 - 1 feet below organic material.
							CL	10YR 6/4 light yellowish brown silty CLAY, medium stiff, medium plasticity, moist.	
								Asphalt liner.	
	2		1	40	0			10YR 6/4 light yellowish brown silty CLAY, medium stiff, medium plasticity, moist.	Soil sample 57SB7AB collected from 2.0 - 5 feet bgs.
	4						CL		
	6		2	48	0			10YR 6/4 light yellowish brown clayey SILT, medium stiff, low plasticity, moist.	Soil sample 57SB7B collected from 6 - 9 feet bgs.
								Same as above except gravelly.	
	8							7.5YR 6/8 reddish yellow clayey SILT, medium stiff, low plasticity, moist.	
	10		3	42	0				
							ML	7.5YR 5/8 strong brown fine sandy SILT, micaceous, medium stiff, moist.	
	12								
								10YR 5/8 yellowish brown clayey fine sandy SILT, medium stiff, low plasticity, moist.	Soil sample 57SB7C collected from 14 - 16 feet bgs.
	14		4	44	0				
	16							Boring was terminated at 16 feet below ground surface (refusal).	
	18								
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB7

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB8

Sheet 1 of 1

Date(s) Drilled and Installed	**01.14.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Drop hammer driven macrocore.**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**15.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,176.4 E 10,881,949.6**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Organic matter, plant litter, saturated.	
							CL	10YR 5/3 brown silty CLAY, soft, wet.	Soil sample 57SB8A collected from 0 - 1 feet below organic material. Soil sample 57SB8AB collected from 1.2 - 4 feet bgs.
								Asphalt liner.	
	2		1	42	0			7.5YR 5/8 strong brown clayey sandy SILT, soft, moist.	
	4						ML		
	6		2	32	0				Soil sample 57SB8B collected from 6 - 8 feet bgs.
	8							7.5YR 5/8 strong brown (~20% mottled black) sandy silty CLAY, minor gravel, medium stiff, slight plasticity, moist.	
	10		3	40	0		CL		
	12								
	14		4	28	0				Soil sample 57SB8C collected from 13 - 15 feet bgs.
	16							Boring was terminated at 15 feet below ground surface (refusal).	
	18								
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB8

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB9

Sheet 1 of 1

Date(s) Drilled and Installed	**01.10.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Drop hammer driven macrocore.**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**13.5 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,113.2 E 10,881,915.1**

Elevation feet / Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
0							Topsoil, dark brown, organic rich.	Soil sample 57SB9A collected from 0 - 1 feet below organic material.
							5YR 4/6 clayey sandy SILT, soft, low plasticity, moist.	
2		1	36	0				
4							Same as above except medium stiff consistency.	
6		2	42	0		ML	5YR 5/8 yellowish red sandy SILT, stiff, moist.	
8							5YR 5/8 yellowish red clayey sandy SILT, stiff, moist.	
10		3	48	0				Soil sample 57SB9AB collected from 10 - 12 feet bgs.
12		4	18	0				
14							Boring was terminated at 13.5 feet below ground surface (refusal).	
16								
18								
20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB9

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB10

Date(s) Drilled and Installed	**01.08.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**36.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,122.9 E 10,881,959.3**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Topsoil, dark brown, organic rich.	
	2		1	36	0		CL	7.5YR 5/1 gray (~20% mottled red 2.5YR 4/8) silty CLAY with sand, soft, medium plastic, moist.	Soil sample 57SB10A collected from 0 - 1 feet below organic material.
	4								
	6		2	40	0				
	8						ML	10YR 5/8 yellowish brown sandy SILT, medium stiff, moist.	
	10		3	40	0		GW	10YR 5/8 yellowish brown well-graded gravel with sand and silt, medium dense, moist.	Soil sample 57SB10B collected from 10 - 12 feet bgs.
	12							10YR 5/8 yellowish brown sandy SILT with clay, medium stiff, moist.	
	14		4	40	0		ML	10YR 5/8 yellowish brown (~30% mottled dark brown 10YR 3/3) sandy SILT, medium stiff, moist.	
	16								
	18		5	42	0				
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB10

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB10

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
20							10YR 5/8 yellowish brown gravelly sandy SILT, medium stiff, moist.	
22		6	48	0				
							Same as above except ~30% mottled black.	
24								
26		7	48	0			10YR 6/8 brownish yellow sandy SILT, medium stiff, moist.	
28						ML	Same as above except gravelly.	
30		8	40	0				
							10YR 6/8 sandy SILT with clay, medium stiff, moist.	
32							10YR 6/8 brownish yellow gravelly sandy silt, medium stiff, moist.	
34		9	40	0				Soil sample 57SB10C collected from 34 - 36 feet bgs.
36							Boring was terminated at 36 feet below ground surface (target depth).	
38								
40								
42								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB10

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB11

Date(s) Drilled and Installed	**01.09.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**36.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,142.1 E 10,881,984.1**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Topsoil, dark brown, organic rich.	
								7.5YR 6/1 gray (80%) and 5YR 5/8 yellowish red (20%) silty CLAY, soft, high plasticity, moist.	Soil sample 57SB11A and duplicate sample DUP-2 collected from 0 - 1 feet below organic material.
	2		1	48	0				
	4						CH	7.5YR 6/1 gray (70%) and 5YR 5/8 yellowish red (30%) sandy silty CLAY, soft, high plasticity, moist.	
	6		2	48	0				
	8							7.5YR 6/1 gray (70%) and 5YR 5/8 yellowish red (30%) sandy silty CLAY, soft,medium plasticity, moist.	
	10		3	40	0				Soil sample 57SB11B collected from 10 - 12 feet bgs.
	12							Same as above, except slight plasticity.	
	14		4	40	0		CL		
	16								
	18		5	48	0				
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB11

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB11

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
	20								7.5YR 5/6 silty CLAY, medium stiff, medium plasticity, moist.		
	22		6		40	0		CL			
	24							ML	7.5YR 3/2 dark brown (60%) and 7.5YR 4/6 strong brown (40%) fine sandy SILT, medium stiff, moist.		
	26		7		30	0		SM	7.5YR 2.5/1 black silty fine SAND, loose, moist.		
	28								7.5YR 3/2 dark brown (60%) and 7.5YR 4/6 strong brown (40%) fine sandy SILT, medium stiff, moist.		
	30		8		34	0		ML	Same as above except color changes to black at the 30 - 30.5 foot interval.		
	32										
	34		9		36	0			7.5YR 5/6 strong brown clayey sandy SILT, soft, moist.		Soil sample 57SB11C collected from 34 - 36 feet bgs.
	36								Boring was terminated at 36 feet below ground surface (target depth).		
	38										
	40										
	42										

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB11

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB12

Date(s) Drilled and Installed	**01.09.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**36.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,191.1 E 10,881,949.7**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Topsoil, dark brown, organic rich.	Soil sample 57SB12A/MS/MSD collected from 0 - 1 feet below organic material. Physical sample also collected here.
								7.5YR 6/1 gray (50%) and 7.5YR 5/6 strong brown (50%) clayey SILT, medium stiff, slight plasticity, moist.	
	2		1	48	0		ML		
	4								
	6		2	45	0			5YR 5/6 yellowish red silty fine SAND, medium dense, moist.	
	8							Same as above except color is black at the 7.0 - 7.5 ft interval.	
	10		3	45	0		SM		Soil sample 57SB12B collected from 10 - 12 feet bgs.
	12								
	14		4	42	0				
	16							5YR 5/6 yellowish red (~10% black mottling) sandy SILT, micaceous, medium stiff, slight plasticity, moist.	
	18		5	48	0		ML		
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB12

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB12

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
20						ML	5YR 5/6 yellowish red (~10% black mottling) sandy SILT, micaceous, medium stiff, slight plasticity, moist.	
22		6	42	0				
24								
26		7	48	0		CL	10YR 6/6 brownish yellow sandy silty CLAY, soft, medium plasticity, moist.	
28								
30		8	48	0		SM	10YR 6/6 brownish yellow silty SAND, with some clay and gravel, loose, moist.	
32								
34		9	48	0				Soil sample 57SB12C collected from 34 - 36 feet bgs.
36							Boring was terminated at 36 feet below ground surface (target depth).	
38								
40								
42								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB12

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB13

Sheet 1 of 2

Date(s) Drilled and Installed	**01.09.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**36.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,195.2 E 10,881,922.0**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Topsoil, dark brown, organic rich.	Soil sample 57SB13A and duplicate sample DUP-3 collected from 0 - 1 feet below organic material.
			1	42	0		ML	5YR 4/4 reddish brown sandy SILT, soft, slight plasticity, moist.	
	2								
	4								
	6		2	48	0		CL	5YR 4/4 reddish brown (70%) and 5YR 2.5/1 black (30%) silty CLAY, very stiff, medium plasticity, moist.	
	8								
	10		3	42	0		ML	5YR 5/6 yellowish red sandy SILT with minor clay, micaceous, medium stiff, moist.	Soil sample 57SB13B collected from 10 - 12 feet bgs.
	12								
	14		4	48	0				
	16								
	18		5	44	0		GW	5YR 4/6 yellowish red well-graded GRAVEL with clay and sand, loose, moist.	
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB13

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB13

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
	20							GW			
									5YR 4/6 yellowish red silty CLAY with sand and gravel, soft, medium plasticity, moist.		
	22		6		48	0					
	24										
	26		7		48	0					
	28							CL	5YR 4/6 yellowish red silty CLAY, very soft, medium plasticity, moist.		
	30		8		24	0					
	32								5YR 4/6 yellowish red silty CLAY with sand and gravel, very soft, medium plasticity, moist.		
	34		9		48	0					Soil sample 57SB13C collected from 34 - 36 feet bgs.
	36								Boring was terminated at 36 feet below ground surface (target depth).		
	38										
	40										
	42										

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB13

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB14

Sheet 1 of 2

Date(s) Drilled and Installed	**01.10.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**36.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,139.2 E 10,881,895.8**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Topsoil, dark brown, organic rich.	Soil sample 57SB14A/MS/MSD collected from 0 - 1 feet below organic material.
								5YR 4/6 yellowish red sandy SILT, medium stiff, slight plasticity, dry.	
	2		1	30	0				
	4							5YR 4/6 yellowish red sandy SILT with clay, medium stiff, slight plasticity, moist.	
								5YR 4/6 yellowish red sandy SILT, stiff, slight plasticity, moist.	
	6		2	48	0				
	8								
	10		3	36	0		ML		Soil sample 57SB14B collected from 10 - 12 feet bgs.
	12							Same as above except the color changes to 7.5YR 6/8 reddish yellow.	
	14		4	40	0				
	16							7.5YR 6/8 reddish yellow sandy SILT with clay, stiff, slight plasticity, moist.	
	18		5	30	0				
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB14

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB14

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
	20								5YR 5/4 reddish brown clayey SILT with sand and gravel, soft, low plasticity, moist.		
	22		6		24	0					
	24										
	26		7		36	0		ML			
	28										
	30		8		40	0					
	32								5YR 5/4 reddish brown silty CLAY with sand and gravel, soft, medium plasticity, moist.		
	34		9		40	0		CL			Soil sample 57SB14C collected from 34 - 36 feet bgs.
	36								Boring was terminated at 36 feet below ground surface (target depth).		
	38										
	40										
	42										

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB14

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB15

Date(s) Drilled and Installed	**01.08.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**40.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**38 feet bgs**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**38 feet bgs**	Coordinates	**N 3,600,097.8 E 10,881,965.6**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Topsoil, dark brown, organic rich.	
	2		1	45	0		SM	10YR 6/3 pale brown silty fine SAND, loose, moist.	Soil sample 57SB15A and duplicate sample DUP-1 collected from 0 - 1 feet below organic material.
	4							10YR 6/6 brownish yellow silty CLAY, soft, medium plasticity, moist.	
	6		2	42	0				
	8						CL	10YR 5/6 yellowish brown silty CLAY with sand, medium stiff, medium plasticity, moist.	
	10		3	48	0				Soil sample 57SB15B collected from 10 - 12 feet bgs.
	12							Same as above except ~30% mottled black.	
	14		4	42	0		ML	7.5YR 6/8 reddish yellow sandy SILT, medium stiff, moist.	
	16							10YR 7/8 yellow silty fine SAND, medium dense, moist.	
	18		5	24	0		SM		
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB15

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB15

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
	20								10YR 6/8 brownish yellow clayey SILT with sand, medium stiff, moist.		
	22		6		48	0					
	24							ML	10YR 7/8 yellow clayey SILT, soft, moist.		
	26		7		48	0					
	28								10YR 6/8 brownish yellow sandy CLAY, soft, low plasticity, moist.		
	30		8		48	0		CL			
	32							SM	10YR 6/8 brownish yellow silty fine SAND with some clay, loose, moist.		
	34		9		24	0			10YR 6/8 brownish yellow sandy SILT, very soft, moist.		Soil sample 57SB15C collected from 34 - 36 feet bgs.
	36							ML			
	38		10		40				Same as above except wet (water at 38 feet bgs). ▽		
	40								Boring was terminated at 40 feet below ground surface (target depth).		
	42										

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB15

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB16

Date(s) Drilled and Installed	**01.08.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**51.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,121.9 E 10,881,980.2**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Topsoil, dark brown to black, organic rich.	
	2		1	28	0		ML	10YR 3/2 very dark grayish brown sandy SILT, soft, moist.	Soil sample 57SB16A collected from 0 - 1 feet below organic material.
	4							10YR 5/3 brown silty CLAY, soft, medium plasticity, moist.	
	6		2	48	0			Same as above except color changes to 10YR 5/2 grayish brown (65%) and 5YR 4/6 yellowish red (35%).	
	8						ML	Same as above except color ratio (50/50) and sand content increasing with depth.	
	10		3	40	0				Soil sample 57SB16B collected from 10 - 12 feet bgs.
	12						GP	10YR 2/1 black gravel, loose, moist.	
	14		4	40	0			7.5YR 5/8 silty fine SAND with some clay, medium dense, moist.	
	16						SM		
	18		5	40	0				
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB16

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB16

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
20						ML	10YR 5/8 yellowish brown clayey SILT with sand, very stiff, moist.	
22		6	40	0				
24								
26		7	36	0		CL	10YR 5/6 yellowish brown sandy CLAY, medium stiff, medium plasticity, moist, displays saprolitic texture.	
28								
30		8	36	0				
32						CH	10YR 5/8 yellowish brown clayey SILT with sand and gravel, medium stiff stiff, highly plastic, moist, displays saprolitic texture.	
34		9	48	0				
36						CL	10YR 5/6 yellowish brown silty CLAY with sand and gravel, soft to medium stiff, medium plasticity, moist.	
38		10	48	0				
40							Same as above except color is ~20% mottled black.	
42		11	48	0				

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB16

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB16

Elevation feet / Depth, feet	SAMPLES: Type Number	SAMPLES:	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
44							Same as above except medium stiff consistency.		
46	12		44	0		CL	Same as above except soft consistency.		
48							Same as above except medium stiff consistency.		
50	13		36	0					Soil sample 57SB16C collected from 49 - 51 feet bgs.
							10YR 5/1 gray LIMESTONE, weathered, friable.		
52							Boring was terminated at 51 feet below ground surface (refusal).		
54									
56									
58									
60									
62									
64									
66									

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB16

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB17

Date(s) Drilled and Installed	**01.07.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**59.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**Groundwater was not encountered.**	Approximate Surface Elevation	**Not Avaiable**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**Groundwater was not encountered.**	Coordinates	**N 3,600,189.4 E 10,881,983.8**

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
0							Topsoil, dark brown, organic rich.	Soil sample 57SB17A collected from 0 - 1 feet below organic material.
2		1	48	0		ML	10YR 4/6 dark yellowish brown sandy SILT, medium stiff, dry.	
4							10YR 4/6 dark yellowish brown silty CLAY, medium stiff, low plasticity, moist.	
6		2	48	0				
8								
10		3	48	0				Soil sample 57SB17B collected from 10 - 12 feet bgs.
12						CL		
14		4	48	0				
16								
18		5	40	0				
20						ML	10YR 4/6 dark yellowish brown sandy SILT with clay, medium stiff, moist.	

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB17

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB17

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
20						ML	10YR 4/6 dark yellowish brown sandy SILT with clay, medium stiff, moist.	
22		6	48	0		CL	10YR 4/6 dark yellowish brown silty CLAY, medium stiff, low plasticity, moist.	
24						ML	10YR 4/6 dark yellowish brown clayey SILT, medium stiff, moist. 10YR 4/6 dark yellowish brown sandy SILT with clay, medium stiff, moist.	
26		7	46	0				
28						SM	10YR 4/6 dark yellowish brown sandy SILT, medium dense, moist. 10YR 4/6 dark yellowish brown silty fine SAND, loose, moist.	
30		8	24	0				
32						ML	10YR 4/6 dark yellowish brown sandy SILT with clay, soft, moist.	
34		9	36	0				
36							Same as above except very soft.	
38		10	32	0				
40								
42		11	28	0				

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB17

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB17

Elevation feet / Depth, feet	SAMPLES: Type Number	SAMPLES	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
44							10YR 4/6 dark yellowish brown sandy SILT with clay, very soft, moist.		
46	12		28	0					
48									
50	13		40	0		ML			
52									
54	14		40	0					
56									
58	15		32	0					Soil sample 57SB17C collected from 57 - 59 feet bgs.
							10YR 5/1 LIMESTONE, weathered, friable.		
60							Boring was terminated at 59 feet below ground surface (refusal).		
62									
64									
66									

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB17

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB18

Date(s) Drilled and Installed	**01.09.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**35.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**28 feet bgs**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**28 feet bgs**	Coordinates	**N 3,600,181.6 E 10,881,890.7**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Topsoil, dark brown to black, organic rich.	
								5YR 5/8 yellowish red sandy SILT with clay, micaceous, soft, low plasticity, moist.	Soil sample 57SB18A collected from 0 - 1 feet below organic material.
	2		1	44	0				
	4								
	6		2	32	0				
							ML	5YR 2.5/1 black GRAVEL, loose, moist.	
	8							5YR 5/8 yellowish red sandy SILT with clay, micaceous, soft, low plasticity, moist.	
	10		3	40	0				Soil sample 57SB18B collected from 10 - 12 feet bgs.
	12							5YR 5/8 yellowish red clayey SILT with sand and gravel, soft, moist.	
	14		4	36	0				
							CL	5YR 5/8 yellowish red silty CLAY, medium stiff, moist.	
	16							5YR 5/8 yellowish red clayey SILT with sand and gravel, soft, moist.	
							ML		
	18		5	48	0				
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB18

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB18

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
	20							ML	5YR 5/8 yellowish red clayey SILT with sand and gravel, soft, moist.		
	22		6		42	0			7.5YR 6/8 reddish yellow silty CLAY with sand, soft, medium plasticity, moist.		
	24							CL	7.5YR 6/8 yellowish red silty CLAY with sand and gravel, soft, medium plasticity, moist.		
	26		7		48	0					Soil sample 57SB18C collected from 26 - 28 feet bgs.
	28								7.5YR 6/8 yellowish red sandy SILT with clay, very soft, saturated (material appears to be saturated but free water not observed).	▽	
	30		8		28	0		ML			
	32										
	34		9		26	0					
								GW	7.5YR 5/4 brown sandy GRAVEL with clay, medium dense, wet.		
	36								Boring was terminated at 35 feet below ground surface (refusal).		
	38										
	40										
	42										

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB18

URS

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB19

Date(s) Drilled and Installed	**01.09.2008**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**32.0 feet**
Sampling Method	**Macrocore with disposable acetate liner**	Drill Bit Size/Type	**Direct Push Macrocore**	Top of Casing Elevation	
Size and Type of Well Casing		Groundwater Level(s)	**28 feet bgs**	Approximate Surface Elevation	**Not Available**
Seal or Backfill	**Bentonite pellets**	Groundwater Level(s)	**28 feet bgs**	Coordinates	**N 3,600,197.9 E 10,881,857.5**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Topsoil, dark brown, organic rich.	Soil sample 57SB19A collected from 0 - 1 feet below organic material.
			1	48	0		ML	5YR 4/6 yellowish red sandy SILT with clay, soft, low plasticity, moist.	
	2								
	4							5YR 4/6 yellowish red silty fine SAND with some clay, loose, moist.	
	6		2	48	0				
	8						SM	5YR 3/2 dark reddish brown silty fine SAND, loose, moist. 5YR 5/8 yellowish red silty fine SAND, loose, moist.	
	10		3	38	0			5YR 5/8 yellowish red silty fine SAND with gravel, loose, moist.	Soil sample 57SB19B collected from 10 - 12 feet bgs.
	12							10YR 6/6 brownish yellow clayey SILT, soft, low plasticity, moist.	
	14		4	40	0				
	16						ML	10YR 6/6 brownish yellow clayey SILT with sand and gravel, soft, moist.	
	18		5	48	0				
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB19

Project: SWMU 57 RFI
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57SB19

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
	20										
	22		6		48	0					
	24								Same as above except very soft.		
	26		7		40	0		ML			Soil sample 57SB19C collected from 26 - 28 feet bgs.
	28								Same as above except wet (water at 28 feet bgs).	▽	
	30		8		36	0					
	32								Boring was terminated at 32 feet below ground surface (target depth).		
	34										
	36										
	38										
	40										
	42										

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI DIRECT PUSH INVESTIGATION.GPJ; 4/30/2008 57SB19

Project: SWMU 57 RFI Monitor Well Installation
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57MW1

Date(s) Drilled and Installed	**01.17.2008**	Geologist	**Jim Carter**	Reviewer	**Tina DeVine**
Drilling Method	**Mixed - Direct Push, Hollow-Stem Auger, Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**73.0 feet**
Sampling Method	**4' Macrocore with disposable acetate liner**	Hammer Data	**Continuous hydraulic pressure**	Top of Casing Elevation	
Size and Type of Well Casing	**2-inch I.D. Schedule 40 PVC**	Screen Perforation	**0.010-inch**	Approximate Surface Elevation	
Seal or Backfill	**Bentonite pellets/Bentonite-cement grout**	Groundwater Level(s)	**53 ft bgs**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in.)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
0							Topsoil, dark brown, organic rich.	
2		1	40	0		CL	7.5YR 5/6 strong brown silty sandy CLAY, soft, medium plasticity, moist.	
4						ML	5YR 5/8 yellowish red clayey sandy SILT, medium stiff, slight plasticity, moist.	
6		2	48	0				
8						CL	5YR 5/8 yellowish red silty CLAY, stiff, low to medium plasticity, moist. Same as above except ~ 40% mottled black (8 - 9 ft interval). 2.5YR 5/8 red silty CLAY, stiff, medium plasticity, moist.	
10		3	42	0			5YR 5/8 yellowish red silty CLAY, stiff, medium plasticity, moist.	
12								
14		4	16	0				
16								
18		5	38	0		ML	5YR 6/6 reddish yellow clayey sandy SILT, medium stiff, low plasticity, moist.	
20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI WELL INSTALLATION.GPJ; 4/29/2008 57MW1

Project: SWMU 57 RFI Monitor Well Installation
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57MW1

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	20								Same as above except color changes to 10YR 6/8 brownish yellow.	
	22		6		36	0		ML		Grout: 10% Bentonite/Cement Slurry
	24									
	26		7		40	0		CL	10YR 6/8 brownish yellow (65%) and 5YR 4/6 yellowish red (35%) silty CLAY with some sand, medium stiff, moist.	
								ML	10YR 6/8 brownish yellow clayey sandy SILT, medium stiff, low plasticity, moist.	
	28								7.5YR 6/8 reddish yellow sandy silty CLAY with minor gravel, medium stiff, low plasticity, moist.	
	30		8		42	0		CL		
	32									
	34		9		48	0				
	36							ML	7.5YR 6/8 reddish yellow (~ 15% mottled black) clayey sandy SILT, medium stiff, low plasticity, moist.	
	38		10		40	0			7.5YR 6/8 reddish yellow sandy silty CLAY, medium stiff, medium plasticity, moist.	
	40							CL		
	42		11		48	0			Same as above except stiff consistency.	

Project: SWMU 57 RFI Monitor Well Installation
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57MW1

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
	44								Same as above except medium stiff consistency.		3/8-inch Hydrated Bentonite Pellets
	46		12		40	0					No. 1 Silica Quartz Sandpack
	48								Same as above except very soft consistency.		
	50		13		48	0		CL			
	52									▽	
	54		14		46	0					
	56										
	58		15		42	0					
	60							WLS	7.5YR 5/1 gray LIMESTONE, weathered. Direct-push refusal at 59.5 ft.		Screen: 0.01-inch Factory Slotted, Sch 40, 2-inch PVC
									Hollow-stem auger refusal at 61.5 ft.		
	62								LIMESTONE, competent bedrock.		
	64							LS			
	66										

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI WELL INSTALLATION.GPJ; 4/29/2008 57MW1

Project: SWMU 57 RFI Monitor Well Installation
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57MW1

Elevation feet / Depth, feet	SAMPLES: Type Number	SAMPLES	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
68						LS	LIMESTONE, competent bedrock.		
70									
72									
74							Boring was terminated at 73 feet below ground surface (target depth).		
76									
78									
80									
82									
84									
86									
88									
90									

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI WELL INSTALLATION.GPJ; 4/29/2008 57MW1

Project: SWMU 57 RFI Monitor Well Installation
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57MW2

Date(s) Drilled and Installed	**01.15.2008**	Geologist	**Jim Carter**	Reviewer	**Tina DeVine**
Drilling Method	**Mixed - Direct Push, Hollow-Stem Auger, Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**65.0 feet**
Sampling Method	**4' Macrocore with disposable acetate liner**	Hammer Data	**Continuous hydraulic pressure**	Top of Casing Elevation	
Size and Type of Well Casing	**2-inch I.D. Schedule 40 PVC**	Screen Perforation	**0.010-inch**	Approximate Surface Elevation	
Seal or Backfill	**Bentonite pellets/Bentonite-cement grout**	Groundwater Level(s)	**48 ft bgs**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Topsoil, dark brown to black, organic rich.	
								7.5YR 4/4 brown sandy SILT, soft, dry.	
	2		1	40	0				
								Same as above except the color changes to 2.5YR 5/6 strong brown.	
	4							Same as above except medium stiff consistency.	
	6		2	48	0		ML		
	8							Same as above except ~ 20% mottled black.	
								Same as above except some small (< 1") black concretions at the 9.5 - 10 ft interval.	
	10		3	48	0				
	12								
	14		4	48	0			7.5YR 6/8 reddish yellow silty fine SAND, medium dense, moist.	
	16						SM		
	18		5	36	0				Grout: 10% Bentonite/Cement Slurry
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI WELL INSTALLATION.GPJ; 4/29/2008 57MW2

Project: SWMU 57 RFI Monitor Well Installation
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57MW2

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
	20								5YR 5/6 yellowish red (~ 20% mottled black) silty fine SAND with minor clay, medium dense, moist.		
	22		6		24	0					
	24							SM			
	26		7		40	0					
	28							GW	5YR 5/6 yellowish red well-graded GRAVEL with sand and clay, loose, moist.		
									10YR 6/6 brownish yellow clayey sandy SILT, soft, moist.		
	30		8		32	0		ML			
	32								10YR 6/6 brownish yellow sandy silty CLAY, soft, medium plastic, moist.		
	34		9		48	0					
	36							CL			3/8-inch Hydrated Bentonite Pellets
	38		10		36	0					No. 1 Silica Quartz Sandpack
	40								Same as above except very soft consistency.		
	42		11		48	0					

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI WELL INSTALLATION.GPJ; 4/29/2008 57MW2

Project: SWMU 57 RFI Monitor Well Installation
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57MW2

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
	44										
	46		12		28	0		CL			
	48							SC/SW	10YR 6/6 brownish yellow gravellly clayey SAND, loose, wet.	▽	
	50		13		16	0		WLS	10YR 6/2 gray LIMESTONE, weathered. Direct-push refusal at 50 ft.		Screen: 0.01-inch Factory Slotted, Sch 40, 2-inch PVC
	52										
	54										
	56								Hollow-stem auger refusal at 57 ft.		
	58								LIMESTONE, competent bedrock.		
	60										
	62										
	64										
	66								Boring was terminated at 65 feet below ground surface (target depth).		

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI WELL INSTALLATION.GPJ; 4/29/2008 57MW2

URS

Project: SWMU 57 RFI Monitor Well Installation
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57MW3

Date(s) Drilled and Installed	**01.16.2008**	Geologist	**Jim Carter**	Reviewer	**Tina DeVine**
Drilling Method	**Mixed - Direct Push, Hollow-Stem Auger, Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**65.0 feet**
Sampling Method	**4' Macrocore with disposable acetate liner**	Hammer Data	**Continuous hydraulic pressure**	Top of Casing Elevation	
Size and Type of Well Casing	**2-inch I.D. Schedule 40 PVC**	Screen Perforation	**0.010-inch**	Approximate Surface Elevation	
Seal or Backfill	**Bentonite pellets/Bentonite-cement grout**	Groundwater Level(s)	**49 ft bgs**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	0							Topsoil, dark brown, organic rich.	
								2.5YR 4/8 red clayey sandy SILT, medium stiff, moist.	
	2		1	48	0				
								Same as above except color changes to 7.5YR 6/8 reddish yellow.	
	4								
	6		2	48	0		ML		
	8								
	10		3	48	0				
	12							10YR 5/8 yellowish brown sandy silty CLAY, medium stiff, medium plasticity, moist.	
	14		4	48	1.9				
	16						CL		
	18		5	38	3.3				Grout: 10% Bentonite/Cement Slurry
	20								

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI WELL INSTALLATION.GPJ; 4/29/2008 57MW3

URS

Project: SWMU 57 RFI Monitor Well Installation
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57MW3

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
	20								Same as above except the color changes to 7.5YR 5/6 strong brown.		
	22		6		42	3.0		CL			
	24										
	26		7		42	0			7.5YR 5/6 gravelly sandy silty CLAY, medium stiff, medium plasticity, moist.		
	28										
	30		8		24	0		CL/SW			
	32										
	34		9		30	0			Same as above except wet. This layer did not produce enough water to set well.		
	36								10YR 6/2 light brownish gray LIMESTONE, weathered, friable. Direct-push refusal at 35.5 feet bgs.		3/8-inch Hydrated Bentonite Pellets
	38							LS			No. 1 Silica Quartz Sandpack
	40								Light brownish gray LIMESTONE, competent bedrock. Hollow-stem auger refusal at 40 feet bgs.		
	42							LS			

Report: ENV_12W_CLEVELAND+/-USCS; File: SWMU 57 RFI WELL INSTALLATION.GPJ; 4/29/2008 57MW3

URS

Project: SWMU 57 RFI Monitor Well Installation
Project Location: Radford Army Ammunition Plant
Project Number: 11656421.20000

Log of Borehole 57MW3

Elevation feet / Depth, feet	SAMPLES: Type Number	SAMPLES	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
44							Light brownish gray LIMESTONE, competent bedrock.		
46						LS			
48								▽	
50						WLS	Weathered zone, clay and rock pieces, loose, wet.		
52							Light brownish gray LIMESTONE, competent bedrock.		◄Screen: 0.01-inch Factory Slotted, Sch 40, 2-inch PVC
54									
56						LS			
58									
60									
62									
64									
66							Boring terminated at 65 feet below ground surface (target depth).		

URS

APPENDIX C.3

SLUG TEST DATA

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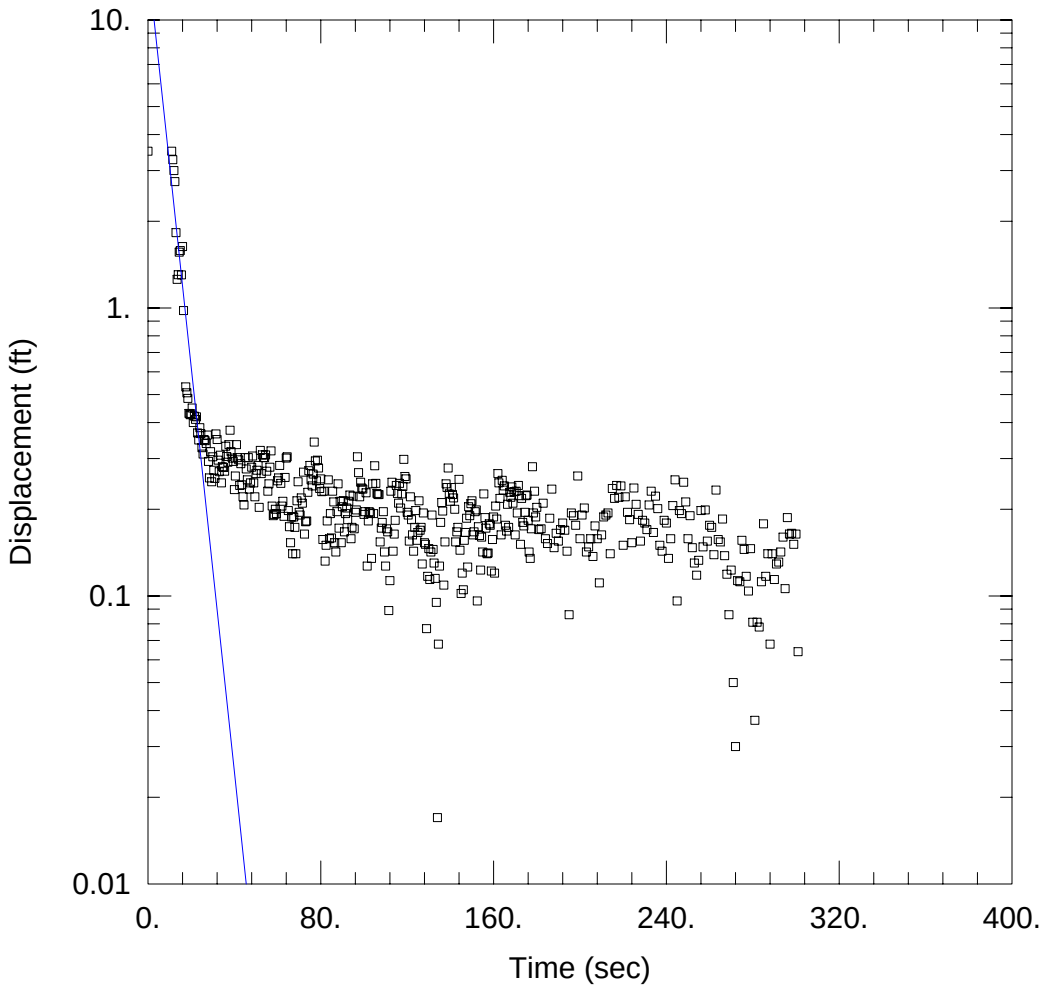


57MW2 FALLING HEAD TEST

Data Set: P:\...\57MW2 Falling Head.aqt
Date: 04/29/08 Time: 14:26:25

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656421
Test Location: Radford, VA
Test Well: 57MW2
Test Date: 3-19-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

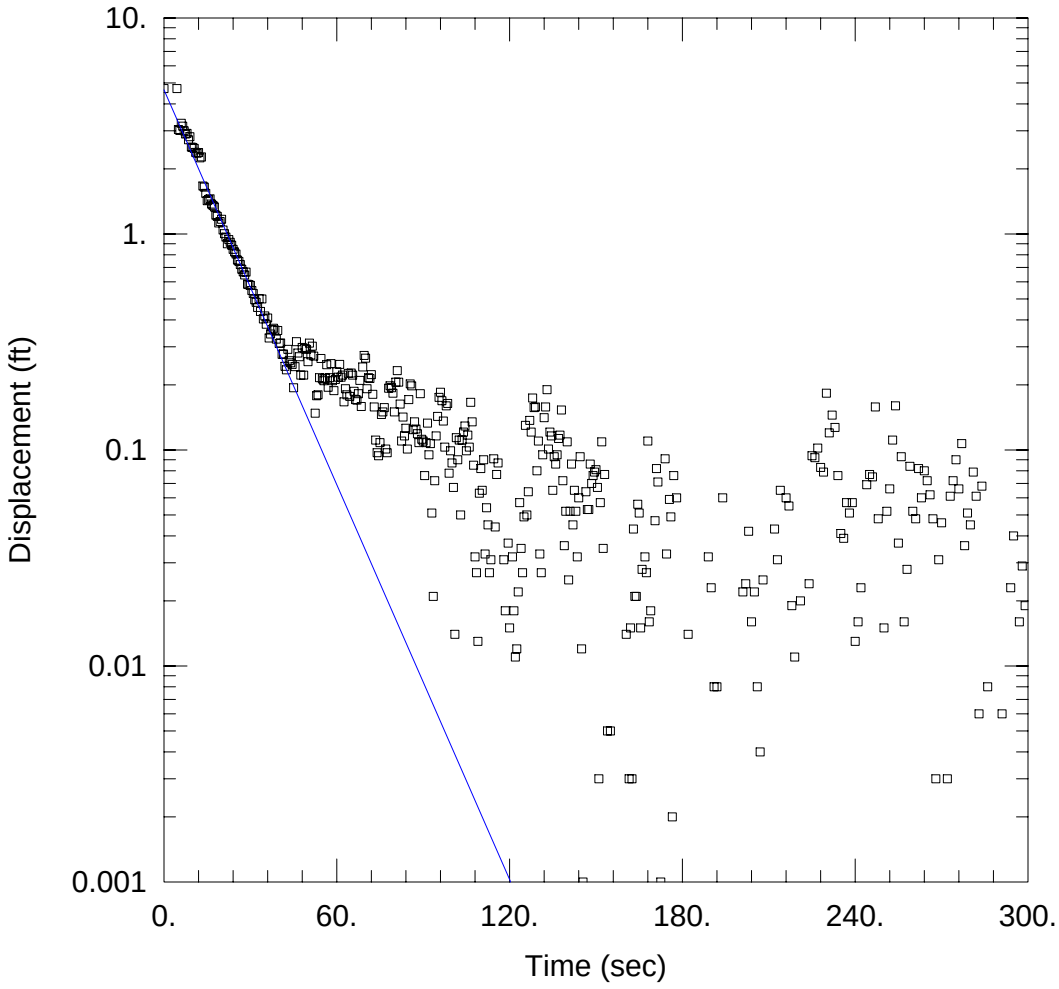
WELL DATA (57MW2)

Initial Displacement: 3.499 ft
Wellbore Radius: 0.083 ft
Screen Length: 25. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 14.41 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.002578 cm/sec y0 = 15.85 ft



57MW2 RISING HEAD TEST

Data Set: P:\...\57MW2 Rising Head.aqt
Date: 04/03/08 Time: 08:58:53

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656421
Test Location: Radford, VA
Test Well: 57MW2
Test Date: 3-19-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

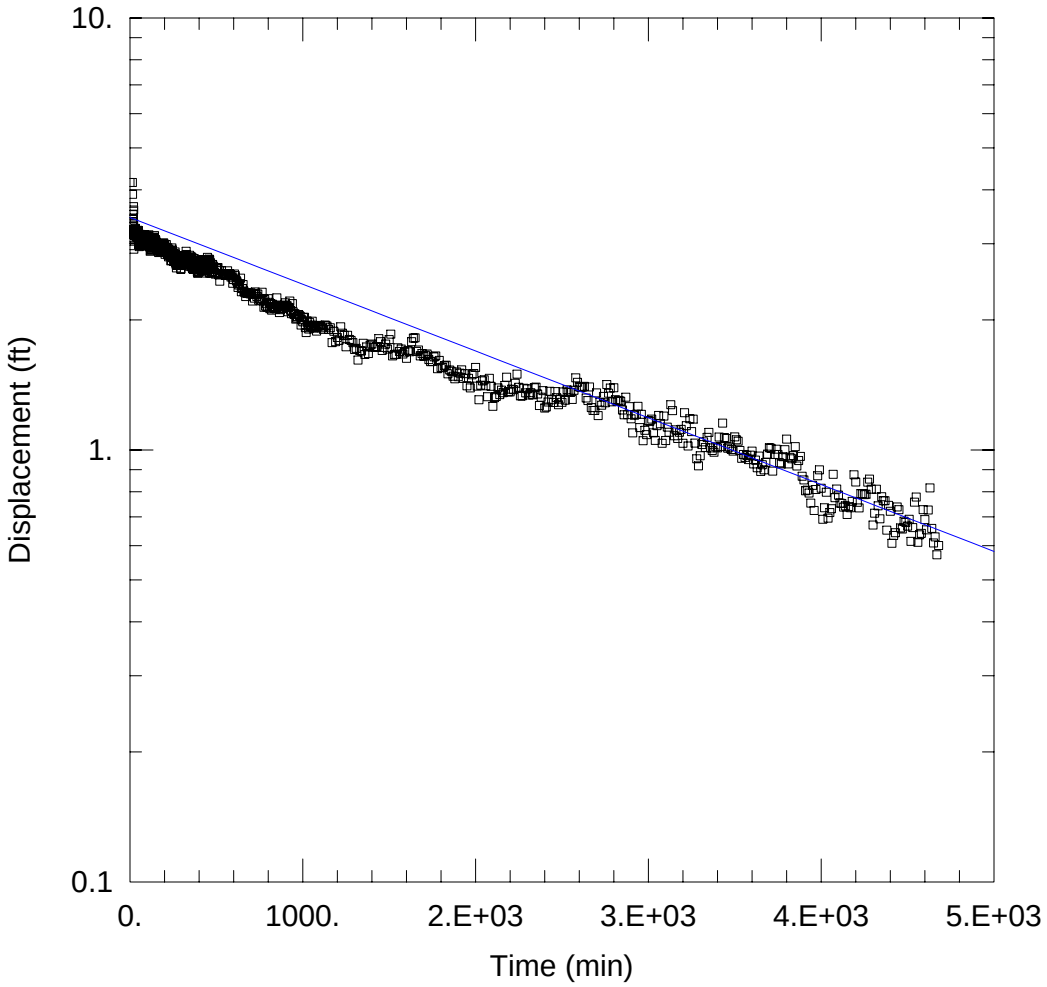
WELL DATA (57MW2)

Initial Displacement: 4.709 ft
Wellbore Radius: 0.083 ft
Screen Length: 25. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 14.41 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.001118 cm/sec y0 = 4.645 ft



57MW3 FALLING HEAD TEST

Data Set: P:\...\57MW3 Falling Head.aqt
Date: 04/03/08 Time: 09:00:07

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656421
Test Location: Radford, VA
Test Well: 57MW2
Test Date: 3-19-08

AQUIFER DATA

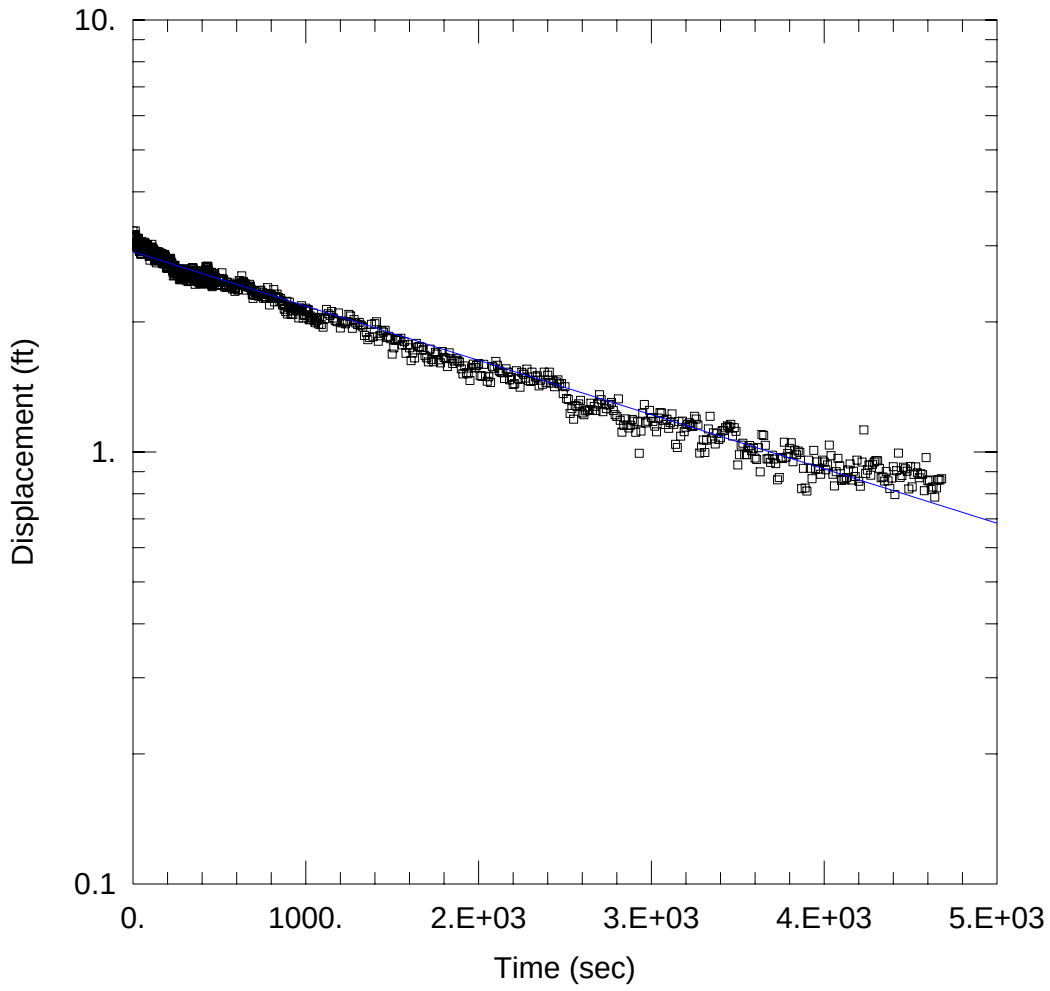
Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (57MW3)

Initial Displacement: 4.16 ft
Wellbore Radius: 0.083 ft
Screen Length: 25. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 24.67 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.047E-07 cm/sec
y0 = 3.453 ft



57MW3 RISING HEAD TEST

Data Set: P:\...\57MW3 Rising Head.aqt
Date: 04/03/08 Time: 09:00:30

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656421
Test Location: Radford, VA
Test Well: 57MW3
Test Date: 3-19-08

AQUIFER DATA

Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (57MW3)

Initial Displacement: 3.249 ft
Wellbore Radius: 0.083 ft
Screen Length: 25. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 24.67 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 5.106E-06 cm/sec
y0 = 2.905 ft

APPENDIX C.4

FIELD DATA FORMS

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APPENDIX C.4.1

SOIL SAMPLING FORMS

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Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/10/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	SWMU 57 Soil Sampling
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB1AB — Sample Collection Time: 1055

Sampling Device: geoprobe - macrocore — Depth (top): 10

Depth Interval: 10-12ft

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: ✓ DUP-4 — Photo No:

MS/MSD Samples Taken Here:

Sample ID: — Sample Collection Time:

Sampling Device: — Depth (top):

Depth Interval:

Sample Containers/Preservatives

VOC, SVOC, Pesticides, PCBs, Herbicides, Metals

Physical Analysis: — PID Reading:

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Sample ID: — Sample Collection Time:

Sampling Device: — Depth (top):

Depth Interval:

Sample Containers/Preservatives

VOC, SVOC, Pesticides, PCBs, Herbicides, Metals

Physical Analysis: — PID Reading:

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Signature of Sampler: [signature] — Date Completed: 1/10/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/09/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	SWMU 57 Soil Sampling
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB2AB — Sample Collection Time: 0956

Sampling Device: hand auger — Depth (top): 1

Depth Interval: 1-2'

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: _____

PID Reading: _____

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: _____

PID Reading: _____

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Sampler: [signature] Date Completed: 1/9/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/10/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	SWMU 57 Soil Sampling
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB9A — Sample Collection Time: 12:55

Sampling Device: Tripod w/ prop hammer 140 lbs. — Depth (top): 0 — Depth Interval: 0-1 ft

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: — — — PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —

MS/MSD Samples Taken Here: —

Sample ID: 57SB9AB — Sample Collection Time: 1330

Sampling Device: Tripod w/ prop hammer 140 lbs. — Depth (top): 10 — Depth Interval: 10-12 ft

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: — — — PID Reading: 0.0

Comments: Hit refusal w/ this equip @ 13' (not suited for this depth with clay like dense soil)

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —

MS/MSD Samples Taken Here: —

Sample ID: 57SB9C — Sample Collection Time: —

Sampling Device: — Depth (top): — Depth Interval: —

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: — PID Reading: ~~0.0~~

Comments: No C could be taken

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —

MS/MSD Samples Taken Here: —

Signature of Sampler: [signature] — Date Completed: 1/10/08

Physical sample taken level "A" @ SB4

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/11/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	SWMU 57 Soil Sampling
Weather Conditions:	Sunny / ~60°F	Sampling Team:	MF, JC

Sample ID: 57SB4AB — Sample Collection Time: 1105

Sampling Device: Tripod w/ drop hammer 140 lbs. — Depth (top): 1.5 — Depth Interval: 1.5 - 4 ft

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: ✓ — PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: ✓ Dup-5 — Photo No:

MS/MSD Samples Taken Here:

Sample ID: 57SB4B — Sample Collection Time: 1240

Sampling Device: Tripod w/ drop hammer — Depth (top): 6 — Depth Interval: 6-8 ft

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: — — PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Sample ID: 57SB4C — Sample Collection Time: 1300

Sampling Device: Tripod w/ drop hammer — Depth (top): 13 — Depth Interval: 13.5 - 15.5 ft

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: — — PID Reading: 0.0

Comments: EQBK - taken after this

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Signature of Sampler: [signature] — Date Completed: 1/11/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/14/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	Swmu 57 Soil Sampling
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: S7SB5A — Sample Collection Time: 1255

Sampling Device: Tripod w/ drop hammer — Depth (top): 0

Depth Interval: 0-1

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —

MS/MSD Samples Taken Here: —

Sample ID: S7SB5AB + DUP-6 — Sample Collection Time: 1255

Sampling Device: Tripod w/ drop hammer — Depth (top): 1.25

Depth Interval: 1.25-4

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: ✓ DUP-6 — Photo No: —

MS/MSD Samples Taken Here: —

Sample ID: S7SB5B — Sample Collection Time: 1400

Sampling Device: Tripod w/ drop hammer — Depth (top): 6

Depth Interval: 6-8

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —

MS/MSD Samples Taken Here: —

Signature of Sampler: [signature] — Date Completed: 1/14/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/14/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	SWMU 57 Soil Samp
Weather Conditions:		Sampling Team:	MF, JC

Sample ID: 57 SB5C — Sample Collection Time: 1400

Sampling Device: Tripod w/ drop hammer — Depth (top): 13

Depth Interval: 13-15

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: _____

PID Reading: _____

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: _____

PID Reading: _____

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Sampler: [signature] Date Completed: 1/14/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/10/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	Swmu 57 Soil Scop
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB6A — Sample Collection Time: 1540

Sampling Device: Tripod w/ drop hammer — Depth (top): 0

Depth Interval: 0 - 1.0 ft

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here:

MS/MSD Samples Taken Here:

Photo No:

Sample ID: 57SB6AB — Sample Collection Time: 1540

Sampling Device: Tripod w/ drop hammer — Depth (top): 1.7

Depth Interval: 1.7 - 4 ft

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here:

MS/MSD Samples Taken Here:

Photo No:

Sample ID: 57SB6B — Sample Collection Time: 1703

Sampling Device: Tripod w/ drop hammer — Depth (top): 6

Depth Interval: 6-9 ft.

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here:

MS/MSD Samples Taken Here:

Photo No:

Signature of Sampler:

Date Completed: 1/10/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/11/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	Swmu 57 Soil Sampling
Weather Conditions:	Rainy / ~50°	Sampling Team:	MF, JC

Sample ID: 57SB6C — Sample Collection Time: 0815

Sampling Device: Tripod w/ drop hammer — Depth (top): 13

Depth Interval: 13 - 15.5 ft

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: _____

PID Reading: _____

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: _____

PID Reading: _____

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Sampler: _____ Date Completed: _____

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/11/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	SWMU 57 Soil Samp.
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB7A — Sample Collection Time: 0905

Sampling Device: Tripod w/ drop hammer — Depth (top): 0

Depth Interval: 0-2

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —

MS/MSD Samples Taken Here: —

Sample ID: 57SB7AB — Sample Collection Time: 0905

Sampling Device: Tripod w/ drop hammer — Depth (top): 2

Depth Interval: 2.8 - 5 ft

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —

MS/MSD Samples Taken Here: —

Sample ID: 57SB7B — Sample Collection Time: 0910

Sampling Device: Tripod w/ drop hammer — Depth (top): 6

Depth Interval: 6-9 ft

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —

MS/MSD Samples Taken Here: —

Signature of Sampler: [signature] — Date Completed: 1/11/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/11/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	Swmu 57 Soil Samp.
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB7C — Sample Collection Time: 1005

Sampling Device: Tripod w/ drop hammer — Depth (top): 14

Depth Interval: 14 - 16 ft

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 6.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: _____

PID Reading: _____

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: _____

PID Reading: _____

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Sampler: [signature] Date Completed: 1/11/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/14/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	Swmu 57 Soil Samp.
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB8A — Sample Collection Time: 1510

Sampling Device: ~~Split Spoon~~ 4' macrocore Tripod w/ drop hammer — Depth (top): 0 → 1 — Depth Interval: 0-1

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC	X	PID Reading:	0.0
Pesticides	X		
PCBs	X		
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: 57SB8AB — Sample Collection Time: 1510

Sampling Device: ~~Split Spoon~~ 4' macrocore Tripod w/ drop hammer — Depth (top): 1.2 — Depth Interval: 1.2-4

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC	X	PID Reading:	0.0
Pesticides	X		
PCBs	X		
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: 57SB8B — Sample Collection Time: 1530

Sampling Device: ~~Split~~ 4' macrocore Tripod w/ drop hammer — Depth (top): 6 — Depth Interval: 6-8

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC	X	PID Reading:	0.0
Pesticides	X		
PCBs	X		
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Sampler: [signature] Date Completed: 01/14/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/14/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	SWMU 57 Soil Samp.
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57 SB8C — Sample Collection Time: ~~1510~~ 1535

Sampling Device: Tripod w/ drop hammer 4' macrocore — Depth (top): ~~0~~ ~~2.5~~ 13

Depth Interval: 13-15 ft

Sample Containers/Preservatives

VOC	X
SVOC	X
Pesticides	X
PCBs	X
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: S — Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: _____

PID Reading: _____

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: _____

PID Reading: _____

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Sampler: [signature] Date Completed: 1/14/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/8/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	Swmu 57 Soil Samp.
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB10A — Sample Collection Time: 1535

Sampling Device: geoprobe - macrocore — Depth (top): 0

Depth Interval: 0-10

Sample Containers/Preservatives

VOC	X	Physical Analysis:	— —
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Sample ID: 57SB10B — Sample Collection Time: 1600

Sampling Device: geoprobe - macrocore — Depth (top): 10

Depth Interval: 10-12 ft.

Sample Containers/Preservatives

VOC	X	Physical Analysis:	— —
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Sample ID: 57SB10C — Sample Collection Time: 1645

Sampling Device: geoprobe - macrocore — Depth (top): 34

Depth Interval: 34-36ft.

Sample Containers/Preservatives

VOC	X	Physical Analysis:	— —
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Signature of Sampler: [signature] — Date Completed: 1/8/08

1st one on hand.

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/9/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	SWMU 57 Soil Samp.
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB11A — Sample Collection Time: 0748

Sampling Device: geoprobe - macrocore — Depth (top): 0

Depth Interval: 0-1.8 ft.

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: ✓ DUP-2 — Photo No:

MS/MSD Samples Taken Here:

Sample ID: 57SB11B — Sample Collection Time: 0755

Sampling Device: geoprobe - macrocore — Depth (top): 10

Depth Interval: 10-12 ft.

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Sample ID: 57SB11C — Sample Collection Time: 1030

Sampling Device: geoprobe - macrocore — Depth (top): 34

Depth Interval: 34-36 ft

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments: Hit refusal @ 16 1/2 ft in 1st hole stepped over and pushed to 36 ft

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Signature of Sampler: MLTF — Date Completed: 1/9/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1-9-08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	SWMU 57 SOil Samp
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB12A — Sample Collection Time: 1100

Sampling Device: geoprobe - macrocore — Depth (top): 0

Depth Interval: 0-1 ft

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: ✓ — PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here: ✓

physical sample taken here

Sample ID: 57SB12B — Sample Collection Time: 1120

Sampling Device: geoprobe - macrocore — Depth (top): 10

Depth Interval: 10-12 ft

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: — — PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Sample ID: 57SB12C — Sample Collection Time: 1200

Sampling Device: geoprobe - macrocore — Depth (top): 34

Depth Interval: 34-36 ft

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: — — PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Signature of Sampler: [signature] — Date Completed: 1/9/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/9/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	SWMU 57 Soil Samp.
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB13A — Sample Collection Time: 1419

Sampling Device: geoprobe - macrocore — Depth (top): 0

Depth Interval: 0-1 ft

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: ✓ Dup-3 — Photo No:

MS/MSD Samples Taken Here:

Sample ID: 57SB13B — Sample Collection Time: 1430

Sampling Device: geoprobe - macrocore — Depth (top): 10

Depth Interval: 10-12 ft

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Sample ID: 57SB13C — Sample Collection Time: 1510

Sampling Device: geoprobe - macrocore — Depth (top): 34

Depth Interval: 34-36 ft

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Signature of Sampler: [signature] — Date Completed: 1/9/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/8/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	Swmu 57 Soil Samp.
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB16A — Sample Collection Time: 1250

Sampling Device: geoprobe - macrocore — Depth (top): 0

Depth Interval: ~~0-1.0~~ 0-1

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: .50

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: 57SB16B — Sample Collection Time: 1300

Sampling Device: geoprobe - macrocore — Depth (top): 10

Depth Interval: 10-12

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: 57SB16C — Sample Collection Time: 1520

Sampling Device: geoprobe - macrocore — Depth (top): 49

Depth Interval: 49-51ft.

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments: refusal @ 51' (limestone @ bottom)

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Sampler: M.J.F — Date Completed: 1/8/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/10/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	SWMU 57 So. 1 Samp.
Weather Conditions:	~~Rainy~~ / cloudy started raining @ 0915	Sampling Team:	MF, JC

Sample ID: S7SB14A — Sample Collection Time: 0810

Sampling Device: geoprobe - macrocore — Depth (top): 0

Depth Interval: 0 - 14 ft

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here: ✓

Sample ID: S7SB14B — Sample Collection Time: 0825

Sampling Device: geoprobe - macrocore — Depth (top): 10

Depth Interval: 10 - 12 ft

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Sample ID: S7SB14C — Sample Collection Time: 0907

Sampling Device: geoprobe & macrocore — Depth (top): 34

Depth Interval: 34 - 36 ft

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Signature of Sampler: [signature] — Date Completed: 1/10/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/8/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	Swmu 57 Soil Samp.
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB15A — Sample Collection Time: 1040

Sampling Device: geoprobe - macrocore — Depth (top): 0

Depth Interval: ~~0~~ 0 - 1.0 ft

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: ✓ DUP-1 — Photo No:

MS/MSD Samples Taken Here:

Sample ID: 57SB15B — Sample Collection Time: 1050

Sampling Device: geoprobe - macrocore — Depth (top): 10

Depth Interval: 10 - 12'

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Sample ID: 57SB15C — Sample Collection Time: 1140

Sampling Device: geoprobe - macrocore — Depth (top): 34

Depth Interval: 34 - 36

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments: EQBK-1 taken after these borings

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:

MS/MSD Samples Taken Here:

Signature of Sampler: [signature] — Date Completed: 1/8/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/7/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	Swmu 57 RFI Soil Sup.
Weather Conditions:	Sunny mild	Sampling Team:	MF,JC

Sample ID: 57 SB17A — Sample Collection Time: 1425

Sampling Device: 4ft Macrocore — Depth (top): ~~0~~ 0 — Depth Interval: 0-4ft

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: 57 SB17B — Sample Collection Time: 1438

Sampling Device: geoprobe - macrocore — Depth (top): 10 — Depth Interval: 10 - 12 ft

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: 57 SB17C — Sample Collection Time: 1/8/08 @ 0820

Sampling Device: geoprobe - macrocore — Depth (top): 57 — Depth Interval: 57-59'

Sample Containers/Preservatives

VOC	X	Physical Analysis:	—
SVOC		PID Reading:	0.0
Pesticides			
PCBs			
Herbicides			
Metals	X		

Comments: Started seeing very moist soil @ 38ft on 1/7/08 Didn't hit actual water so waited overnight & no water in hole Kept boring until refusal @ 59'

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Sampler: [signature] — Date Completed: 1/8/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/9/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	Swmu 57 soil samp.
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB18A — Sample Collection Time: 1305

Sampling Device: geoprobe - macrocore — Depth (top): 0

Depth Interval: 0 - 1.0 ft.

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: — —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: 57SB18B — Sample Collection Time: 1315

Sampling Device: geoprobe - macrocore — Depth (top): 10

Depth Interval: 10 - 12 ft

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: 57SB18C — Sample Collection Time: 1338

Sampling Device: geoprobe - macrocore — Depth (top): 26

Depth Interval: 26 - 28 ft.

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: — —

PID Reading: 0.0

Comments: HT refusal @ 35'. very wet sloppy clay @ 26'

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Sampler: [signature] — Date Completed: 1/9/08

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	1/9/08
Site Name:	RFAAP	Client:	Radford Army Ammunition Plant
URS Project No.:	11656421	Sampling Event:	Swmu 57 Soil Sup.
Weather Conditions:		Sampling Team:	MF,JC

Sample ID: 57SB19A — Sample Collection Time: 1530

Sampling Device: geoprobe - macrocore — Depth (top): 0

Depth Interval: 0-1 ft.

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: — —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: 57SB19B — Sample Collection Time: 1540

Sampling Device: geoprobe - macrocore — Depth (top): 10

Depth Interval: 10-12 ft.

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: — —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: 57SB19C — Sample Collection Time: 1605

Sampling Device: geoprobe macrocore — Depth (top): 26

Depth Interval: 26-28 ft.

Sample Containers/Preservatives

VOC	X
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	X

Physical Analysis: — —

PID Reading: 0.0

Comments:

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Sampler: [signature] — Date Completed: 1/9/08

APPENDIX C.4.2

MONITORING WELL DEVELOPMENT FORMS

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MONITORING WELL INSPECTION LOG

PROJECT NAME: Sump 57 well Development RFI/CMS

URS PROJECT NO. 11656421

FACILITY NAME: RAAP

MONITORING WELL: 57MW2

A. Inspected by (full name): MARK FISHER

B. Date/Time of Inspection: 1/29/08 @ 1515

C. Inspection Observations:

1. Locking protective casing:
   Good
2. Concrete well Pad:
   Good
3. Lock:
   Good
4. Erosion:
   None
5. Exterior well identification number:
   Still needs one

D. Inspection Comments:
Exterior well ID needed

MONITORING WELL INSPECTION LOG

E. Repair/remediation comments:

none

F. Repair/remediation Date: N/A

Field Well Development Measurement Log

Project Information

Project Name: Swmu 57 well development
Facility Name: RFAAP
URS Project No.: 11656421
Weather Conditions: cloudy mild
Development Team: MF, JE

Event: Swmu 57 well development
Date: 1/29/08
Facility: RFAAP
Well ID: 57MW2

Purge Data

Purge Rate/Volume Units: 800 milliliters per minute [X] gallons per minute [ ]

Time	Rate	Volume	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
1604	800	0	murky	7.05	16.28	.405	1.49	-34	~~905~~
1606	↓	1600	↓	7.01	16.47	.402	1.14	-37	012
1608		3200		6.99	16.65	.400	0.96	-36	↓
1610		4800		6.98	16.76	.400	0.82	-46	
1612		6400		6.98	16.78	.398	0.66	-36	
1614		8000		6.99	16.84	.398	0.68	-32	
1616		9600		7.01	17.17	.400	0.70	-43	
1618	↓	11200		7.01	17.12	.401	0.70	-41	
1620	400	12000		7.01	17.01	.399	0.65	-43	
1622		12800		7.01	17.15	.399	0.65	-38	
1624		13680		7.02	17.23	.398	0.62	-37	
1626		14400		7.02	17.34	.397	0.60	-37	
1628		15200		7.03	17.32	.397	0.55	-39	
1630		16000		7.03	17.52	.396	0.57	-38	
1632		16800		7.03	17.68	.398	0.58	-31	
1634		17600	↓	7.04	17.55	.398	0.61	-31	952
1636		18400	very	7.04	17.56	.397	0.58	-30	837
1638		19200	hazy	7.05	17.65	.396	0.54	-30	
1640		20000	but	7.05	17.88	.397	0.57	-31	846
1642		20800	lighter	7.05	17.76	.398	0.60	-28	692
1644		21600		7.06	17.74	.398	0.57	-25	
1646		22400		7.06	17.69	.397	0.55	-25	604
1648		23200		7.06	17.52	.398	0.56	-25	539
1650		24000		7.06	17.55	.398	0.57	-21	
1652		24800		7.07	17.54	.398	0.58	-21	507
1654		25600		7.07	17.61	.399	0.57	-23	
1656		26400		7.08	17.66	.398	0.55	-23	493
1658		27200		7.08	17.70	.398	0.57	-29	
1700		28000		7.09	17.54	.398	0.56	-23	
1702		28800		7.10	17.21	.399	0.52	-24	580
1704		29600		7.10	17.34	.399	0.51	-24	
1706		30400		7.10	17.75	.398	0.62	-46	793
1708		31200		7.11	18.39	.398	0.64	-32	576
1710		32000		7.11	18.34	.397	0.60	-30	
1712		32800		7.11	18.31	.397	0.59	-29	500
1714		33600		7.11	18.32	.397	0.59	-28	380
1716		34400		7.11	18.35	.396	0.58	-26	
1718		35200		7.12	18.39	.396	0.58	-27	387
1720		36000		7.12	18.49	.396	0.58	-26	
1722		36800		7.12	18.42	.395	0.57	-24	318
1724		37600		7.13	18.30	.396	0.53	-23	346
~~1726~~		~~38400~~		Stopped purging for today					
~~1728~~		~~39200~~		turbidity still high will continue					
~~1730~~		~~40000~~		tomorrow after settling.					
~~1732~~	↓	~~40800~~	↓						

Well Development Notes: Began this @ @1520
At first water was very muddy so purged w/ out flow cell @ ~~1.2 L/min~~ until ~~clear~~ more clear and hooked Horiba back up.

Final pH (SU): 7.13
Final Temperature (°C): 18.30
Well Locked At: 1730
Final Conductivity (µs): .396
Final DO: 0.53
Signature of Samplers:
Final Turbidity: 346 ntu
Final ORP: -23
Date Completed: Continued until 1/30/08

Field Well Development Measurement Log

Project Information

Project Name: SMW 57 RFI / CMS
Facility Name: RFAAP
URS Project No.: 11656421
Weather Conditions: Clear ~ 40°
Development Team: MF, JC

Event: SMW 57 well development
Date: 1/30/08
Facility: RFAAP
Well ID: CONT 57MW2

Purge Data

Purge Rate/Volume Units:
400
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
0838	400	0	hazy	7.13	15.82	.380	1.46	-22	681
0840	↓	800	↓	7.11	15.91	.384	0.56	-5	328
0842		~~800~~ 1600		7.10	15.50	.386	0.43	-6	
0844		2400		7.10	15.72	.383	0.41	1	380
0846		3200		7.09	15.65	.383	0.43	4	
0848		4000		7.06	15.30	.388	0.42	8	398
0850		4800		7.05	15.03	.389	0.41	7	475
0852		5600		7.04	14.52	.396	0.40	5	
0854		6400		7.04	13.98	.391	0.41	3	470
0856		7200		7.02	17.64	.382	0.51	-32	
0858		8000		7.03	19.35	.377	0.49	-8	668
0900		8800		7.02	18.88	.388	0.52	2	
0902		9600		7.03	18.88	.389	0.59	12	549
0904		10400		7.00	17.48	.390	0.29	25	
0906		11200		6.99	17.25	.391	0.26	28	381
0908		12000		6.99	17.16	.392	0.27	27	348
0910		12800		6.99	17.36	.393	0.29	26	
0912		13600		6.99	16.95	.396	0.30	27	299
0914		14400		7.00	17.04	.396	0.30	24	306
0916	↓	15200	↓	7.00	17.04	.397	0.31	23	307
		Stopped	pumping	letting	settle	down	again		
		more	than	400	57MW2				

Well Development Notes:

Final pH (SU): 7.00
Final Temperature (°C): 16.97
Final Conductivity (µs): .397
Final DO: 0.30
Final Turbidity: 322 ntu
Final ORP: 20
Date Completed: 1/30/08
Well Locked At: 0920
Signature of Samplers:

Field Well Development Measurement Log

Project Information

Project Name:	Swmu 57 well Development	Event:	Swmu 57 well development
Facility Name:	RFAAP	Date:	01.30.2008
URS Project No.:	11656421.20000	Facility	RFAAP
Weather Conditions:	clear, ~45°F	Well ID:	57MW2
Development Team:	Jim Carter + Mark Fisher		

Purge Data

Purge Rate/Volume Units:
~1,500
milliliters per minute
[✓]

gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
1325	1,500	0	cloudy	7.05	17.36	0.382	2.02	4	85.6
1330	↓	7500	↓	7.06	17.07	0.385	1.32	25	111
1335		15000		7.04	17.09	0383	0.94	29	74.8
1340		22500		7.04	17.20	0.382	0.79	25	54.2
1345		30000		7.04	17.20	0.382	0.72	26	45.5
1350		37500		7.05	17.14	0.384	0.68	27	65.0
1355		45000		7.05	17.12	0.383	0.62	25	72.3
1400		52500		7.05	17.10	0.381	0.57	28	63.6
1405		60000		7.04	17.08	0.380	0.50	29	48.4
1410		67500		7.04	17.12	0.381	0.52	28	43.3
1415		75000		7.05	17.09	0.381	0.51	29	43.3
1420		82500		7.05	17.12	0.381	0.50	24	69.6
1425		90000		7.04	17.28	0.379	0.50	27	54.3
1430		97500		7.04	17.16	0.378	0.48	28	48.1
1435		105000		7.05	17.31	0378	0.48	27	51.2
1440		112500		7.04	17.15	0.380	0.47	29	92.1
1445		120000		7.06	16.10	0.377	0.22	26	151
1450		127500		7.05	16.99	0.373	0.61	-1	—
1455	↓	135000	↓						

Well Development Notes: purged at higher flow rate which allowed turbidity to settle down a bit.

~~Total volume purged~~

Final pH (SU)	7.06	Final Conductivity (µs):	.373	Final Turbidity:	151 ntu
Final Temperature (°C)	16.99	Final DO:	0.61	Final ORP:	26
Well Locked At:	1500	Signature of Samplers:		Date Completed:	1/30/08

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APPENDIX C.4.3

GROUNDWATER SAMPLING FORMS

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Field Groundwater Sampling Log

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	2/13/08
Facility Name:	RFAAP	Client:	RFAAP
URS Project No.:	11656421	Sampling Event:	SWMU 57 RFI/CMS GW Samp.
Weather Conditions:	Overcast, Cool, 40°	Sampling Team:	MF, JC
Monitoring Well ID:	57MW2	Depth to Water:	51.87'
		Total Well Depth:	666.11'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump:	[X] Grundfos pump	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10 DO Meter: _____

Conductivity Meter: _____us standard solution Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
500
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1115	500	0	grey	7.11	.357	1.10	13.19	159	684
1117		1000	Cloudy	7.03	.356	0.12	14.34	88	869
1119		2000		6.98	.355	.07	15.73	57	896
1121		3000		6.97	.358	0.10	16.22	52	
1123		4000		6.96	.358	0.13	16.46	53	853
1125		5000		6.96	.362	0.11	16.80	55	
1127		6000	↓	6.97	.363	0.10	16.88	57	685
1129		7000	Slightly foggy	6.96	.363	0.05	17.10	60	508
1131		8000		6.97	.368	0.03	16.95	64	282
1133		9000		6.97	.367	0.01	17.05	64	271
1135		10000		6.97	.366	0.00	17.13	61	233
1137		11000		6.97	.365	0.00	17.08	60	170
1139		12000		6.96	.362	0.00	17.16	54	126
1141		13000		6.97	.361	0.00	17.09	48	101
1143		14000		6.97	.361	0.00	17.17	43	101
1145		15000		6.98	.364	0.00	17.09	41	96.3
1147		16000		6.98	.363	0.00	17.16	38	
1149		17000		6.98	.363	0.00	17.37	37	93.9
1151		18000		6.98	.364	0.00	17.31	36	
1153		19000		6.98	.363	0.00	17.34	34	70.1
1155		20000		6.88	.363	0.00	17.47	37	
1157		21000		6.98	.364	0.00	17.54	27	70.8
1159		22000	↓	6.99	.363	0.00	17.46	24	
1201		23000	Clear	6.99	.363	0.00	17.53	22	66.7
1203		24000		6.99	.363	0.00	17.48	19	58.3
1205		25000		6.99	.363	0.00	17.32	18	54.4
1207		26000		6.99	.363	0.00	17.60	15	47.3
1209	↓	27000	↓	6.99	.364	0.00	17.52	14	44.1

continued on next page.

Sampling Data

Monitoring Well ID: 57MW2 Sample Collection Time: cont →

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos Pump	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs		(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate	X	(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [X]Yes [ ]No

Final pH (SU):		Final Conductivity (µs):		Final Turbidity:	ntu
Final Temperature (°C):		Final DO:		Final ORP:	
				Date Completed:	

Well Locked At: _____ Signature of Samplers: _____

Field Groundwater Sampling Log

Project Information

Project Name:	Sump 57 RFI/CMS	Date:	2/13/08
Facility Name:	RFAAP	Client:	RFAAP
URS Project No.:	116564421	Sampling Event:	Sump 57 RFI/CMS GW Samp.
Weather Conditions:	Overcast, cool 40°F	Sampling Team:	MF, TC
Monitoring Well ID:	57MW2 cont.	Depth to Water:	51.87'
		Total Well Depth:	66.11'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump:	[X] Grundfos Pump	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10 DO Meter: _____

Conductivity Meter: _____µs standard solution Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
500
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1211		28000		6.99	.363	0.00	17.59	16	39.9
1213		29000		6.99	.364	0.00	17.58	16	
1215		30000		6.99	.364	0.00	17.59	20	36.9
1217		31000		6.99	.363	0.00	17.60	20	39.50
1219		32000		7.00	.363	0.00	17.58	21	
1221		33000		7.00	.362	0.00	17.68	23	30.4
1223		34000		7.00	.363	0.00	17.34	24	28.50
1225		35000		7.00	.363	0.00	17.55	25	26.10
1227	↓	36000	↓	7.00	.362	0.00	17.54	26	26.00
	All readings except turb are stable (take readings every 5 min until stable								
1232		38500		7.00	.363	0.00	17.68	29	21.90
1237		41000		7.00	.362	0.00	17.55	32	18.71
1242		43500		7.00	.361	0.00	17.70	34	17.02
1247	↓	46000	↓	7.00					

Sampling Data

Monitoring Well ID: 57MW2 cont. Sample Collection Time: 1300

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos Pump	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs		(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate	X	(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [X]Yes [ ]No

Final pH (SU):	7.00	Final Conductivity (µs):	0.361	Final Turbidity:	15.02 ntu
Final Temperature (°C):	17.83	Final DO:	0.00	Final ORP:	37
				Date Completed:	2/13/08

Well Locked At: 1315 Signature of Samplers: MF TC

Field Groundwater Sampling Log

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	2/13/08
Facility Name:	RFAAP	Client:	RFAAP
URS Project No.:	11656421	Sampling Event:	SWMU 57 RFI/CMS GW Samp.
Weather Conditions:	overcast, flurries 30°	Sampling Team:	MF, JC
Monitoring Well ID:	57MW3	Depth to Water:	41.83'
		Total Well Depth:	65.00'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump:	[X] Grundfos Pump	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10 — DO Meter: _____

Conductivity Meter: _____µs standard solution — Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units: 100 milliliters per minute [X] gallons per minute [ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1550	100	0	clear	7.30	.361	4.77	10.64	214	88
1552	↓	200	↓	7.30	.370	4.76	9.35	207	70
1554		400		7.29	.372	4.75	8.64	202	65.9
1556		600	↓	7.24	.341	4.12	11.07	195	61.8
1558		800	light	7.23	.344	4.13	11.87	191	
1600		1000	cloudy	7.22	.351	4.34	12.95	153	104
1602		1200	↓	7.23	.351	4.38	13.31	91	176
1604		1400		7.23	.355	4.53	15.20	85	170
1606		1600		7.25	.363	4.70	14.40	81	153
1608		1800		7.27	.368	4.79	13.49	78	147
1610		2000		7.29	.361	4.56	13.23	73	
1612		2200		7.25	.358	4.56	15.05	67	134
1614		2400		7.26	.358	4.68	15.59	57	116
1616		2600		7.27	.358	4.77	15.48	49	136
1618		2800		7.28	.355	4.84	15.73	53	113
1620		3000		7.29	.358	5.01	15.12	56	107
1622		3200		7.31	.364	4.98	14.01	58	112
1624		3400		7.29	.348	4.86	15.44	58	95
1626		3600		7.30	.356	5.07	14.83	56	87.3
1628		3800		7.31	.356	5.01	14.45	57	88.2
1630		4000		7.33	.364	5.10	13.23	49	
1632		4200		7.33	.364	5.02	12.86	47	88.9
1634		4400		7.33	.371	5.11	11.57	52	91.3
1636		4600		7.31	.345	4.60	13.57	55	83.5
1638		4800		7.31	.353	4.61	13.56	58	
1640		5000		7.31	.353	4.65	13.40	59	91.5
1642		5200		7.31	.353	4.64	13.78	58	
1644	↓	5400	↓	7.32	.356	4.69	13.80	60	109

Cont. on next page

Sampling Data

Monitoring Well ID: 57MW3 — Sample Collection Time: →

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos Pump	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs		(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [ ]Yes [ ]No

Final pH (SU):		Final Conductivity (µs):		Final Turbidity:	ntu
Final Temperature (°C):		Final DO:		Final ORP:	
				Date Completed:	

Well Locked At: _____ Signature of Samplers: _____

Field Groundwater Sampling Log

Project Information

Project Name:	SWMU 57 RFI/CMS	Date:	2/13/08
Facility Name:	RFAAP	Client:	RFAAP
URS Project No.:	11653642.1	Sampling Event:	SWMU 57 RFI/CMS Gw Sarp.
Weather Conditions:	overcast, flurries 30°	Sampling Team:	MF, TC
Monitoring Well ID:	57mw3	Depth to Water:	41.83'
		Total Well Depth:	65.00'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump:	[X] Grundfos Pump	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10 — DO Meter: _____

Conductivity Meter: _____µs standard solution — Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
100
milliliters per minute
[X]

gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1646		5600		7.33	.359	4.66	13.14	64	105
1648		5800		7.33	.363	4.69	12.58	67	
1650		6000		7.33	.360	4.61	12.31	70	103
1652		6200		7.35	.372	4.75	10.64	73	
1654		HAD TO LET RECHARGE							
1715		6200		7.36	.362	5.01	1080	164	
1720		6700		7.34	.355	4.80	11.25	161	103
1725		7200		7.34	.357	4.70	11.05	155	75.6
1730		7700		7.33	.347	4.42	12.98	128	63.2
1735		8200		7.32	.351	4.78	13.40	112	80
1740		8700		7.35	.364	5.02	13.66	109	76.1
1745	↓	9200	↓						

→ Readings @ 5 min apart to allow for stable turb. everything else is stable

Sampling Data

Monitoring Well ID: 57mw3 — Sample Collection Time: 1815

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos Pump	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs		(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate	X	(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [ ]Yes [ ]No

Final pH (SU):	7.38	Final Conductivity (µs):	.390	Final Turbidity:	78.4 ntu
Final Temperature (°C):	10.28	Final DO:	5.55	Final ORP:	108
				Date Completed:	2/13/08

Well Locked At: 1830 — Signature of Samplers: MF TC

APPENDIX C.5

INVESTIGATION-DERIVED MATERIAL ANALYTICAL RESULTS

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ORGANIC ANALYSIS DATA SHEET
USEPA-8330

SWMU 57 IDM-Soil

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-49 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801390-02 File ID: data005-0

Sampled: 01/22/08 11:00 Prepared: 01/30/08 15:21 Analyzed: 02/06/08 07:41

Solids: Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800502 Sequence: 8020546 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.61	105	57 - 139	

* Values outside of QC limits

: 8018

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

SWMU 57 IDM-Soil

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-49 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801390-02 File ID: data005-0

Sampled: 01/22/08 11:00 Prepared: 01/30/08 07:47 Analyzed: 02/01/08 16:23

Solids: Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800522 Sequence: 8020137 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.85	115	50 - 150	

* Values outside of QC limits

00035

INORGANIC ANALYSIS DATA SHEET
USEPA-9040B

SWMU 57 IDM-Soil

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/22/08 11:00
Solids: 0.00
Laboratory ID: 0801390-03

SDG: 36440-49
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: Method-Specific Prepara
Prepared: 01/23/08 14:19
Initial/Final: 20 g / 20 mL
QC Batch: 0800858

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	pH	6.4	pH Units	1	0.1	0.1		01/23/08 15:00

: 00954

INORGANIC ANALYSIS DATA SHEET
USEPA-9095

SWMU 57 IDM-Soil

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/22/08 11:00
Solids: 0.00
Laboratory ID: 0801390-03

SDG: 36440-49
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: General Inorganic Prep
Prepared: 01/28/08 12:05
Initial/Final: 104.11 g / 104.11 mL
QC Batch: 0800982

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Paint Filter Liquids Test	Pass	mL	1	1	1	U	01/28/08 12:05

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

SWMU 57 IDM-Soil

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: TCLP
Sampled: 01/22/08 11:00
Solids: 0.00
Laboratory ID: 0801390-01

SDG: 36440-49
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3010A TCLP Digestion
Prepared: 01/24/08 07:15
Initial/Final: 25 mL / 25 mL
QC Batch: 0800870

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, TCLP	0.20	mg/L	1	0.20	0.056	U	01/31/08 08:35
7440-39-3	Barium, TCLP	0.46	mg/L	1	0.35	0.0010		01/31/08 08:35
7440-43-9	Cadmium, TCLP	0.0071	mg/L	1	0.020	0.0045	J	01/31/08 08:35
7440-47-3	Chromium, TCLP	0.024	mg/L	1	0.050	0.0034	J	01/31/08 08:35
7439-92-1	Lead, TCLP	0.035	mg/L	1	0.10	0.030	J	01/31/08 08:35
7782-49-2	Selenium, TCLP	0.20	mg/L	1	0.20	0.064	U	01/31/08 08:35
7440-22-4	Silver, TCLP	0.010	mg/L	1	0.010	0.0029	U	01/31/08 08:35

: 00073

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

SWMU 57 IDM-Soil

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: TCLP
Sampled: 01/22/08 11:00
Solids: 0.00
Laboratory ID: 0801390-01

SDG: 36440-49
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A TCLP Digestion
Prepared: 01/28/08 10:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0800931

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, TCLP	0.00020	mg/L	1	0.00020	0.000046	U	01/29/08 11:07

00087

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

SWMU 57 IDM-Soil

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-49 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: TCLP Laboratory ID: 0801390-01 File ID: 39001.D

Sampled: 01/22/08 11:00 Prepared: 01/29/08 07:00 Analyzed: 01/29/08 12:28

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 g / 5 mL

QC Batch: 0800631 Sequence: 8013012 Calibration: 8A18001 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
71-43-2	Benzene, TCLP	100	0.021	0.10	0.012	J
56-23-5	Carbon Tetrachloride, TCLP	100	0.10	0.10	0.015	U
108-90-7	Chlorobenzene, TCLP	100	0.022	0.10	0.012	J
67-66-3	Chloroform, TCLP	100	0.024	0.10	0.0061	J
107-06-2	1,2-Dichloroethane, TCLP	100	0.10	0.10	0.015	U
75-35-4	1,1-Dichloroethene, TCLP	100	0.10	0.10	0.014	U
78-93-3	2-Butanone (MEK), TCLP	100	5.0	5.0	0.033	U
127-18-4	Tetrachloroethene, TCLP	100	0.10	0.10	0.015	U
79-01-6	Trichloroethene, TCLP	100	0.10	0.10	0.017	U
75-01-4	Vinyl Chloride, TCLP	100	0.10	0.10	0.017	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane, TCLP	40.0	40.5	101	79 - 124	
1,2-Dichloroethane-d4, TCLP	40.0	38.9	97	75 - 128	
Toluene-d8, TCLP	40.0	40.5	101	87 - 113	
4-Bromofluorobenzene, TCLP	40.0	39.3	98	70 - 121	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene, TCLP	947996	7.49	1055641	7.47	
Chlorobenzene-d5, TCLP	413169	17.52	469002	17.49	
1,4-Dichlorobenzene-d4, TCLP	454005	22.51	536230	22.5	

* Values outside of QC limits

00168

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

SWMU 57 IDM-Soil

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-49 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: TCLP Laboratory ID: 0801390-01 File ID: 0801390-01r.D

Sampled: 01/22/08 11:00 Prepared: 01/29/08 08:05 Analyzed: 02/06/08 15:34

Solids: Preparation: 8151A TCLP Liq/Liq Ext Initial/Final: 500 mL / 5 mL

QC Batch: 0800818 Sequence: 8020529 Calibration: 8B06003 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
94-75-7	2,4-D, TCLP	1	0.10	0.10	0.0041	U
93-72-1	2,4,5-TP (Silvex), TCLP	1	0.10	0.10	0.0038	U

System Monitoring Compound	ADDED (mg/L)	CONC (mg/L)	% REC.	QC Limits	Q
2,4,5-T, TCLP	0.200	0.220	110	50 - 150	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Phenanthrene-d10, TCLP	788924	7.739	574067	7.745	

* Values outside of QC limits

: 00121

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

SWMU 57 IDM-Soil

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-49 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: TCLP Laboratory ID: 0801390-01 File ID: 0801390-01.D

Sampled: 01/22/08 11:00 Prepared: 01/29/08 08:06 Analyzed: 01/30/08 20:41

Solids: Preparation: 3510C TCLP Liquid-Liqu Initial/Final: 500 mL / 5 mL

QC Batch: 0800819 Sequence: 8013111 Calibration: 8A29003 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
106-46-7	1,4-Dichlorobenzene, TCLP	1	0.0050	0.0050	0.0000074	U
121-14-2	2,4-Dinitrotoluene, TCLP	1	0.0050	0.0050	0.00011	U
118-74-1	Hexachlorobenzene, TCLP	1	0.0050	0.0050	0.0000058	U
87-68-3	Hexachlorobutadiene, TCLP	1	0.0050	0.0050	0.000062	U
67-72-1	Hexachloroethane, TCLP	1	0.0050	0.0050	0.000019	U
98-95-3	Nitrobenzene, TCLP	1	0.0050	0.0050	0.000013	U
110-86-1	Pyridine, TCLP	1	0.050	0.050	0.00019	U
87-86-5	Pentachlorophenol, TCLP	1	0.0050	0.0050	0.000094	U
88-06-2	2,4,6-Trichlorophenol, TCLP	1	0.0050	0.0050	0.000013	U
95-95-4	2,4,5-Trichlorophenol, TCLP	1	0.0050	0.0050	0.000054	U
95-48-7	2-Methylphenol, TCLP	1	0.0050	0.0050	0.000072	U
108-39-4	3-Methylphenol, TCLP	1	0.0050	0.0050	0.0000078	U
106-44-5	4-Methylphenol, TCLP	1	0.0050	0.0050	0.0000078	U
58-89-9	gamma-BHC (Lindane), TCLP	1	0.0050	0.0050	0.000028	U
72-20-8	Endrin, TCLP	1	0.0050	0.0050	0.00014	U
72-43-5	Methoxychlor, TCLP	1	0.0050	0.0050	0.000036	U
57-74-9	Technical Chlordane, TCLP	1	0.0050	0.0050	0.000062	U
76-44-8	Heptachlor, TCLP	1	0.0050	0.0050	0.000045	U
1024-57-3	Heptachlor Epoxide, TCLP	1	0.0050	0.0050	0.000038	U
8001-35-2	Toxaphene, TCLP	1	0.50	0.50	0.00015	U

System Monitoring Compound	ADDED (mg/L)	CONC (mg/L)	% REC.	QC Limits	Q
2-Fluorophenol, TCLP	0.202	0.167	83	30 - 120	
Phenol-d6, TCLP	0.200	0.124	62	20 - 109	
Nitrobenzene-d5, TCLP	0.104	0.109	105	20 - 140	
2-Fluorobiphenyl, TCLP	0.100	0.103	103	35 - 130	
2,4,6-Tribromophenol, TCLP	0.201	0.211	105	23 - 120	
o-Terphenyl, TCLP	0.100	0.126	126	34 - 131	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4, TCLP	179176	7.657	188106	7.656	
Naphthalene-d8, TCLP	597714	10.384	627250	10.384	
Acenaphthene-d10, TCLP	306256	14.499	341886	14.499	
Phenanthrene-d10, TCLP	446845	17.921	482774	17.927	
Chrysene-d12, TCLP	411838	21.54	449118	21.54	
Perylene-d12, TCLP	425415	23.225	437632	23.231	

* Values outside of QC limits

: 00122

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INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

SWMU 57 IDM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 02/13/08 16:40
Solids: 0.00
Laboratory ID: 0802296-01

SDG: 36440-53
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A TCLP Digestion
Prepared: 02/25/08 15:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0802160

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, TCLP	0.00020	mg/L	1	0.00020	0.000046	U	02/26/08 13:20

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

SWMU 57 IDM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 02/13/08 16:40
Solids: 0.00
Laboratory ID: 0802296-01

SDG: 36440-53
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3010A TCLP Digestion
Prepared: 02/22/08 07:35
Initial/Final: 25 mL / 25 mL
QC Batch: 0802081

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, TCLP	0.20	mg/L	1	0.20	0.056	U	02/28/08 11:02
7440-39-3	Barium, TCLP	0.11	mg/L	1	0.35	0.0010	J	02/28/08 11:01
7440-43-9	Cadmium, TCLP	0.020	mg/L	1	0.020	0.0045	U	02/28/08 11:02
7440-47-3	Chromium, TCLP	0.050	mg/L	1	0.050	0.0034	U	02/28/08 11:02
7439-92-1	Lead, TCLP	0.10	mg/L	1	0.10	0.030	U	02/28/08 11:02
7782-49-2	Selenium, TCLP	0.20	mg/L	1	0.20	0.064	U	02/28/08 11:02
7440-22-4	Silver, TCLP	0.010	mg/L	1	0.010	0.0029	U	02/28/08 11:01

INORGANIC ANALYSIS DATA SHEET
USEPA-410.4

SWMU 57 IDM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 02/13/08 16:40
Solids: 0.00
Laboratory ID: 0802296-02

SDG: 36440-53
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 410.4 COD Digestion
Prepared: 02/27/08 10:50
Initial/Final: 1 mL / 2 mL
QC Batch: 0802298

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Chemical Oxygen Demand	63	mg/L	2	10	4.3		02/27/08 15:45

INORGANIC ANALYSIS DATA SHEET

USEPA-9040B

SWMU 57 IDM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 02/13/08 16:40
Solids: 0.00
Laboratory ID: 0802296-02

SDG: 36440-53
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: Method-Specific Preparation
Prepared: 02/18/08 15:34
Initial/Final: 20 mL / 20 mL
QC Batch: 0801817

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	pH	7.7	pH Units	1	0.1	0.1		02/18/08 15:50

APPENDIX C.6

SSL CALCULATION - CHLOROFORM

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Table C.6-1
Site-Specific SSL(s) for Chloroform (using C_w = MCL)
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Input Parameters Averaged from All Soil-Sample Physical Test Results

			units
DAF =	Dilution Factor =	20	--
MCL	GW Concentration Source=	8.00E-02	mg/L
C_w =	Target Leachate Conc (MCL*DAF)=	1.60E+00	mg/L
θ_w =	Water-Filled Soil Porosity =	0.3	--
θ_a=	Air-Filled Soil Porosity =	0.13	--
H' =	Henry's Law Constant =	1.505E-01	--
P_b =	Dry Soil Bulk Density =	1.5	kg/L
Koc=	Soil Organic Carbon/Water Partition Coefficient =	4.00E+01	L/kg
foc =	Fraction Organic Carbon =	0.00235	unitless
K_d =	Soil-Water Partition Coeff (K_{oc}*foc) =	0.094	L/kg

SSL (mg/kg) = $C_w [K_d + (\theta_w + \theta_a H')/Pb]$

Site-specific SSL = 0.491 mg/kg

Table C.6-2
Concentration in Groundwater Using Maximum Detected Concentration in Soil - Chloroform
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Input Parameters Averaged from All Soil-Sample Physical Test Results

			units
C_s =	Maximum Site Soil Concentration =	0.024	mg/kg
DAF =	Dilution Factor =	20	--
θ_w =	Water-Filled Soil Porosity =	0.3	--
θ_a=	Air-Filled Soil Porosity =	0.13	--
H' =	Henry's Law Constant =	1.505E-01	--
P_b =	Dry Soil Bulk Density =	1.5	kg/L
Koc=	Soil Organic Carbon/Water Partition Coefficient =	4.00E+01	L/kg
foc =	Fraction Organic Carbon =	0.00235	unitless
K_d =	Soil-Water Partition Coeff (K_{oc}*foc) =	0.094	L/kg

$C_w = Cs/([K_d + (\theta_w + \theta_a H')/P_b]*DAF)$

C_w =	**GW Concentration=**	**3.9E-03**	**mg/L**

APPENDIX D

STATISTICAL CALCULATIONS

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APPENDIX D.1

EXPOSURE POINT CONCENTRATION CALCULATION RESULTS – ProUCL 4.0

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Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Full Data Sets

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum (mg/kg)

General Statistics

Number of Valid Samples	15	Number of Unique Samples	13

Raw Statistics		**Log-transformed Statistics**	
Minimum	11900	Minimum of Log Data	9.384
Maximum	33300	Maximum of Log Data	10.41
Mean	25663	Mean of log Data	10.12
Median	26000	SD of log Data	0.271
SD	5870		
Coefficient of Variation	0.229		
Skewness	-0.942		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.935	Shapiro Wilk Test Statistic	0.856
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	28333	95% H-UCL	29559
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	33707
95% Adjusted-CLT UCL	27763	97.5% Chebyshev (MVUE) UCL	37145
95% Modified-t UCL	28271	99% Chebyshev (MVUE) UCL	43897

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	13.33	Data appear Normal at 5% Significance Level	
Theta Star	1925		
nu star	399.9		
Approximate Chi Square Value (.05)	354.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	28156
Adjusted Chi Square Value	349.3	95% Jackknife UCL	28333
		95% Standard Bootstrap UCL	28044
Anderson-Darling Test Statistic	0.593	95% Bootstrap-t UCL	27939
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	27775
Kolmogorov-Smirnov Test Statistic	0.161	95% Percentile Bootstrap UCL	28060
Kolmogorov-Smirnov 5% Critical Value	0.221	95% BCA Bootstrap UCL	27757
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	32270
		97.5% Chebyshev(Mean, Sd) UCL	35128
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	40744
95% Approximate Gamma UCL	28946		
95% Adjusted Gamma UCL	29382		

Potential UCL to Use		Use 95% Student's-t UCL	28333

Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Antimony (mg/kg)

General Statistics			
Number of Valid Samples	15	Number of Unique Samples	15
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.305	Minimum of Log Data	-1.187
Maximum	340	Maximum of Log Data	5.829
Mean	59.63	Mean of log Data	2.079
Median	9.7	SD of log Data	2.433
SD	107.1		
Coefficient of Variation	1.796		
Skewness	2.092		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.618	Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	108.3	95% H-UCL	5236
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	365
95% Adjusted-CLT UCL	121.1	97.5% Chebyshev (MVUE) UCL	484.3
95% Modified-t UCL	110.8	99% Chebyshev (MVUE) UCL	718.5
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.314	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	190		
nu star	9.417		
Approximate Chi Square Value (.05)	3.581	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	105.1
Adjusted Chi Square Value	3.15	95% Jackknife UCL	108.3
		95% Standard Bootstrap UCL	104
Anderson-Darling Test Statistic	0.577	95% Bootstrap-t UCL	200.1
Anderson-Darling 5% Critical Value	0.828	95% Hall's Bootstrap UCL	292.7
Kolmogorov-Smirnov Test Statistic	0.189	95% Percentile Bootstrap UCL	103.9
Kolmogorov-Smirnov 5% Critical Value	0.239	95% BCA Bootstrap UCL	124.8
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	180.1
		97.5% Chebyshev(Mean, Sd) UCL	232.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	334.7
95% Approximate Gamma UCL	156.8		
95% Adjusted Gamma UCL	178.2		
Potential UCL to Use		Use 95% Adjusted Gamma UCL	178.2

Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic (mg/kg)

General Statistics			
Number of Valid Samples	15	Number of Unique Samples	14
Raw Statistics		**Log-transformed Statistics**	
Minimum	1.035	Minimum of Log Data	0.0344
Maximum	5.2	Maximum of Log Data	1.649
Mean	3.202	Mean of log Data	1.052
Median	3.4	SD of log Data	0.521
SD	1.405		
Coefficient of Variation	0.439		
Skewness	-0.0631		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.94	Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	3.841	95% H-UCL	4.389
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	5.214
95% Adjusted-CLT UCL	3.793	97.5% Chebyshev (MVUE) UCL	6.065
95% Modified-t UCL	3.84	99% Chebyshev (MVUE) UCL	7.736
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.752	Data appear Normal at 5% Significance Level	
Theta Star	0.854		
nu star	112.6		
Approximate Chi Square Value (.05)	89.06	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	3.799
Adjusted Chi Square Value	86.49	95% Jackknife UCL	3.841
		95% Standard Bootstrap UCL	3.779
Anderson-Darling Test Statistic	0.403	95% Bootstrap-t UCL	3.825
Anderson-Darling 5% Critical Value	0.739	95% Hall's Bootstrap UCL	3.768
Kolmogorov-Smirnov Test Statistic	0.146	95% Percentile Bootstrap UCL	3.793
Kolmogorov-Smirnov 5% Critical Value	0.222	95% BCA Bootstrap UCL	3.733
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4.783
		97.5% Chebyshev(Mean, Sd) UCL	5.467
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.811
95% Approximate Gamma UCL	4.047		
95% Adjusted Gamma UCL	4.167		
Potential UCL to Use		Use 95% Student's-t UCL	3.841

Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium (mg/kg)

General Statistics

Number of Valid Samples	15	Number of Unique Samples	15

Raw Statistics		**Log-transformed Statistics**	
Minimum	372	Minimum of Log Data	5.919
Maximum	4440	Maximum of Log Data	8.398
Mean	1776	Mean of log Data	7.278
Median	1530	SD of log Data	0.687
SD	1145		
Coefficient of Variation	0.645		
Skewness	1.016		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.917	Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	2297	95% H-UCL	2793
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	3265
95% Adjusted-CLT UCL	2346	97.5% Chebyshev (MVUE) UCL	3899
95% Modified-t UCL	2310	99% Chebyshev (MVUE) UCL	5145

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.128	Data appear Normal at 5% Significance Level	
Theta Star	834.8		
nu star	63.84		
Approximate Chi Square Value (.05)	46.46	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	2263
Adjusted Chi Square Value	44.63	95% Jackknife UCL	2297
		95% Standard Bootstrap UCL	2249
Anderson-Darling Test Statistic	0.193	95% Bootstrap-t UCL	2507
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	2568
Kolmogorov-Smirnov Test Statistic	0.133	95% Percentile Bootstrap UCL	2268
Kolmogorov-Smirnov 5% Critical Value	0.224	95% BCA Bootstrap UCL	2334
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3065
		97.5% Chebyshev(Mean, Sd) UCL	3623
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4718
95% Approximate Gamma UCL	2441		
95% Adjusted Gamma UCL	2541		

Potential UCL to Use		Use 95% Student's-t UCL	2297

Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium (mg/kg)

General Statistics			
Number of Valid Samples	15	Number of Unique Samples	15
Raw Statistics		**Log-transformed Statistics**	
Minimum	20	Minimum of Log Data	2.996
Maximum	1500	Maximum of Log Data	7.313
Mean	187.7	Mean of log Data	4.242
Median	45	SD of log Data	1.255
SD	380.9		
Coefficient of Variation	2.029		
Skewness	3.331		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.485	Shapiro Wilk Test Statistic	0.849
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	360.9	95% H-UCL	443.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	363.8
95% Adjusted-CLT UCL	439.9	97.5% Chebyshev (MVUE) UCL	460.3
95% Modified-t UCL	375	99% Chebyshev (MVUE) UCL	649.9
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.54	Data do not follow a Discernable Distribution (0.05)	
Theta Star	347.6		
nu star	16.2		
Approximate Chi Square Value (.05)	8.103	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	349.5
Adjusted Chi Square Value	7.407	95% Jackknife UCL	360.9
		95% Standard Bootstrap UCL	341.8
Anderson-Darling Test Statistic	1.672	95% Bootstrap-t UCL	737.4
Anderson-Darling 5% Critical Value	0.784	95% Hall's Bootstrap UCL	816
Kolmogorov-Smirnov Test Statistic	0.32	95% Percentile Bootstrap UCL	362.1
Kolmogorov-Smirnov 5% Critical Value	0.232	95% BCA Bootstrap UCL	467.6
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	616.4
		97.5% Chebyshev(Mean, Sd) UCL	801.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1166
95% Approximate Gamma UCL	375.2		
95% Adjusted Gamma UCL	410.5		
Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	1166

Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt (mg/kg)

General Statistics			
Number of Valid Samples	15	Number of Unique Samples	13
Raw Statistics		**Log-transformed Statistics**	
Minimum	1.8	Minimum of Log Data	0.588
Maximum	41.5	Maximum of Log Data	3.726
Mean	12.1	Mean of log Data	2.129
Median	7	SD of log Data	0.844
SD	12.47		
Coefficient of Variation	1.03		
Skewness	1.975		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.677	Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	17.77	95% H-UCL	21.13
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	23.51
95% Adjusted-CLT UCL	19.15	97.5% Chebyshev (MVUE) UCL	28.64
95% Modified-t UCL	18.04	99% Chebyshev (MVUE) UCL	38.73
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.26	Data appear Lognormal at 5% Significance Level	
Theta Star	9.605		
nu star	37.79		
Approximate Chi Square Value (.05)	24.72	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	17.39
Adjusted Chi Square Value	23.42	95% Jackknife UCL	17.77
		95% Standard Bootstrap UCL	17.09
Anderson-Darling Test Statistic	0.937	95% Bootstrap-t UCL	25.72
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	44.52
Kolmogorov-Smirnov Test Statistic	0.227	95% Percentile Bootstrap UCL	17.53
Kolmogorov-Smirnov 5% Critical Value	0.225	95% BCA Bootstrap UCL	19.29
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	26.13
		97.5% Chebyshev(Mean, Sd) UCL	32.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	44.13
95% Approximate Gamma UCL	18.5		
95% Adjusted Gamma UCL	19.53		
Potential UCL to Use		Use 95% H-UCL	21.13

Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Copper (mg/kg)

General Statistics			
Number of Valid Samples	15	Number of Unique Samples	13
Raw Statistics		**Log-transformed Statistics**	
Minimum	4.9	Minimum of Log Data	1.589
Maximum	110	Maximum of Log Data	4.7
Mean	27.74	Mean of log Data	2.935
Median	18	SD of log Data	0.845
SD	30.97		
Coefficient of Variation	1.117		
Skewness	2.2		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.641	Shapiro Wilk Test Statistic	0.919
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	41.82	95% H-UCL	47.39
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	52.72
95% Adjusted-CLT UCL	45.74	97.5% Chebyshev (MVUE) UCL	64.24
95% Modified-t UCL	42.58	99% Chebyshev (MVUE) UCL	86.86
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.191	Data appear Lognormal at 5% Significance Level	
Theta Star	23.28		
nu star	35.74		
Approximate Chi Square Value (.05)	23.06	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	40.89
Adjusted Chi Square Value	21.81	95% Jackknife UCL	41.82
		95% Standard Bootstrap UCL	40.82
Anderson-Darling Test Statistic	1.068	95% Bootstrap-t UCL	78.67
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	121.4
Kolmogorov-Smirnov Test Statistic	0.246	95% Percentile Bootstrap UCL	41.71
Kolmogorov-Smirnov 5% Critical Value	0.226	95% BCA Bootstrap UCL	46.35
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	62.59
		97.5% Chebyshev(Mean, Sd) UCL	77.68
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	107.3
95% Approximate Gamma UCL	42.99		
95% Adjusted Gamma UCL	45.45		
Potential UCL to Use		Use 95% H-UCL	47.39

Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Iron (mg/kg)

General Statistics			
Number of Valid Samples	15	Number of Unique Samples	15
Raw Statistics		**Log-transformed Statistics**	
Minimum	7100	Minimum of Log Data	8.868
Maximum	78700	Maximum of Log Data	11.27
Mean	35590	Mean of log Data	10.29
Median	36000	SD of log Data	0.687
SD	20569		
Coefficient of Variation	0.578		
Skewness	0.591		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.958	Shapiro Wilk Test Statistic	0.951
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	44944	95% H-UCL	56787
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	66393
95% Adjusted-CLT UCL	45192	97.5% Chebyshev (MVUE) UCL	79284
95% Modified-t UCL	45079	99% Chebyshev (MVUE) UCL	104606
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.28	Data appear Normal at 5% Significance Level	
Theta Star	15608		
nu star	68.41		
Approximate Chi Square Value (.05)	50.37	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	44326
Adjusted Chi Square Value	48.47	95% Jackknife UCL	44944
		95% Standard Bootstrap UCL	44000
Anderson-Darling Test Statistic	0.189	95% Bootstrap-t UCL	46802
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	45926
Kolmogorov-Smirnov Test Statistic	0.12	95% Percentile Bootstrap UCL	44540
Kolmogorov-Smirnov 5% Critical Value	0.224	95% BCA Bootstrap UCL	44693
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	58740
		97.5% Chebyshev(Mean, Sd) UCL	68757
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	88433
95% Approximate Gamma UCL	48335		
95% Adjusted Gamma UCL	50232		
Potential UCL to Use		Use 95% Student's-t UCL	44944

Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Lead (mg/kg)

General Statistics			
Number of Valid Samples	15	Number of Unique Samples	11
Raw Statistics		**Log-transformed Statistics**	
Minimum	13	Minimum of Log Data	2.565
Maximum	680	Maximum of Log Data	6.522
Mean	97.97	Mean of log Data	3.733
Median	20	SD of log Data	1.192
SD	174.2		
Coefficient of Variation	1.779		
Skewness	3.045		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.539	Shapiro Wilk Test Statistic	0.826
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	177.2	95% H-UCL	225.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	197.4
95% Adjusted-CLT UCL	209.8	97.5% Chebyshev (MVUE) UCL	248.6
95% Modified-t UCL	183.1	99% Chebyshev (MVUE) UCL	349.2
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.611	Data do not follow a Discernable Distribution (0.05)	
Theta Star	160.2		
nu star	18.34		
Approximate Chi Square Value (.05)	9.64	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	172
Adjusted Chi Square Value	8.871	95% Jackknife UCL	177.2
		95% Standard Bootstrap UCL	170
Anderson-Darling Test Statistic	1.636	95% Bootstrap-t UCL	320.5
Anderson-Darling 5% Critical Value	0.778	95% Hall's Bootstrap UCL	395.7
Kolmogorov-Smirnov Test Statistic	0.276	95% Percentile Bootstrap UCL	181.7
Kolmogorov-Smirnov 5% Critical Value	0.231	95% BCA Bootstrap UCL	229.4
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	294.1
		97.5% Chebyshev(Mean, Sd) UCL	378.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	545.6
95% Approximate Gamma UCL	186.4		
95% Adjusted Gamma UCL	202.6		
Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	545.6

Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese (mg/kg)

General Statistics			
Number of Valid Samples	15	Number of Unique Samples	15
Raw Statistics		**Log-transformed Statistics**	
Minimum	85	Minimum of Log Data	4.443
Maximum	4400	Maximum of Log Data	8.389
Mean	1008	Mean of log Data	6.383
Median	630	SD of log Data	1.057
SD	1218		
Coefficient of Variation	1.209		
Skewness	2.131		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.699	Shapiro Wilk Test Statistic	0.981
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1562	95% H-UCL	2304
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2264
95% Adjusted-CLT UCL	1710	97.5% Chebyshev (MVUE) UCL	2820
95% Modified-t UCL	1591	99% Chebyshev (MVUE) UCL	3910
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.905	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1114		
nu star	27.15		
Approximate Chi Square Value (.05)	16.26	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	1525
Adjusted Chi Square Value	15.23	95% Jackknife UCL	1562
		95% Standard Bootstrap UCL	1491
Anderson-Darling Test Statistic	0.526	95% Bootstrap-t UCL	2372
Anderson-Darling 5% Critical Value	0.762	95% Hall's Bootstrap UCL	4038
Kolmogorov-Smirnov Test Statistic	0.183	95% Percentile Bootstrap UCL	1527
Kolmogorov-Smirnov 5% Critical Value	0.228	95% BCA Bootstrap UCL	1737
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2379
		97.5% Chebyshev(Mean, Sd) UCL	2973
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4138
95% Approximate Gamma UCL	1682		
95% Adjusted Gamma UCL	1796		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1682

Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury (mg/kg)

General Statistics			
Number of Valid Samples	15	Number of Unique Samples	13
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.041	Minimum of Log Data	-3.194
Maximum	0.76	Maximum of Log Data	-0.274
Mean	0.15	Mean of log Data	-2.214
Median	0.11	SD of log Data	0.727
SD	0.175		
Coefficient of Variation	1.168		
Skewness	3.416		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.531	Shapiro Wilk Test Statistic	0.898
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.229	95% H-UCL	0.224
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.26
95% Adjusted-CLT UCL	0.267	97.5% Chebyshev (MVUE) UCL	0.312
95% Modified-t UCL	0.236	99% Chebyshev (MVUE) UCL	0.414
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.43	Data appear Lognormal at 5% Significance Level	
Theta Star	0.105		
nu star	42.89		
Approximate Chi Square Value (.05)	28.87	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	0.224
Adjusted Chi Square Value	27.46	95% Jackknife UCL	0.229
		95% Standard Bootstrap UCL	0.22
Anderson-Darling Test Statistic	0.984	95% Bootstrap-t UCL	0.372
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	0.516
Kolmogorov-Smirnov Test Statistic	0.269	95% Percentile Bootstrap UCL	0.235
Kolmogorov-Smirnov 5% Critical Value	0.225	95% BCA Bootstrap UCL	0.276
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.347
		97.5% Chebyshev(Mean, Sd) UCL	0.432
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.599
95% Approximate Gamma UCL	0.223		
95% Adjusted Gamma UCL	0.234		
Potential UCL to Use		Use 95% H-UCL	0.224

Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium (mg/kg)

General Statistics			
Number of Valid Samples	15	Number of Unique Samples	15
Raw Statistics		**Log-transformed Statistics**	
Minimum	20	Minimum of Log Data	2.996
Maximum	1200	Maximum of Log Data	7.09
Mean	145.8	Mean of log Data	4.138
Median	58	SD of log Data	1.105
SD	300.6		
Coefficient of Variation	2.061		
Skewness	3.527		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.445	Shapiro Wilk Test Statistic	0.851
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	282.5	95% H-UCL	273.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	258.4
95% Adjusted-CLT UCL	349	97.5% Chebyshev (MVUE) UCL	323.1
95% Modified-t UCL	294.3	99% Chebyshev (MVUE) UCL	450.3
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.615	Data do not follow a Discernable Distribution (0.05)	
Theta Star	237		
nu star	18.46		
Approximate Chi Square Value (.05)	9.726	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	273.5
Adjusted Chi Square Value	8.953	95% Jackknife UCL	282.5
		95% Standard Bootstrap UCL	265.6
Anderson-Darling Test Statistic	1.737	95% Bootstrap-t UCL	1091
Anderson-Darling 5% Critical Value	0.778	95% Hall's Bootstrap UCL	796.7
Kolmogorov-Smirnov Test Statistic	0.306	95% Percentile Bootstrap UCL	292.3
Kolmogorov-Smirnov 5% Critical Value	0.231	95% BCA Bootstrap UCL	378.4
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	484.1
		97.5% Chebyshev(Mean, Sd) UCL	630.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	918
95% Approximate Gamma UCL	276.8		
95% Adjusted Gamma UCL	300.7		
Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	918

Table D.1-1a
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc (mg/kg)

General Statistics			
Number of Valid Samples	15	Number of Unique Samples	14
Raw Statistics		**Log-transformed Statistics**	
Minimum	34	Minimum of Log Data	3.526
Maximum	3700	Maximum of Log Data	8.216
Mean	611.3	Mean of log Data	5.306
Median	160	SD of log Data	1.562
SD	995.5		
Coefficient of Variation	1.628		
Skewness	2.476		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.643	Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical Value	0.881	Shapiro Wilk Critical Value	0.881
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1064	95% H-UCL	3231
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1767
95% Adjusted-CLT UCL	1210	97.5% Chebyshev (MVUE) UCL	2277
95% Modified-t UCL	1091	99% Chebyshev (MVUE) UCL	3281
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.494	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	1237		
nu star	14.83		
Approximate Chi Square Value (.05)	7.141	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0324	95% CLT UCL	1034
Adjusted Chi Square Value	6.494	95% Jackknife UCL	1064
		95% Standard Bootstrap UCL	1025
Anderson-Darling Test Statistic	0.796	95% Bootstrap-t UCL	1576
Anderson-Darling 5% Critical Value	0.789	95% Hall's Bootstrap UCL	2520
Kolmogorov-Smirnov Test Statistic	0.214	95% Percentile Bootstrap UCL	1056
Kolmogorov-Smirnov 5% Critical Value	0.233	95% BCA Bootstrap UCL	1227
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1732
		97.5% Chebyshev(Mean, Sd) UCL	2216
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3169
95% Approximate Gamma UCL	1269		
95% Adjusted Gamma UCL	1396		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1269

Table D.1-1b
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Cadmium (mg/kg)

General Statistics

Number of Valid Samples	15	Number of Detected Data	14
Number of Unique Samples	13	Number of Non-Detect Data	1
		Percent Non-Detects	6.67%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.118	Minimum Detected	-2.141
Maximum Detected	120	Maximum Detected	4.787
Mean of Detected	17.61	Mean of Detected	1.273
SD of Detected	33.05	SD of Detected	2.049
Minimum Non-Detect	0.11	Minimum Non-Detect	-2.207
Maximum Non-Detect	0.11	Maximum Non-Detect	-2.207

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.593	Shapiro Wilk Test Statistic	0.969
5% Shapiro Wilk Critical Value	0.874	5% Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	16.44	Mean	0.995
SD	32.16	SD	2.25
95% DL/2 (t) UCL	31.06	95% H-Stat (DL/2) UCL	387.6
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	15.02	Mean in Log Scale	0.936
SD	32.54	SD in Log Scale	2.366
95% MLE (t) UCL	29.83	Mean in Original Scale	16.43
95% MLE (Tiku) UCL	28.62	SD in Original Scale	32.17
		95% Percentile Bootstrap UCL	30.85
		95% BCA Bootstrap UCL	38.86

Table D.1-1b
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.37
Theta Star	47.55
nu star	10.37
A-D Test Statistic	0.553
5% A-D Critical Value	0.811
K-S Test Statistic	0.811
5% K-S Critical Value	0.244
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0
Maximum	120
Mean	16.43
Median	1.8
SD	32.17
k star	0.236
Theta star	69.73
Nu star	7.07
AppChi2	2.209
95% Gamma Approximate UCL	52.59
95% Adjusted Gamma UCL	61.47

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Gamma Distributed at 5% Significance Level	

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	16.44
SD	31.07
SE of Mean	8.325
95% KM (t) UCL	31.1
95% KM (z) UCL	30.14
95% KM (jackknife) UCL	31.07
95% KM (bootstrap t) UCL	60.95
95% KM (BCA) UCL	30.02
95% KM (Percentile Bootstrap) UCL	32.23
95% KM (Chebyshev) UCL	52.73
97.5% KM (Chebyshev) UCL	68.43
99% KM (Chebyshev) UCL	99.28
Potential UCLs to Use	
95% KM (Chebyshev) UCL	52.73

Table D.1-1b
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Selenium (mg/kg)

General Statistics

Number of Valid Samples	15	Number of Detected Data	10
Number of Unique Samples	10	Number of Non-Detect Data	5
		Percent Non-Detects	33.33%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.14	Minimum Detected	-1.966
Maximum Detected	0.89	Maximum Detected	-0.117
Mean of Detected	0.495	Mean of Detected	-0.841
SD of Detected	0.233	SD of Detected	0.604
Minimum Non-Detect	0.089	Minimum Non-Detect	-2.419
Maximum Non-Detect	0.089	Maximum Non-Detect	-2.419

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.964	Shapiro Wilk Test Statistic	0.881
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.345	Mean	-1.598
SD	0.288	SD	1.209
95% DL/2 (t) UCL	0.476	95% H-Stat (DL/2) UCL	0.403
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.281	Mean in Log Scale	-1.313
SD	0.368	SD in Log Scale	0.866
95% MLE (t) UCL	0.449	Mean in Original Scale	0.366
95% MLE (Tiku) UCL	0.464	SD in Original Scale	0.266
		95% Percentile Bootstrap UCL	0.474
		95% BCA Bootstrap UCL	0.481

Table D.1-1b
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	2.74
Theta Star	0.18
nu star	54.81
A-D Test Statistic	0.44
5% A-D Critical Value	0.73
K-S Test Statistic	0.73
5% K-S Critical Value	0.268
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0.108
Maximum	0.89
Mean	0.431
Median	0.4
SD	0.222
k star	2.779
Theta star	0.155
Nu star	83.37
AppChi2	63.33
95% Gamma Approximate UCL	0.568
95% Adjusted Gamma UCL	0.588

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Normal at 5% Significance Level	

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.376
SD	0.246
SE of Mean	0.067
95% KM (t) UCL	0.494
95% KM (z) UCL	0.486
95% KM (jackknife) UCL	0.488
95% KM (bootstrap t) UCL	0.497
95% KM (BCA) UCL	0.532
95% KM (Percentile Bootstrap) UCL	0.512
95% KM (Chebyshev) UCL	0.668
97.5% KM (Chebyshev) UCL	0.795
99% KM (Chebyshev) UCL	1.043
Potential UCLs to Use	
95% KM (t) UCL	0.494
95% KM (Percentile Bootstrap) UCL	0.512

Table D.1-1b
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Aroclor 1254 (ug/kg)

General Statistics

Number of Valid Samples	5	Number of Unique Samples	5

Raw Statistics		**Log-transformed Statistics**	
Minimum	12	Minimum of Log Data	2.485
Maximum	2000	Maximum of Log Data	7.601
Mean	584.4	Mean of log Data	5.419
Median	290	SD of log Data	1.86
SD	805.1		
Coefficient of Variation	1.378		
Skewness	2.046		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.728	Shapiro Wilk Test Statistic	0.926
Shapiro Wilk Critical Value	0.762	Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1352	95% H-UCL	4333385
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2931
95% Adjusted-CLT UCL	1529	97.5% Chebyshev (MVUE) UCL	3888
95% Modified-t UCL	1407	99% Chebyshev (MVUE) UCL	5767

Table D.1-1b
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.39	**Data appear Gamma Distributed at 5% Significance Level**	
Theta Star	1497		
nu star	3.904		
Approximate Chi Square Value (.05)	0.684	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0086	95% CLT UCL	1177
Adjusted Chi Square Value	0.278	95% Jackknife UCL	1352
		95% Standard Bootstrap UCL	1118
Anderson-Darling Test Statistic	0.285	95% Bootstrap-t UCL	3430
Anderson-Darling 5% Critical Value	0.704	95% Hall's Bootstrap UCL	4615
Kolmogorov-Smirnov Test Statistic	0.23	95% Percentile Bootstrap UCL	1242
Kolmogorov-Smirnov 5% Critical Value	0.369	95% BCA Bootstrap UCL	1324
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2154
		97.5% Chebyshev(Mean, Sd) UCL	2833
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4167
95% Approximate Gamma UCL	3335		
95% Adjusted Gamma UCL	8193		

Potential UCL to Use	Use 95% Approximate Gamma UCL	3335

Recommended UCL exceeds the maximum observation

Table D.1-1b
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Aroclor 1260 (ug/kg)

General Statistics

Number of Valid Samples	5	Number of Detected Data	4
Number of Unique Samples	4	Number of Non-Detect Data	1
		Percent Non-Detects	20.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	73	Minimum Detected	4.29
Maximum Detected	2000	Maximum Detected	7.601
Mean of Detected	605.8	Mean of Detected	5.545
SD of Detected	931.2	SD of Detected	1.438
Minimum Non-Detect	9.8	Minimum Non-Detect	2.282
Maximum Non-Detect	9.8	Maximum Non-Detect	2.282

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.686	Shapiro Wilk Test Statistic	0.885
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	485.6	Mean	4.754
SD	850	SD	2.163
95% DL/2 (t) UCL	1296	95% H-Stat (DL/2) UCL	69332584
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	367.6	Mean in Log Scale	4.805
SD	890.1	SD in Log Scale	2.071
95% MLE (t) UCL	1216	Mean in Original Scale	485.9
95% MLE (Tiku) UCL	1205	SD in Original Scale	849.8
		95% Percentile Bootstrap UCL	1216
		95% BCA Bootstrap UCL	1257

Table D.1-1b
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.342
Theta Star	1771
nu star	2.736
A-D Test Statistic	0.557
5% A-D Critical Value	0.672
K-S Test Statistic	0.672
5% K-S Critical Value	0.406
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0
Maximum	2000
Mean	484.6
Median	140
SD	850.7
k star	0.186
Theta star	2599
Nu star	1.864
AppChi2	0.135
95% Gamma Approximate UCL	6688
95% Adjusted Gamma UCL	N/A

Warning: Recommended UCL exceeds the maximum observation

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Gamma Distributed at 5% Significance Level	

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	499.2
SD	752.1
SE of Mean	388.4
95% KM (t) UCL	1327
95% KM (z) UCL	1138
95% KM (jackknife) UCL	1296
95% KM (bootstrap t) UCL	9344
95% KM (BCA) UCL	1243
95% KM (Percentile Bootstrap) UCL	1256
95% KM (Chebyshev) UCL	2192
97.5% KM (Chebyshev) UCL	2925
99% KM (Chebyshev) UCL	4364
Potential UCLs to Use	
95% KM (Chebyshev) UCL	2192

Table D.1-1b
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Benzo(a)pyrene (ug/kg)

General Statistics

Number of Valid Samples	9	Number of Detected Data	5
Number of Unique Samples	5	Number of Non-Detect Data	4
		Percent Non-Detects	44.44%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	8.9	Minimum Detected	2.186
Maximum Detected	31	Maximum Detected	3.434
Mean of Detected	19.58	Mean of Detected	2.856
SD of Detected	10.29	SD of Detected	0.553
Minimum Non-Detect	1.4	Minimum Non-Detect	0.336
Maximum Non-Detect	7.99	Maximum Non-Detect	2.078

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	4
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	5
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	44.44%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.856	Shapiro Wilk Test Statistic	0.901
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	11.92	Mean	1.815
SD	11.69	SD	1.434
95% DL/2 (t) UCL	19.17	95% H-Stat (DL/2) UCL	39.34
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	9.687	Mean in Log Scale	2.156
SD	14.12	SD in Log Scale	0.938
95% MLE (t) UCL	18.44	Mean in Original Scale	12.54
95% MLE (Tiku) UCL	19.9	SD in Original Scale	11.09
		95% Percentile Bootstrap UCL	18.38
		95% BCA Bootstrap UCL	19.18

Table D.1-1b
EPC Calculation Results - SWMU 57 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	1.881
Theta Star	10.41
nu star	18.81
A-D Test Statistic	0.398
5% A-D Critical Value	0.681
K-S Test Statistic	0.681
5% K-S Critical Value	0.358
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	8.9
Maximum	31
Mean	18.29
Median	16
SD	7.974
k star	4.205
Theta star	4.349
Nu star	75.69
AppChi2	56.65
95% Gamma Approximate UCL	24.43
95% Adjusted Gamma UCL	26.02

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Normal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	14.83
SD	8.672
SE of Mean	3.232
95% KM (t) UCL	20.84
95% KM (z) UCL	20.15
95% KM (jackknife) UCL	20.25
95% KM (bootstrap t) UCL	25.51
95% KM (BCA) UCL	24.33
95% KM (Percentile Bootstrap) UCL	22.22
95% KM (Chebyshev) UCL	28.92
97.5% KM (Chebyshev) UCL	35.02
99% KM (Chebyshev) UCL	46.99
Potential UCLs to Use	
95% KM (t) UCL	20.84
95% KM (Percentile Bootstrap) UCL	22.22

Table D.1-2a
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Full Data Sets

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum (mg/kg)

General Statistics

Number of Valid Samples	41	Number of Unique Samples	25

Raw Statistics		**Log-transformed Statistics**	
Minimum	11900	Minimum of Log Data	9.384
Maximum	38000	Maximum of Log Data	10.55
Mean	24648	Mean of log Data	10.08
Median	25000	SD of log Data	0.284
SD	6377		
Coefficient of Variation	0.259		
Skewness	-0.0905		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.974	Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	0.941
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	26325	95% H-UCL	26790
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	29580
95% Adjusted-CLT UCL	26271	97.5% Chebyshev (MVUE) UCL	31684
95% Modified-t UCL	26322	99% Chebyshev (MVUE) UCL	35818

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	12.81	Data appear Normal at 5% Significance Level	
Theta Star	1924		
nu star	1050		
Approximate Chi Square Value (.05)	976.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0441	95% CLT UCL	26286
Adjusted Chi Square Value	973.5	95% Jackknife UCL	26325
		95% Standard Bootstrap UCL	26298
Anderson-Darling Test Statistic	0.541	95% Bootstrap-t UCL	26378
Anderson-Darling 5% Critical Value	0.748	95% Hall's Bootstrap UCL	26360
Kolmogorov-Smirnov Test Statistic	0.105	95% Percentile Bootstrap UCL	26213
Kolmogorov-Smirnov 5% Critical Value	0.138	95% BCA Bootstrap UCL	26328
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	28989
		97.5% Chebyshev(Mean, Sd) UCL	30867
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	34557
95% Approximate Gamma UCL	26522		
95% Adjusted Gamma UCL	26593		

Potential UCL to Use		Use 95% Student's-t UCL	26325

Table D.1-2a
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic (mg/kg)

General Statistics			
Number of Valid Samples	41	Number of Unique Samples	31
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.82	Minimum of Log Data	-0.198
Maximum	12	Maximum of Log Data	2.485
Mean	2.975	Mean of log Data	0.907
Median	2.7	SD of log Data	0.615
SD	1.994		
Coefficient of Variation	0.67		
Skewness	2.366		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.804	Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	0.941
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	3.5	95% H-UCL	3.631
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	4.31
95% Adjusted-CLT UCL	3.61	97.5% Chebyshev (MVUE) UCL	4.888
95% Modified-t UCL	3.519	99% Chebyshev (MVUE) UCL	6.022
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.686	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.108		
nu star	220.2		
Approximate Chi Square Value (.05)	186.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0441	95% CLT UCL	3.487
Adjusted Chi Square Value	185.8	95% Jackknife UCL	3.5
		95% Standard Bootstrap UCL	3.481
Anderson-Darling Test Statistic	0.504	95% Bootstrap-t UCL	3.692
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	4.045
Kolmogorov-Smirnov Test Statistic	0.101	95% Percentile Bootstrap UCL	3.504
Kolmogorov-Smirnov 5% Critical Value	0.139	95% BCA Bootstrap UCL	3.598
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4.332
		97.5% Chebyshev(Mean, Sd) UCL	4.92
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.073
95% Approximate Gamma UCL	3.506		
95% Adjusted Gamma UCL	3.527		
Potential UCL to Use		Use 95% Approximate Gamma UCL	3.506

Table D.1-2a
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium (mg/kg)

General Statistics			
Number of Valid Samples	41	Number of Unique Samples	32
Raw Statistics		**Log-transformed Statistics**	
Minimum	9.3	Minimum of Log Data	2.23
Maximum	1500	Maximum of Log Data	7.313
Mean	90.51	Mean of log Data	3.698
Median	33	SD of log Data	0.943
SD	238.4		
Coefficient of Variation	2.634		
Skewness	5.497		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.319	Shapiro Wilk Test Statistic	0.795
Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	0.941
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	153.2	95% H-UCL	88.79
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	107.9
95% Adjusted-CLT UCL	185.9	97.5% Chebyshev (MVUE) UCL	127.7
95% Modified-t UCL	158.5	99% Chebyshev (MVUE) UCL	166.7
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.705	Data do not follow a Discernable Distribution (0.05)	
Theta Star	128.4		
nu star	57.78		
Approximate Chi Square Value (.05)	41.31	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0441	95% CLT UCL	151.8
Adjusted Chi Square Value	40.8	95% Jackknife UCL	153.2
		95% Standard Bootstrap UCL	152.3
Anderson-Darling Test Statistic	6.295	95% Bootstrap-t UCL	307.9
Anderson-Darling 5% Critical Value	0.79	95% Hall's Bootstrap UCL	329.4
Kolmogorov-Smirnov Test Statistic	0.354	95% Percentile Bootstrap UCL	156.5
Kolmogorov-Smirnov 5% Critical Value	0.143	95% BCA Bootstrap UCL	190.4
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	252.8
		97.5% Chebyshev(Mean, Sd) UCL	323
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	461
95% Approximate Gamma UCL	126.6		
95% Adjusted Gamma UCL	128.2		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	252.8

Table D.1-2a
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt (mg/kg)

General Statistics			
Number of Valid Samples	41	Number of Unique Samples	33
Raw Statistics		**Log-transformed Statistics**	
Minimum	1.8	Minimum of Log Data	0.588
Maximum	51	Maximum of Log Data	3.932
Mean	14.69	Mean of log Data	2.4
Median	11	SD of log Data	0.783
SD	11.59		
Coefficient of Variation	0.789		
Skewness	1.438		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.851	Shapiro Wilk Test Statistic	0.985
Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	0.941
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	17.74	95% H-UCL	19.54
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	23.63
95% Adjusted-CLT UCL	18.1	97.5% Chebyshev (MVUE) UCL	27.43
95% Modified-t UCL	17.81	99% Chebyshev (MVUE) UCL	34.9
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.771	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	8.298		
nu star	145.2		
Approximate Chi Square Value (.05)	118.3	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0441	95% CLT UCL	17.67
Adjusted Chi Square Value	117.5	95% Jackknife UCL	17.74
		95% Standard Bootstrap UCL	17.63
Anderson-Darling Test Statistic	0.379	95% Bootstrap-t UCL	18.59
Anderson-Darling 5% Critical Value	0.761	95% Hall's Bootstrap UCL	18.25
Kolmogorov-Smirnov Test Statistic	0.0932	95% Percentile Bootstrap UCL	17.53
Kolmogorov-Smirnov 5% Critical Value	0.14	95% BCA Bootstrap UCL	18.27
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	22.58
		97.5% Chebyshev(Mean, Sd) UCL	26
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	32.7
95% Approximate Gamma UCL	18.02		
95% Adjusted Gamma UCL	18.16		
Potential UCL to Use		Use 95% Approximate Gamma UCL	18.02

Table D.1-2a
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Iron (mg/kg)

General Statistics			
Number of Valid Samples	41	Number of Unique Samples	33
Raw Statistics		**Log-transformed Statistics**	
Minimum	7100	Minimum of Log Data	8.868
Maximum	87000	Maximum of Log Data	11.37
Mean	40160	Mean of log Data	10.47
Median	36000	SD of log Data	0.549
SD	18896		
Coefficient of Variation	0.471		
Skewness	0.59		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.948	Shapiro Wilk Test Statistic	0.926
Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	0.941
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	45129	95% H-UCL	48690
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	57176
95% Adjusted-CLT UCL	45304	97.5% Chebyshev (MVUE) UCL	64186
95% Modified-t UCL	45174	99% Chebyshev (MVUE) UCL	77956
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.827	Data appear Normal at 5% Significance Level	
Theta Star	10493		
nu star	313.8		
Approximate Chi Square Value (.05)	273.8	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0441	95% CLT UCL	45014
Adjusted Chi Square Value	272.4	95% Jackknife UCL	45129
		95% Standard Bootstrap UCL	45079
Anderson-Darling Test Statistic	0.58	95% Bootstrap-t UCL	45428
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	45333
Kolmogorov-Smirnov Test Statistic	0.109	95% Percentile Bootstrap UCL	44940
Kolmogorov-Smirnov 5% Critical Value	0.139	95% BCA Bootstrap UCL	45421
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	53023
		97.5% Chebyshev(Mean, Sd) UCL	58589
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	69522
95% Approximate Gamma UCL	46033		
95% Adjusted Gamma UCL	46263		
Potential UCL to Use		Use 95% Student's-t UCL	45129

Table D.1-2a
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Lead (mg/kg)

General Statistics			
Number of Valid Samples	41	Number of Unique Samples	27
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.86	Minimum of Log Data	-0.151
Maximum	680	Maximum of Log Data	6.522
Mean	45.63	Mean of log Data	2.952
Median	18	SD of log Data	1.127
SD	110.9		
Coefficient of Variation	2.431		
Skewness	5.071		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.364	Shapiro Wilk Test Statistic	0.904
Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	0.941
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	74.81	95% H-UCL	56.48
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	67.76
95% Adjusted-CLT UCL	88.79	97.5% Chebyshev (MVUE) UCL	81.83
95% Modified-t UCL	77.09	99% Chebyshev (MVUE) UCL	109.5
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.661	Data do not follow a Discernable Distribution (0.05)	
Theta Star	68.98		
nu star	54.24		
Approximate Chi Square Value (.05)	38.32	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0441	95% CLT UCL	74.13
Adjusted Chi Square Value	37.83	95% Jackknife UCL	74.81
		95% Standard Bootstrap UCL	73.57
Anderson-Darling Test Statistic	4.503	95% Bootstrap-t UCL	132.8
Anderson-Darling 5% Critical Value	0.794	95% Hall's Bootstrap UCL	157.8
Kolmogorov-Smirnov Test Statistic	0.296	95% Percentile Bootstrap UCL	77.04
Kolmogorov-Smirnov 5% Critical Value	0.144	95% BCA Bootstrap UCL	93.5
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	121.2
		97.5% Chebyshev(Mean, Sd) UCL	153.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	218
95% Approximate Gamma UCL	64.59		
95% Adjusted Gamma UCL	65.43		
Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	218

Table D.1-2a
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese (mg/kg)

General Statistics			
Number of Valid Samples	41	Number of Unique Samples	40
Raw Statistics		**Log-transformed Statistics**	
Minimum	79	Minimum of Log Data	4.369
Maximum	7700	Maximum of Log Data	8.949
Mean	1372	Mean of log Data	6.607
Median	690	SD of log Data	1.136
SD	1693		
Coefficient of Variation	1.234		
Skewness	2.141		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.718	Shapiro Wilk Test Statistic	0.975
Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	0.941
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1817	95% H-UCL	2220
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2660
95% Adjusted-CLT UCL	1902	97.5% Chebyshev (MVUE) UCL	3215
95% Modified-t UCL	1832	99% Chebyshev (MVUE) UCL	4305
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.89	Data appear Lognormal at 5% Significance Level	
Theta Star	1542		
nu star	72.97		
Approximate Chi Square Value (.05)	54.3	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0441	95% CLT UCL	1807
Adjusted Chi Square Value	53.71	95% Jackknife UCL	1817
		95% Standard Bootstrap UCL	1807
Anderson-Darling Test Statistic	1.055	95% Bootstrap-t UCL	1967
Anderson-Darling 5% Critical Value	0.781	95% Hall's Bootstrap UCL	1950
Kolmogorov-Smirnov Test Statistic	0.161	95% Percentile Bootstrap UCL	1835
Kolmogorov-Smirnov 5% Critical Value	0.142	95% BCA Bootstrap UCL	1924
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2525
		97.5% Chebyshev(Mean, Sd) UCL	3024
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4004
95% Approximate Gamma UCL	1844		
95% Adjusted Gamma UCL	1864		
Potential UCL to Use		Use 95% H-UCL	2220

Table D.1-2a
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium (mg/kg)

General Statistics			
Number of Valid Samples	41	Number of Unique Samples	28
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.041	Minimum of Log Data	-3.194
Maximum	0.77	Maximum of Log Data	-0.261
Mean	0.237	Mean of log Data	-1.56
Median	0.23	SD of log Data	0.517
SD	0.123		
Coefficient of Variation	0.52		
Skewness	2.117		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.851	Shapiro Wilk Test Statistic	0.956
Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	0.941
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.269	95% H-UCL	0.281
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.328
95% Adjusted-CLT UCL	0.275	97.5% Chebyshev (MVUE) UCL	0.366
95% Modified-t UCL	0.27	99% Chebyshev (MVUE) UCL	0.441
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	4.01	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	0.0591		
nu star	328.8		
Approximate Chi Square Value (.05)	287.8	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0441	95% CLT UCL	0.269
Adjusted Chi Square Value	286.4	95% Jackknife UCL	0.269
		95% Standard Bootstrap UCL	0.268
Anderson-Darling Test Statistic	0.479	95% Bootstrap-t UCL	0.277
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	0.292
Kolmogorov-Smirnov Test Statistic	0.0969	95% Percentile Bootstrap UCL	0.271
Kolmogorov-Smirnov 5% Critical Value	0.138	95% BCA Bootstrap UCL	0.278
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.321
		97.5% Chebyshev(Mean, Sd) UCL	0.357
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.428
95% Approximate Gamma UCL	0.271		
95% Adjusted Gamma UCL	0.272		
Potential UCL to Use		Use 95% Approximate Gamma UCL	0.271

Table D.1-2a
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium (mg/kg)

General Statistics			
Number of Valid Samples	41	Number of Unique Samples	31
Raw Statistics		**Log-transformed Statistics**	
Minimum	11	Minimum of Log Data	2.398
Maximum	1200	Maximum of Log Data	7.09
Mean	73.89	Mean of log Data	3.624
Median	29	SD of log Data	0.862
SD	187.2		
Coefficient of Variation	2.533		
Skewness	5.764		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.304	Shapiro Wilk Test Statistic	0.818
Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	0.941
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	123.1	95% H-UCL	73.57
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	89.33
95% Adjusted-CLT UCL	150.1	97.5% Chebyshev (MVUE) UCL	104.7
95% Modified-t UCL	127.5	99% Chebyshev (MVUE) UCL	135
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.819	Data do not follow a Discernable Distribution (0.05)	
Theta Star	90.26		
nu star	67.13		
Approximate Chi Square Value (.05)	49.27	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0441	95% CLT UCL	122
Adjusted Chi Square Value	48.72	95% Jackknife UCL	123.1
		95% Standard Bootstrap UCL	120.9
Anderson-Darling Test Statistic	5.286	95% Bootstrap-t UCL	328.2
Anderson-Darling 5% Critical Value	0.784	95% Hall's Bootstrap UCL	296.6
Kolmogorov-Smirnov Test Statistic	0.288	95% Percentile Bootstrap UCL	131.1
Kolmogorov-Smirnov 5% Critical Value	0.143	95% BCA Bootstrap UCL	166.9
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	201.3
		97.5% Chebyshev(Mean, Sd) UCL	256.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	364.7
95% Approximate Gamma UCL	100.7		
95% Adjusted Gamma UCL	101.8		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	201.3

Table D.1-2a
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc (mg/kg)

General Statistics			
Number of Valid Samples	41	Number of Unique Samples	35
Raw Statistics		**Log-transformed Statistics**	
Minimum	9.3	Minimum of Log Data	2.23
Maximum	3700	Maximum of Log Data	8.216
Mean	256.1	Mean of log Data	4.262
Median	40	SD of log Data	1.34
SD	650.6		
Coefficient of Variation	2.541		
Skewness	4.279		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.413	Shapiro Wilk Test Statistic	0.852
Shapiro Wilk Critical Value	0.941	Shapiro Wilk Critical Value	0.941
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	427.1	95% H-UCL	312.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	359.6
95% Adjusted-CLT UCL	495.7	97.5% Chebyshev (MVUE) UCL	442.8
95% Modified-t UCL	438.5	99% Chebyshev (MVUE) UCL	606.3
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.475	Data do not follow a Discernable Distribution (0.05)	
Theta Star	538.5		
nu star	38.99		
Approximate Chi Square Value (.05)	25.69	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0441	95% CLT UCL	423.2
Adjusted Chi Square Value	25.29	95% Jackknife UCL	427.1
		95% Standard Bootstrap UCL	415.2
Anderson-Darling Test Statistic	5.248	95% Bootstrap-t UCL	685.8
Anderson-Darling 5% Critical Value	0.814	95% Hall's Bootstrap UCL	932
Kolmogorov-Smirnov Test Statistic	0.302	95% Percentile Bootstrap UCL	441.4
Kolmogorov-Smirnov 5% Critical Value	0.146	95% BCA Bootstrap UCL	516.4
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	698.9
		97.5% Chebyshev(Mean, Sd) UCL	890.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1267
95% Approximate Gamma UCL	388.7		
95% Adjusted Gamma UCL	394.7		
Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	1267

Table D.1-2b
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony (mg/kg)

General Statistics

Number of Valid Samples	41	Number of Detected Data	40
Number of Unique Samples	34	Number of Non-Detect Data	1
		Percent Non-Detects	2.44%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.045	Minimum Detected	-3.101
Maximum Detected	340	Maximum Detected	5.829
Mean of Detected	23.82	Mean of Detected	0.379
SD of Detected	70.14	SD of Detected	2.339
Minimum Non-Detect	0.0518	Minimum Non-Detect	-2.96
Maximum Non-Detect	0.0518	Maximum Non-Detect	-2.96

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.387	Shapiro Wilk Test Statistic	0.9
5% Shapiro Wilk Critical Value	0.94	5% Shapiro Wilk Critical Value	0.94
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	23.24	Mean	0.28
SD	69.35	SD	2.394
95% DL/2 (t) UCL	41.48	95% H-Stat (DL/2) UCL	112.6
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	20.83	Mean in Log Scale	0.257
SD	70.65	SD in Log Scale	2.438
95% MLE (t) UCL	39.41	Mean in Original Scale	23.24
95% MLE (Tiku) UCL	37.51	SD in Original Scale	69.35
		95% Percentile Bootstrap UCL	42.01
		95% BCA Bootstrap UCL	49.81

Table D.1-2b
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.251
Theta Star	94.74
nu star	20.11
A-D Test Statistic	4.045
5% A-D Critical Value	0.879
K-S Test Statistic	0.879
5% K-S Critical Value	0.153
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0
Maximum	340
Mean	23.24
Median	0.52
SD	69.35
k star	0.221
Theta star	105.2
Nu star	18.11
AppChi2	9.472
95% Gamma Approximate UCL	44.44
95% Adjusted Gamma UCL	45.54
Note: DL/2 is not a recommended method.	

Data Distribution Test with Detected Values Only	
Data do not follow a Discernable Distribution (0.05)	

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	23.24
SD	68.5
SE of Mean	10.83
95% KM (t) UCL	41.48
95% KM (z) UCL	41.06
95% KM (jackknife) UCL	41.48
95% KM (bootstrap t) UCL	86.58
95% KM (BCA) UCL	43.32
95% KM (Percentile Bootstrap) UCL	41.83
95% KM (Chebyshev) UCL	70.47
97.5% KM (Chebyshev) UCL	90.9
99% KM (Chebyshev) UCL	131
Potential UCLs to Use	
99% KM (Chebyshev) UCL	131

Table D.1-2b
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium (mg/kg)

General Statistics

Number of Valid Samples	41	Number of Detected Data	24
Number of Unique Samples	23	Number of Non-Detect Data	17
		Percent Non-Detects	41.46%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.118	Minimum Detected	-2.141
Maximum Detected	120	Maximum Detected	4.787
Mean of Detected	11.24	Mean of Detected	0.754
SD of Detected	26.1	SD of Detected	1.875
Minimum Non-Detect	0.11	Minimum Non-Detect	-2.207
Maximum Non-Detect	0.11	Maximum Non-Detect	-2.207

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.472	Shapiro Wilk Test Statistic	0.97
5% Shapiro Wilk Critical Value	0.916	5% Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	6.604	Mean	-0.761
SD	20.56	SD	2.312
95% DL/2 (t) UCL	12.01	95% H-Stat (DL/2) UCL	10.19

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-1.283
		SD in Log Scale	3.002
		Mean in Original Scale	6.595
		SD in Original Scale	20.57
		95% Percentile Bootstrap UCL	12.21
		95% BCA Bootstrap UCL	15.5

Table D.1-2b
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.374
Theta Star	30.06
nu star	17.95
A-D Test Statistic	1.321
5% A-D Critical Value	0.83
K-S Test Statistic	0.83
5% K-S Critical Value	0.191
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0
Maximum	120
Mean	7.776
Median	1.5
SD	20.47
k star	0.13
Theta star	59.98
Nu star	10.63
AppChi2	4.34
95% Gamma Approximate UCL	19.05
95% Adjusted Gamma UCL	19.71
Note: DL/2 is not a recommended method.	

Data Distribution Test with Detected Values Only	
Data appear Lognormal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	6.63
SD	20.3
SE of Mean	3.239
95% KM (t) UCL	12.08
95% KM (z) UCL	11.96
95% KM (jackknife) UCL	12.03
95% KM (bootstrap t) UCL	23.2
95% KM (BCA) UCL	12.52
95% KM (Percentile Bootstrap) UCL	12.61
95% KM (Chebyshev) UCL	20.75
97.5% KM (Chebyshev) UCL	26.86
99% KM (Chebyshev) UCL	38.86
Potential UCLs to Use	
97.5% KM (Chebyshev) UCL	26.86

Table D.1-2b
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Aroclor 1254 (ug/kg)

General Statistics

Number of Valid Samples	20	Number of Detected Data	11
Number of Unique Samples	11	Number of Non-Detect Data	9
		Percent Non-Detects	45.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	12	Minimum Detected	2.485
Maximum Detected	2000	Maximum Detected	7.601
Mean of Detected	365.7	Mean of Detected	4.994
SD of Detected	568.2	SD of Detected	1.528
Minimum Non-Detect	5.5	Minimum Non-Detect	1.705
Maximum Non-Detect	6.4	Maximum Non-Detect	1.856

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	9
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	11
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	45.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.616	Shapiro Wilk Test Statistic	0.961
5% Shapiro Wilk Critical Value	0.85	5% Shapiro Wilk Critical Value	0.85
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	202.5	Mean	3.227
SD	451.9	SD	2.291
95% DL/2 (t) UCL	377.2	95% H-Stat (DL/2) UCL	1699

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	3.213
		SD in Log Scale	2.327
		Mean in Original Scale	202.6
		SD in Original Scale	451.9
		95% Percentile Bootstrap UCL	383.1
		95% BCA Bootstrap UCL	470.7

Table D.1-2b
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.548
Theta Star	667.5
nu star	12.05
A-D Test Statistic	0.337
5% A-D Critical Value	0.768
K-S Test Statistic	0.768
5% K-S Critical Value	0.266
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0
Maximum	2000
Mean	275.6
Median	151
SD	433.1
k star	0.23
Theta star	1196
Nu star	9.219
AppChi2	3.46
95% Gamma Approximate UCL	734.5
95% Adjusted Gamma UCL	797.7

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Gamma Distributed at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	206.6
SD	438.6
SE of Mean	102.9
95% KM (t) UCL	384.4
95% KM (z) UCL	375.8
95% KM (jackknife) UCL	377.3
95% KM (bootstrap t) UCL	703.2
95% KM (BCA) UCL	432
95% KM (Percentile Bootstrap) UCL	388
95% KM (Chebyshev) UCL	654.9
97.5% KM (Chebyshev) UCL	849
99% KM (Chebyshev) UCL	1230
Potential UCLs to Use	
95% KM (BCA) UCL	432

Table D.1-2b
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Aroclor 1260 (ug/kg)

General Statistics

Number of Valid Samples	20	Number of Detected Data	6
Number of Unique Samples	6	Number of Non-Detect Data	14
		Percent Non-Detects	70.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	60	Minimum Detected	4.094
Maximum Detected	2000	Maximum Detected	7.601
Mean of Detected	478.8	Mean of Detected	5.373
SD of Detected	754.9	SD of Detected	1.289
Minimum Non-Detect	9.8	Minimum Non-Detect	2.282
Maximum Non-Detect	23	Maximum Non-Detect	3.135

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	14
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	6
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	70.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.633	Shapiro Wilk Test Statistic	0.917
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	150.8	Mean	3.226
SD	445.5	SD	1.596
95% DL/2 (t) UCL	323.1	95% H-Stat (DL/2) UCL	174.8

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	1.914
		SD in Log Scale	2.69
		Mean in Original Scale	146
		SD in Original Scale	447.2
		95% Percentile Bootstrap UCL	339.1
		95% BCA Bootstrap UCL	486.7

Table D.1-2b
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.486	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	984.8		
nu star	5.835		
A-D Test Statistic	0.562	**Nonparametric Statistics**	
5% A-D Critical Value	0.721	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.721	Mean	185.7
5% K-S Critical Value	0.343	SD	423.4
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	103.7
		95% KM (t) UCL	365
Assuming Gamma Distribution		95% KM (z) UCL	356.3
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	346.3
Minimum	0	95% KM (bootstrap t) UCL	1319
Maximum	2000	95% KM (BCA) UCL	489.7
Mean	420.2	95% KM (Percentile Bootstrap) UCL	388.1
Median	415.1	95% KM (Chebyshev) UCL	637.7
SD	431.6	97.5% KM (Chebyshev) UCL	833.4
k star	0.368	99% KM (Chebyshev) UCL	1218
Theta star	1143		
Nu star	14.7	**Potential UCLs to Use**	
AppChi2	7.054	95% KM (t) UCL	365
95% Gamma Approximate UCL	875.7		
95% Adjusted Gamma UCL	930.6		

Note: DL/2 is not a recommended method.

Table D.1-2b
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Benzo(a)pyrene (ug/kg)

General Statistics

Number of Valid Samples	27	Number of Detected Data	7
Number of Unique Samples	7	Number of Non-Detect Data	20
		Percent Non-Detects	74.07%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	1.8	Minimum Detected	0.588
Maximum Detected	31	Maximum Detected	3.434
Mean of Detected	14.61	Mean of Detected	2.26
SD of Detected	11.94	SD of Detected	1.118
Minimum Non-Detect	1.3	Minimum Non-Detect	0.262
Maximum Non-Detect	9.14	Maximum Non-Detect	2.213

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	23
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	4
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	85.19%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.884	Shapiro Wilk Test Statistic	0.9
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4.91	Mean	0.632
SD	8.29	SD	1.304
95% DL/2 (t) UCL	7.631	95% H-Stat (DL/2) UCL	6.953

Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	23.93	Mean in Log Scale	-0.542
SD	8.378	SD in Log Scale	2.039
95% MLE (t) UCL	26.68	Mean in Original Scale	4.062
95% MLE (Tiku) UCL	30.95	SD in Original Scale	8.57
		95% Percentile Bootstrap UCL	6.994
		95% BCA Bootstrap UCL	7.647

Table D.1-2b
EPC Calculation Results - SWMU 57 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.854
Theta Star	17.12
nu star	11.95
A-D Test Statistic	0.308
5% A-D Critical Value	0.723
K-S Test Statistic	0.723
5% K-S Critical Value	0.318
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1.8
Maximum	31
Mean	15.41
Median	15.25
SD	6.568
k star	3.574
Theta star	4.312
Nu star	193
AppChi2	161.9
95% Gamma Approximate UCL	18.38
95% Adjusted Gamma UCL	18.59

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Normal at 5% Significance Level	

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	5.143
SD	7.947
SE of Mean	1.653
95% KM (t) UCL	7.963
95% KM (z) UCL	7.862
95% KM (jackknife) UCL	7.477
95% KM (bootstrap t) UCL	9.471
95% KM (BCA) UCL	14.19
95% KM (Percentile Bootstrap) UCL	12.81
95% KM (Chebyshev) UCL	12.35
97.5% KM (Chebyshev) UCL	15.47
99% KM (Chebyshev) UCL	21.59
Potential UCLs to Use	
95% KM (t) UCL	7.963
95% KM (Percentile Bootstrap) UCL	12.81

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APPENDIX D.2

BACKGROUND MEANS COMPARISON SUMMARY/RESULTS – ProUCL 4.0

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Table D.2-1a
PROUCL 4.0 - Summary of Background vs Site Means Comparison - Surface Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	Is Site Data Distribution Normal?	Is Background Data Distibution Normal?	Means Test for Comparison	Background Comparison Results (Y/N)
Aluminum	Yes	No	Mann-Whitney	**Y**
Antimony	No	--	--	--
Arsenic	Yes	No	Mann-Whitney	N
Barium	Yes	Yes	Mann-Whitney**	N
Beryllium	No	No	Mann-Whitney	N
Cadmium	No	--	--	--
Calcium	Yes	No	Mann-Whitney	**Y**
Chromium	No	No	Mann-Whitney	**Y**
Cobalt	No	No	Mann-Whitney	N
Copper	No	No	Mann-Whitney	**Y**
Iron	Yes	No	Mann-Whitney	N
Lead	No	No	Mann-Whitney	**Y**
Magnesium	Yes	No	Mann-Whitney	N
Manganese	No	No	Mann-Whitney	N
Mercury	No	--	--	--
Nickel	Yes	No	Mann-Whitney	N
Potassium	Yes	No	Mann-Whitney	**Y**
Selenium	Yes	--	--	--
Silver	No	--	--	--
Sodium	No	--	--	--
Thallium	Yes	--	--	--
Vanadium	No	No	Mann-Whitney	N
Zinc	No	No	Mann-Whitney	**Y**

Notes:
** Data set(s) included non-detects therefore Mann-Whitney test used
-- = Insufficient Detections to Determine Distribution
N = Site <= Background
Y = Site > Background

Table D.2-1b
PROUCL 4.0 - Summary of Background vs Site Means Comparison - Total Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	Is Site Data Distribution Normal?	Is Background Data Distibution Normal?	Means Test for Comparison	Background Comparison Results (Y/N)
Aluminum	Yes	No	Mann-Whitney	**Y**
Antimony	No	--	--	--
Arsenic	No	No	Mann-Whitney	N
Barium	No	No	Mann-Whitney	**Y**
Beryllium	Yes	No	Mann-Whitney	**Y**
Cadmium	No	No	Mann-Whitney	**Y**
Calcium	No	No	Mann-Whitney	N
Chromium	No	Yes	Mann-Whitney	**Y**
Cobalt	No	No	Mann-Whitney	N
Copper	No	No	Mann-Whitney	**Y**
Iron	Yes	Yes	Paired-t test	**Y**
Lead	No	No	Mann-Whitney	**Y**
Magnesium	No	No	Mann-Whitney	N
Manganese	No	No	Mann-Whitney	**Y**
Mercury	No	No	Mann-Whitney	**Y**
Nickel	No	No	Mann-Whitney	N
Potassium	No	No	Mann-Whitney	**Y**
Selenium	No	--	--	--
Silver	No	--	--	--
Sodium	No	--	--	--
Thallium	No	Yes	Mann-Whitney	N
Vanadium	No	Yes	Mann-Whitney	N
Zinc	No	No	Mann-Whitney	**Y**

Notes:
** Data set(s) included non-detects therefore Mann-Whitney test used
-- = Insufficient Detections to Determine Distribution
N = Site <= Background
Y = Site > Background

Table D.2-1a
PROUCL 4.0 - Summary of Background vs Site Means Comparison - Surface Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	Is Site Data Distribution Normal?	Is Background Data Distibution Normal?	Means Test for Comparison	Background Comparison Results (Y/N)
Aluminum	Yes	No	Mann-Whitney	**Y**
Antimony	No	--	--	--
Arsenic	Yes	No	Mann-Whitney	N
Barium	Yes	Yes	Mann-Whitney**	N
Beryllium	No	No	Mann-Whitney	N
Cadmium	No	--	--	--
Calcium	Yes	No	Mann-Whitney	**Y**
Chromium	No	No	Mann-Whitney	**Y**
Cobalt	No	No	Mann-Whitney	N
Copper	No	No	Mann-Whitney	**Y**
Iron	Yes	No	Mann-Whitney	N
Lead	No	No	Mann-Whitney	**Y**
Magnesium	Yes	No	Mann-Whitney	N
Manganese	No	No	Mann-Whitney	N
Mercury	No	--	--	--
Nickel	Yes	No	Mann-Whitney	N
Potassium	Yes	No	Mann-Whitney	**Y**
Selenium	Yes	--	--	--
Silver	No	--	--	--
Sodium	No	--	--	--
Thallium	Yes	--	--	--
Vanadium	No	No	Mann-Whitney	N
Zinc	No	No	Mann-Whitney	**Y**

Notes:
** Data set(s) included non-detects therefore Mann-Whitney test used
-- = Insufficient Detections to Determine Distribution
N = Site <= Background
Y = Site > Background

Table D.2-1b
PROUCL 4.0 - Summary of Background vs Site Means Comparison - Total Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	Is Site Data Distribution Normal?	Is Background Data Distibution Normal?	Means Test for Comparison	Background Comparison Results (Y/N)
Aluminum	Yes	No	Mann-Whitney	**Y**
Antimony	No	--	--	--
Arsenic	No	No	Mann-Whitney	N
Barium	No	No	Mann-Whitney	**Y**
Beryllium	Yes	No	Mann-Whitney	**Y**
Cadmium	No	No	Mann-Whitney	**Y**
Calcium	No	No	Mann-Whitney	N
Chromium	No	Yes	Mann-Whitney	**Y**
Cobalt	No	No	Mann-Whitney	N
Copper	No	No	Mann-Whitney	**Y**
Iron	Yes	Yes	Paired-t test	**Y**
Lead	No	No	Mann-Whitney	**Y**
Magnesium	No	No	Mann-Whitney	N
Manganese	No	No	Mann-Whitney	**Y**
Mercury	No	No	Mann-Whitney	**Y**
Nickel	No	No	Mann-Whitney	N
Potassium	No	No	Mann-Whitney	**Y**
Selenium	No	--	--	--
Silver	No	--	--	--
Sodium	No	--	--	--
Thallium	No	Yes	Mann-Whitney	N
Vanadium	No	Yes	Mann-Whitney	N
Zinc	No	No	Mann-Whitney	**Y**

Notes:
** Data set(s) included non-detects therefore Mann-Whitney test used
-- = Insufficient Detections to Determine Distribution
N = Site <= Background
Y = Site > Background

Table D.2-2a
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Chromium

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	27
Minimum	6.3
Maximum	53.3
Mean of Raw Data	21.09
Standard Deviation of Raw Data	10.5
Kstar	3.695
Mean of Log Transformed Data	2.922
Standard Deviation of Log Transformed Data	0.529

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.11
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.612
A-D Critical (0.95) Value	0.75
K-S Test Statistic	0.145
K-S Critical(0.95) Value	0.166

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.946
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.17
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.2-2a
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	26
Minimum	7250
Maximum	63000
Mean of Raw Data	20108
Standard Deviation of Raw Data	11869
Kstar	3.069
Mean of Log Transformed Data	9.755
Standard Deviation of Log Transformed Data	0.57

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.846
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.139
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.612
A-D Critical (0.95) Value	0.752
K-S Test Statistic	0.151
K-S Critical(0.95) Value	0.166

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.153
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.2-2a
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	26
Minimum	8.9
Maximum	225
Mean of Raw Data	26.96
Standard Deviation of Raw Data	41.34
Kstar	1.324
Mean of Log Transformed Data	2.913
Standard Deviation of Log Transformed Data	0.702

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.416
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.375
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	3.163
A-D Critical (0.95) Value	0.764
K-S Test Statistic	0.253
K-S Critical(0.95) Value	0.169

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.798
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.192
Lilliefors Critical (0.95) Value	0.167

Data not Lognormal at (0.05) Significance Level

Table D.2-2a
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	27
Minimum	12.2
Maximum	101
Mean of Raw Data	33.89
Standard Deviation of Raw Data	17.78
Kstar	3.946
Mean of Log Transformed Data	3.405
Standard Deviation of Log Transformed Data	0.497

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.832
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.141
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.622
A-D Critical (0.95) Value	0.749
K-S Test Statistic	0.111
K-S Critical(0.95) Value	0.166

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.138
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.2-2a
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	28
Minimum	7.1
Maximum	216
Mean of Raw Data	41.21
Standard Deviation of Raw Data	40.24
Kstar	1.654
Mean of Log Transformed Data	3.421
Standard Deviation of Log Transformed Data	0.761

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.665
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.203
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.54
A-D Critical (0.95) Value	0.76
K-S Test Statistic	0.105
K-S Critical(0.95) Value	0.168

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.975
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.1
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.2-2b
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Calcium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Calcium Data	28	0	28	23	5	17.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	4.6	6.6	5.12	4.8	0.844
Statistics (Detects Only)	23	116	7340	1197	885	1440
Statistics (All: NDs treated as DL value)	28	4.6	7340	983.9	761.5	1380
Statistics (All: NDs treated as DL/2 value)	28	2.3	7340	983.5	761.5	1380
Statistics (Normal ROS Estimated Data)	28	-1605	7340	751.5	761.5	1625
Statistics (Gamma ROS Estimated Data)	28	0	7340	984.5	761.5	1380
Statistics (Lognormal ROS Estimated Data)	28	104.3	7340	1007	761.5	1364

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.506	1.368	794.6	6.72	0.84	0.125
Statistics (NDs = DL)	0.575	0.537	1712	5.81	2.128	0.366
Statistics (NDs = DL/2)	0.523	0.491	1879	5.686	2.383	0.419
Statistics (Gamma ROS Estimates)	0.178	0.183	5519	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.391	1.047	0.164

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.553	0.914	Data Not Normal
Lilliefors (Detects Only)	0.275	0.185	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.587	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.244	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.587	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.244	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.761	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.207	0.167	Data Not Normal

Table D.2-2b
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.694	0.76	
Kolmogorov-Smirnov (Detects Only)	0.152	0.185	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.232	0.803	
Kolmogorov-Smirnov (NDs = DL)	0.192	0.174	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.47	0.808	
Kolmogorov-Smirnov (NDs = DL/2)	0.211	0.175	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	6.572	0.907	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.417	0.184	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.967	0.914	Data Appear Lognormal
Lilliefors (Detects Only)	0.0979	0.185	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.779	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.279	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.75	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.296	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.949	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.114	0.167	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2b
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cobalt Data	28	0	28	20	8	28.57%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	0.11	0.75	0.501	0.72	0.319
Statistics (Detects Only)	20	5.9	45.4	15.95	12.1	10.07
Statistics (All: NDs treated as DL value)	28	0.11	45.4	11.53	10.15	11.04
Statistics (All: NDs treated as DL/2 value)	28	0.055	45.4	11.46	10.15	11.11
Statistics (Normal ROS Estimated Data)	28	-10.02	45.4	9.494	10.15	13.45
Statistics (Gamma ROS Estimated Data)	28	3.774	45.4	13.39	10.15	9.473
Statistics (Lognormal ROS Estimated Data)	28	3.134	45.4	12.48	10.15	10.13

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	3.439	3.095	4.636	2.617	0.545	0.208
Statistics (NDs = DL)	0.701	0.65	16.45	1.583	1.793	1.132
Statistics (NDs = DL/2)	0.588	0.549	19.49	1.385	2.092	1.51
Statistics (Gamma ROS Estimates)	2.851	2.569	4.697	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.25	0.749	0.333

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.819	0.905	Data Not Normal
Lilliefors (Detects Only)	0.236	0.198	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.867	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.158	0.167	Data Appear Normal
Shapiro-Wilks (NDs = DL/2)	0.867	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.156	0.167	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.936	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.128	0.167	Data Appear Normal

Table D.2-2b
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.596	0.747	
Kolmogorov-Smirnov (Detects Only)	0.167	0.195	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.122	0.79	
Kolmogorov-Smirnov (NDs = DL)	0.195	0.172	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.507	0.801	
Kolmogorov-Smirnov (NDs = DL/2)	0.221	0.174	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.785	0.754	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.155	0.167	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.96	0.905	Data Appear Lognormal
Lilliefors (Detects Only)	0.132	0.198	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.831	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.257	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.802	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.288	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.954	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.126	0.167	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2b
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Magnesium Data	28	0	28	25	3	10.71%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	4.7	5	4.833	4.8	0.153
Statistics (Detects Only)	25	158	20400	2498	913	4334
Statistics (All: NDs treated as DL value)	28	4.7	20400	2231	741	4161
Statistics (All: NDs treated as DL/2 value)	28	2.35	20400	2230	741	4161
Statistics (Normal ROS Estimated Data)	28	-5148	20400	1678	741	4743
Statistics (Gamma ROS Estimated Data)	28	0	20400	2230	741	4161
Statistics (Lognormal ROS Estimated Data)	28	56.13	20400	2236	741	4158

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.694	0.643	3600	6.951	1.272	0.183
Statistics (NDs = DL)	0.479	0.451	4657	6.375	2.075	0.325
Statistics (NDs = DL/2)	0.457	0.432	4879	6.301	2.257	0.358
Statistics (Gamma ROS Estimates)	0.198	0.201	11267	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.638	1.512	0.228

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.558	0.918	Data Not Normal
Lilliefors (Detects Only)	0.303	0.177	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.546	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.299	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.546	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.299	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.729	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.267	0.167	Data Not Normal

Table D.2-2b
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.247	0.789	
Kolmogorov-Smirnov (Detects Only)	0.183	0.182	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	0.674	0.815	
Kolmogorov-Smirnov (NDs = DL)	0.131	0.175	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.681	0.82	
Kolmogorov-Smirnov (NDs = DL/2)	0.141	0.176	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.847	0.898	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.366	0.183	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.95	0.918	Data Appear Lognormal
Lilliefors (Detects Only)	0.107	0.177	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.889	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.195	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.856	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.22	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.973	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0849	0.167	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2c
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Aluminum

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	75
Minimum	3620
Maximum	47900
Mean of Raw Data	14204
Standard Deviation of Raw Data	9433
Kstar	2.689
Mean of Log Transformed Data	9.371
Standard Deviation of Log Transformed Data	0.618

Normal Distribution Test Results

Lilliefors Test Statistic	0.15
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.604
A-D Critical (0.95) Value	0.76
K-S Test Statistic	0.0772
K-S Critical(0.95) Value	0.101

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.0626
Lilliefors Critical (0.95) Value	0.0997

Data appear Lognormal at (0.05) Significance Level

Table D.2-2c
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	70
Minimum	6.3
Maximum	75.8
Mean of Raw Data	26.86
Standard Deviation of Raw Data	12.51
Kstar	4.382
Mean of Log Transformed Data	3.177
Standard Deviation of Log Transformed Data	0.501

Normal Distribution Test Results

Lilliefors Test Statistic	0.0734
Lilliefors Critical (0.95) Value	0.0997

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.591
A-D Critical (0.95) Value	0.755
K-S Test Statistic	0.0909
K-S Critical(0.95) Value	0.101

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.122
Lilliefors Critical (0.95) Value	0.0997

Data not Lognormal at (0.05) Significance Level

Table D.2-2c
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	72
Minimum	7250
Maximum	67700
Mean of Raw Data	26963
Standard Deviation of Raw Data	11990
Kstar	4.441
Mean of Log Transformed Data	10.09
Standard Deviation of Log Transformed Data	0.508

Normal Distribution Test Results

Lilliefors Test Statistic	0.0648
Lilliefors Critical (0.95) Value	0.0997

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.831
A-D Critical (0.95) Value	0.755
K-S Test Statistic	0.082
K-S Critical(0.95) Value	0.101

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.115
Lilliefors Critical (0.95) Value	0.0997

Data not Lognormal at (0.05) Significance Level

Table D.2-2c
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	78
Minimum	16.7
Maximum	2040
Mean of Raw Data	471.4
Standard Deviation of Raw Data	467.1
Kstar	1.087
Mean of Log Transformed Data	5.647
Standard Deviation of Log Transformed Data	1.118

Normal Distribution Test Results

Lilliefors Test Statistic	0.165
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.359
A-D Critical (0.95) Value	0.779
K-S Test Statistic	0.0515
K-S Critical(0.95) Value	0.103

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.093
Lilliefors Critical (0.95) Value	0.0997

Data appear Lognormal at (0.05) Significance Level

Table D.2-2c
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	70
Minimum	2.1
Maximum	256
Mean of Raw Data	22.04
Standard Deviation of Raw Data	39.85
Kstar	1.149
Mean of Log Transformed Data	2.615
Standard Deviation of Log Transformed Data	0.783

Normal Distribution Test Results

Lilliefors Test Statistic	0.344
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	7.671
A-D Critical (0.95) Value	0.777
K-S Test Statistic	0.245
K-S Critical(0.95) Value	0.103

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.147
Lilliefors Critical (0.95) Value	0.0997

Data not Lognormal at (0.05) Significance Level

Table D.2-2c
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Samples	78
Number of Unique Samples	75
Minimum	12.2
Maximum	101
Mean of Raw Data	44.97
Standard Deviation of Raw Data	18.97
Kstar	5.086
Mean of Log Transformed Data	3.708
Standard Deviation of Log Transformed Data	0.466

Normal Distribution Test Results

Lilliefors Test Statistic	0.0902
Lilliefors Critical (0.95) Value	0.1

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.29
A-D Critical (0.95) Value	0.754
K-S Test Statistic	0.059
K-S Critical(0.95) Value	0.101

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.0891
Lilliefors Critical (0.95) Value	0.1

Data appear Lognormal at (0.05) Significance Level

Table D.2-2c
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	76
Minimum	4.7
Maximum	598
Mean of Raw Data	54.94
Standard Deviation of Raw Data	87.15
Kstar	1.05
Mean of Log Transformed Data	3.478
Standard Deviation of Log Transformed Data	0.93

Normal Distribution Test Results

Lilliefors Test Statistic	0.291
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	3.363
A-D Critical (0.95) Value	0.78
K-S Test Statistic	0.145
K-S Critical(0.95) Value	0.103

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.0696
Lilliefors Critical (0.95) Value	0.0997

Data appear Lognormal at (0.05) Significance Level

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Arsenic

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Arsenic Data	79	0	79	76	3	3.80%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.09	0.12	0.103	0.1	0.0153
Statistics (Detects Only)	76	1.2	35.9	4.989	3.2	5.36
Statistics (All: NDs treated as DL value)	79	0.09	35.9	4.804	3.1	5.339
Statistics (All: NDs treated as DL/2 value)	79	0.045	35.9	4.802	3.1	5.341
Statistics (Normal ROS Estimated Data)	79	-5.169	35.9	4.604	3.1	5.608
Statistics (Gamma ROS Estimated Data)	79	0	35.9	4.8	3.1	5.343
Statistics (Lognormal ROS Estimated Data)	79	0.728	35.9	4.828	3.1	5.32

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.819	1.759	2.742	1.308	0.692	0.529
Statistics (NDs = DL)	1.401	1.356	3.429	1.172	0.968	0.826
Statistics (NDs = DL/2)	1.323	1.281	3.631	1.146	1.067	0.932
Statistics (Gamma ROS Estimates)	0.568	0.555	8.454	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.246	0.748	0.6

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.282	0.102	Data Not Normal
Lilliefors (NDs = DL)	0.279	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.279	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.263	0.0997	Data Not Normal

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.409	0.766	
Kolmogorov-Smirnov (Detects Only)	0.213	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.469	0.772	
Kolmogorov-Smirnov (NDs = DL)	0.182	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.587	0.774	
Kolmogorov-Smirnov (NDs = DL/2)	0.176	0.103	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	10.23	0.812	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.332	0.106	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.151	0.102	Data Not Lognormal
Lilliefors (NDs = DL)	0.159	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.187	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.134	0.0997	Data Not Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Beryllium Data	71	0	71	32	39	54.93%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	39	0.022	0.03	0.0286	0.03	0.00265
Statistics (Detects Only)	32	0.61	1.6	1.017	0.975	0.272
Statistics (All: NDs treated as DL value)	71	0.022	1.6	0.474	0.03	0.527
Statistics (All: NDs treated as DL/2 value)	71	0.011	1.6	0.466	0.015	0.534
Statistics (Normal ROS Estimated Data)	71	-0.475	1.6	0.59	0.557	0.472
Statistics (Gamma ROS Estimated Data)	71	0.61	1.6	1.031	1.052	0.198
Statistics (Lognormal ROS Estimated Data)	71	0.233	1.6	0.721	0.617	0.335

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	14.61	14	0.0696	-0.0179	0.268	-15
Statistics (NDs = DL)	0.519	0.507	0.913	-1.962	1.784	-0.909
Statistics (NDs = DL/2)	0.414	0.406	1.125	-2.343	2.13	-0.909
Statistics (Gamma ROS Estimates)	26.7	25.58	0.0386	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.429	0.456	-1.063

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.953	0.93	Data Appear Normal
Lilliefors (Detects Only)	0.118	0.157	Data Appear Normal
Lilliefors (NDs = DL)	0.349	0.105	Data Not Normal
Lilliefors (NDs = DL/2)	0.35	0.105	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0495	0.105	Data Appear Normal

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.268	0.746	
Kolmogorov-Smirnov (Detects Only)	0.0843	0.155	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	8.979	0.815	
Kolmogorov-Smirnov (NDs = DL)	0.36	0.112	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	9.326	0.838	
Kolmogorov-Smirnov (NDs = DL/2)	0.361	0.113	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.819	0.749	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0939	0.105	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.967	0.93	Data Appear Lognormal
Lilliefors (Detects Only)	0.0849	0.157	Data Appear Lognormal
Lilliefors (NDs = DL)	0.356	0.105	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.358	0.105	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0725	0.105	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cadmium Data	79	0	79	13	66	83.54%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	66	0.02	0.05	0.0256	0.02	0.00861
Statistics (Detects Only)	13	0.57	2.5	1.152	1.1	0.585
Statistics (All: NDs treated as DL value)	79	0.02	2.5	0.211	0.02	0.479
Statistics (All: NDs treated as DL/2 value)	79	0.01	2.5	0.2	0.01	0.483
Statistics (Normal ROS Estimated Data)	79	-4.148	2.5	-1.016	-1.143	1.342
Statistics (Gamma ROS Estimated Data)	79	0.197	2.987	1.943	2.175	0.717
Statistics (Lognormal ROS Estimated Data)	79	0.0167	2.5	0.338	0.174	0.444

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	5.194	5.005	0.222	0.0424	0.448	10.55
Statistics (NDs = DL)	0.424	0.416	0.498	-3.093	1.437	-0.465
Statistics (NDs = DL/2)	0.329	0.325	0.609	-3.672	1.69	-0.46
Statistics (Gamma ROS Estimates)	5.206	5.016	0.373	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.649	1.046	-0.634

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.82	0.866	Data Not Normal
Lilliefors (Detects Only)	0.246	0.246	Data Not Normal
Lilliefors (NDs = DL)	0.467	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.477	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0689	0.0997	Data Appear Normal

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.512	0.736	
Kolmogorov-Smirnov (Detects Only)	0.181	0.237	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	17.17	0.836	
Kolmogorov-Smirnov (NDs = DL)	0.422	0.107	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	18.08	0.858	
Kolmogorov-Smirnov (NDs = DL/2)	0.448	0.109	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.804	0.754	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.164	0.101	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.934	0.866	Data Appear Lognormal
Lilliefors (Detects Only)	0.158	0.246	Data Appear Lognormal
Lilliefors (NDs = DL)	0.327	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.348	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0689	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Calcium Data	79	0	79	63	16	20.25%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	16	4.6	6.7	5.563	5.4	0.796
Statistics (Detects Only)	63	116	25700	1392	717	3322
Statistics (All: NDs treated as DL value)	79	4.6	25700	1111	534	3014
Statistics (All: NDs treated as DL/2 value)	79	2.3	25700	1111	534	3014
Statistics (Normal ROS Estimated Data)	79	-3726	25700	537.2	534	3423
Statistics (Gamma ROS Estimated Data)	79	0	25700	1110	534	3014
Statistics (Lognormal ROS Estimated Data)	79	60.37	25700	1129	534	3007

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.899	0.873	1548	6.588	0.949	0.144
Statistics (NDs = DL)	0.456	0.447	2437	5.599	2.149	0.384
Statistics (NDs = DL/2)	0.42	0.413	2643	5.459	2.409	0.441
Statistics (Gamma ROS Estimates)	0.131	0.135	8441	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.173	1.189	0.193

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.359	0.112	Data Not Normal
Lilliefors (NDs = DL)	0.357	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.357	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.289	0.0997	Data Not Normal

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.055	0.785	
Kolmogorov-Smirnov (Detects Only)	0.223	0.116	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.78	0.829	
Kolmogorov-Smirnov (NDs = DL)	0.146	0.107	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.129	0.837	
Kolmogorov-Smirnov (NDs = DL/2)	0.149	0.107	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	17.18	0.972	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.418	0.114	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.108	0.112	Data Appear Lognormal
Lilliefors (NDs = DL)	0.224	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.251	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0933	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cobalt Data	79	0	79	56	23	29.11%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	23	0.11	0.84	0.587	0.73	0.286
Statistics (Detects Only)	56	5.9	130	22.23	13.3	23.94
Statistics (All: NDs treated as DL value)	79	0.11	130	15.93	11.4	22.41
Statistics (All: NDs treated as DL/2 value)	79	0.055	130	15.84	11.4	22.47
Statistics (Normal ROS Estimated Data)	79	-40.83	130	8.784	11.4	29.44
Statistics (Gamma ROS Estimated Data)	79	0	130	17.57	11.9	21.54
Statistics (Lognormal ROS Estimated Data)	79	1.86	130	16.76	11.4	21.87

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.78	1.721	12.49	2.795	0.701	0.251
Statistics (NDs = DL)	0.61	0.595	26.11	1.758	1.787	1.017
Statistics (NDs = DL/2)	0.523	0.511	30.31	1.556	2.08	1.337
Statistics (Gamma ROS Estimates)	0.504	0.494	34.83	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.331	0.947	0.406

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.263	0.118	Data Not Normal
Lilliefors (NDs = DL)	0.24	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.241	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.17	0.0997	Data Not Normal

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	3.203	0.765	
Kolmogorov-Smirnov (Detects Only)	0.162	0.121	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.127	0.807	
Kolmogorov-Smirnov (NDs = DL)	0.155	0.105	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.851	0.816	
Kolmogorov-Smirnov (NDs = DL/2)	0.171	0.106	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	9.036	0.818	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.36	0.106	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.13	0.118	Data Not Lognormal
Lilliefors (NDs = DL)	0.213	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.251	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0915	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Magnesium Data	79	0	79	72	7	8.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	3.8	5	4.686	4.8	0.402
Statistics (Detects Only)	72	139	58100	6394	1270	12925
Statistics (All: NDs treated as DL value)	79	3.8	58100	5828	1080	12466
Statistics (All: NDs treated as DL/2 value)	79	1.9	58100	5827	1080	12466
Statistics (Normal ROS Estimated Data)	79	-1911	58100	4438	1080	13862
Statistics (Gamma ROS Estimated Data)	79	0	58100	5827	1080	12466
Statistics (Lognormal ROS Estimated Data)	79	28.2	58100	5832	1080	12464

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.484	0.474	13216	7.443	1.571	0.211
Statistics (NDs = DL)	0.379	0.373	15366	6.92	2.257	0.326
Statistics (NDs = DL/2)	0.368	0.363	15828	6.859	2.409	0.351
Statistics (Gamma ROS Estimates)	0.198	0.199	29431	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	7.129	1.812	0.254

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.323	0.104	Data Not Normal
Lilliefors (NDs = DL)	0.321	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.321	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.29	0.0997	Data Not Normal

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.255	0.821	
Kolmogorov-Smirnov (Detects Only)	0.17	0.111	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.668	0.847	
Kolmogorov-Smirnov (NDs = DL)	0.136	0.108	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.542	0.849	
Kolmogorov-Smirnov (NDs = DL/2)	0.129	0.108	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	7.068	0.912	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.298	0.111	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.0868	0.104	Data Appear Lognormal
Lilliefors (NDs = DL)	0.135	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.157	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0546	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Mercury Data	79	0	79	18	61	77.22%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	61	0.019	0.06	0.0484	0.06	0.0158
Statistics (Detects Only)	18	0.038	1.2	0.187	0.125	0.259
Statistics (All: NDs treated as DL value)	79	0.019	1.2	0.0799	0.06	0.135
Statistics (All: NDs treated as DL/2 value)	79	0.0095	1.2	0.0612	0.03	0.139
Statistics (Normal ROS Estimated Data)	79	-1.214	1.2	-0.361	-0.372	0.403
Statistics (Gamma ROS Estimated Data)	79	0.038	1.2	0.173	0.156	0.138
Statistics (Lognormal ROS Estimated Data)	79	0.0007952	1.2	0.0541	0.0171	0.141

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.552	1.501	0.12	-2.035	0.727	-0.358
Statistics (NDs = DL)	1.645	1.591	0.0485	-2.861	0.681	-0.238
Statistics (NDs = DL/2)	0.962	0.934	0.0636	-3.396	0.902	-0.266
Statistics (Gamma ROS Estimates)	3.073	2.965	0.0563	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-4.029	1.44	-0.357

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.442	0.897	Data Not Normal
Lilliefors (Detects Only)	0.384	0.209	Data Not Normal
Lilliefors (NDs = DL)	0.356	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.361	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.067	0.0997	Data Appear Normal

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.702	0.756	
Kolmogorov-Smirnov (Detects Only)	0.274	0.207	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	6.715	0.768	
Kolmogorov-Smirnov (NDs = DL)	0.33	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	8.44	0.784	
Kolmogorov-Smirnov (NDs = DL/2)	0.377	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.725	0.759	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0728	0.101	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.871	0.897	Data Not Lognormal
Lilliefors (Detects Only)	0.193	0.209	Data Appear Lognormal
Lilliefors (NDs = DL)	0.269	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.321	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.062	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Potassium Data	79	0	79	67	12	15.19%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	201	271	223.1	217	20.78
Statistics (Detects Only)	67	123	10900	1690	694	2232
Statistics (All: NDs treated as DL value)	79	123	10900	1467	618	2120
Statistics (All: NDs treated as DL/2 value)	79	100.5	10900	1450	618	2131
Statistics (Normal ROS Estimated Data)	79	-1878	10900	1235	618	2322
Statistics (Gamma ROS Estimated Data)	79	0	10900	1433	618	2142
Statistics (Lognormal ROS Estimated Data)	79	104.7	10900	1456	618	2127

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.92	0.893	1837	6.798	1.115	0.164
Statistics (NDs = DL)	0.837	0.814	1752	6.586	1.143	0.174
Statistics (NDs = DL/2)	0.75	0.73	1933	6.481	1.273	0.196
Statistics (Gamma ROS Estimates)	0.163	0.165	8778	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.525	1.216	0.186

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.247	0.108	Data Not Normal
Lilliefors (NDs = DL)	0.263	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.263	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.21	0.0997	Data Not Normal

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.945	0.784	
Kolmogorov-Smirnov (Detects Only)	0.153	0.112	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.288	0.789	
Kolmogorov-Smirnov (NDs = DL)	0.171	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.192	0.793	
Kolmogorov-Smirnov (NDs = DL/2)	0.147	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	14.88	0.944	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.392	0.113	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.0982	0.108	Data Appear Lognormal
Lilliefors (NDs = DL)	0.106	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.0732	0.0997	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0941	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Thallium Data	79	0	79	15	64	81.01%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	64	0.13	0.45	0.189	0.15	0.0931
Statistics (Detects Only)	15	1.3	5	2.527	2.2	0.932
Statistics (All: NDs treated as DL value)	79	0.13	5	0.633	0.16	1.007
Statistics (All: NDs treated as DL/2 value)	79	0.065	5	0.556	0.08	1.039
Statistics (Normal ROS Estimated Data)	79	-4.787	5	-0.573	-0.722	1.972
Statistics (Gamma ROS Estimated Data)	79	1.3	5	2.489	2.468	0.399
Statistics (Lognormal ROS Estimated Data)	79	0.155	5	0.998	0.707	0.884

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	8.698	8.377	0.29	0.868	0.352	0.405
Statistics (NDs = DL)	0.753	0.733	0.841	-1.253	1.097	-0.876
Statistics (NDs = DL/2)	0.515	0.504	1.08	-1.814	1.358	-0.748
Statistics (Gamma ROS Estimates)	44.1	42.44	0.0564	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.291	0.738	-2.538

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.893	0.881	Data Appear Normal
Lilliefors (Detects Only)	0.17	0.229	Data Appear Normal
Lilliefors (NDs = DL)	0.382	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.435	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0779	0.0997	Data Appear Normal

Table D.2-2d
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.367	0.738	
Kolmogorov-Smirnov (Detects Only)	0.145	0.222	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	12.86	0.793	
Kolmogorov-Smirnov (NDs = DL)	0.361	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	14.62	0.817	
Kolmogorov-Smirnov (NDs = DL/2)	0.371	0.106	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	10.13	0.749	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.319	0.1	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.959	0.881	Data Appear Lognormal
Lilliefors (Detects Only)	0.134	0.229	Data Appear Lognormal
Lilliefors (NDs = DL)	0.334	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.34	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0779	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Aluminum

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	13
Minimum	11900
Maximum	33300
Mean of Raw Data	25663
Standard Deviation of Raw Data	5870
Kstar	13.33
Mean of Log Transformed Data	10.12
Standard Deviation of Log Transformed Data	0.271

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.125
Lilliefors Critical (0.95) Value	0.229

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.593
A-D Critical (0.95) Value	0.736
K-S Test Statistic	0.161
K-S Critical(0.95) Value	0.221

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.856
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.185
Lilliefors Critical (0.95) Value	0.229

Data not Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Antimony

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	15
Minimum	0.305
Maximum	340
Mean of Raw Data	59.63
Standard Deviation of Raw Data	107.1
Kstar	0.314
Mean of Log Transformed Data	2.079
Standard Deviation of Log Transformed Data	2.433

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.618
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.332
Lilliefors Critical (0.95) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.577
A-D Critical (0.95) Value	0.828
K-S Test Statistic	0.189
K-S Critical(0.95) Value	0.239

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.133
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	14
Minimum	1.035
Maximum	5.2
Mean of Raw Data	3.202
Standard Deviation of Raw Data	1.405
Kstar	3.752
Mean of Log Transformed Data	1.052
Standard Deviation of Log Transformed Data	0.521

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.123
Lilliefors Critical (0.95) Value	0.229

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.403
A-D Critical (0.95) Value	0.739
K-S Test Statistic	0.146
K-S Critical(0.95) Value	0.222

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.162
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Barium

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	12
Minimum	51
Maximum	220
Mean of Raw Data	105.7
Standard Deviation of Raw Data	42.43
Kstar	5.953
Mean of Log Transformed Data	4.591
Standard Deviation of Log Transformed Data	0.384

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.888
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.22
Lilliefors Critical (0.95) Value	0.229

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.362
A-D Critical (0.95) Value	0.738
K-S Test Statistic	0.177
K-S Critical(0.95) Value	0.222

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.954
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.152
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	12
Minimum	0.42
Maximum	2.2
Mean of Raw Data	0.852
Standard Deviation of Raw Data	0.498
Kstar	3.119
Mean of Log Transformed Data	-0.296
Standard Deviation of Log Transformed Data	0.523

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.822
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.193
Lilliefors Critical (0.95) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.651
A-D Critical (0.95) Value	0.741
K-S Test Statistic	0.188
K-S Critical(0.95) Value	0.223

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.901
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.182
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	15
Minimum	372
Maximum	4440
Mean of Raw Data	1776
Standard Deviation of Raw Data	1145
Kstar	2.128
Mean of Log Transformed Data	7.278
Standard Deviation of Log Transformed Data	0.687

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.917
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.161
Lilliefors Critical (0.95) Value	0.229

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.193
A-D Critical (0.95) Value	0.745
K-S Test Statistic	0.133
K-S Critical(0.95) Value	0.224

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.147
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	15
Minimum	20
Maximum	1500
Mean of Raw Data	187.7
Standard Deviation of Raw Data	380.9
Kstar	0.54
Mean of Log Transformed Data	4.242
Standard Deviation of Log Transformed Data	1.255

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.485
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.355
Lilliefors Critical (0.95) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	1.672
A-D Critical (0.95) Value	0.784
K-S Test Statistic	0.32
K-S Critical(0.95) Value	0.232

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.849
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.231
Lilliefors Critical (0.95) Value	0.229

Data not Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	13
Minimum	1.8
Maximum	41.5
Mean of Raw Data	12.1
Standard Deviation of Raw Data	12.47
Kstar	1.26
Mean of Log Transformed Data	2.129
Standard Deviation of Log Transformed Data	0.844

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.677
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.31
Lilliefors Critical (0.95) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.937
A-D Critical (0.95) Value	0.754
K-S Test Statistic	0.227
K-S Critical(0.95) Value	0.225

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.166
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Copper

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	13
Minimum	4.9
Maximum	110
Mean of Raw Data	27.74
Standard Deviation of Raw Data	30.97
Kstar	1.191
Mean of Log Transformed Data	2.935
Standard Deviation of Log Transformed Data	0.845

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.641
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.322
Lilliefors Critical (0.95) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	1.068
A-D Critical (0.95) Value	0.755
K-S Test Statistic	0.246
K-S Critical(0.95) Value	0.226

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.919
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.182
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	15
Minimum	7100
Maximum	78700
Mean of Raw Data	35590
Standard Deviation of Raw Data	20569
Kstar	2.28
Mean of Log Transformed Data	10.29
Standard Deviation of Log Transformed Data	0.687

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.958
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.148
Lilliefors Critical (0.95) Value	0.229

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.189
A-D Critical (0.95) Value	0.745
K-S Test Statistic	0.12
K-S Critical(0.95) Value	0.224

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.951
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.148
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	11
Minimum	13
Maximum	680
Mean of Raw Data	97.97
Standard Deviation of Raw Data	174.2
Kstar	0.611
Mean of Log Transformed Data	3.733
Standard Deviation of Log Transformed Data	1.192

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.539
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.344
Lilliefors Critical (0.95) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	1.636
A-D Critical (0.95) Value	0.778
K-S Test Statistic	0.276
K-S Critical(0.95) Value	0.231

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.826
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.265
Lilliefors Critical (0.95) Value	0.229

Data not Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	14
Minimum	710
Maximum	2700
Mean of Raw Data	1387
Standard Deviation of Raw Data	485.7
Kstar	7.7
Mean of Log Transformed Data	7.181
Standard Deviation of Log Transformed Data	0.335

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.887
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.189
Lilliefors Critical (0.95) Value	0.229

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.419
A-D Critical (0.95) Value	0.737
K-S Test Statistic	0.157
K-S Critical(0.95) Value	0.222

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.951
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.153
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	15
Minimum	85
Maximum	4400
Mean of Raw Data	1008
Standard Deviation of Raw Data	1218
Kstar	0.905
Mean of Log Transformed Data	6.383
Standard Deviation of Log Transformed Data	1.057

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.699
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.309
Lilliefors Critical (0.95) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.526
A-D Critical (0.95) Value	0.762
K-S Test Statistic	0.183
K-S Critical(0.95) Value	0.228

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.981
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.117
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	13
Minimum	0.041
Maximum	0.76
Mean of Raw Data	0.15
Standard Deviation of Raw Data	0.175
Kstar	1.43
Mean of Log Transformed Data	-2.214
Standard Deviation of Log Transformed Data	0.727

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.531
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.387
Lilliefors Critical (0.95) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.984
A-D Critical (0.95) Value	0.751
K-S Test Statistic	0.269
K-S Critical(0.95) Value	0.225

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.898
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.205
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	13
Minimum	5.5
Maximum	17
Mean of Raw Data	9.757
Standard Deviation of Raw Data	3.47
Kstar	6.963
Mean of Log Transformed Data	2.219
Standard Deviation of Log Transformed Data	0.356

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.165
Lilliefors Critical (0.95) Value	0.229

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.38
A-D Critical (0.95) Value	0.738
K-S Test Statistic	0.163
K-S Critical(0.95) Value	0.222

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.943
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.148
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	14
Minimum	528
Maximum	1700
Mean of Raw Data	1011
Standard Deviation of Raw Data	270.6
Kstar	12.39
Mean of Log Transformed Data	6.886
Standard Deviation of Log Transformed Data	0.267

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.163
Lilliefors Critical (0.95) Value	0.229

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.334
A-D Critical (0.95) Value	0.736
K-S Test Statistic	0.143
K-S Critical(0.95) Value	0.221

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.161
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Silver

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	13
Minimum	0.023
Maximum	0.2
Mean of Raw Data	0.0733
Standard Deviation of Raw Data	0.0456
Kstar	2.66
Mean of Log Transformed Data	-2.773
Standard Deviation of Log Transformed Data	0.588

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.853
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.21
Lilliefors Critical (0.95) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.294
A-D Critical (0.95) Value	0.743
K-S Test Statistic	0.135
K-S Critical(0.95) Value	0.223

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.967
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.14
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	14
Minimum	33
Maximum	520
Mean of Raw Data	172
Standard Deviation of Raw Data	155.9
Kstar	1.382
Mean of Log Transformed Data	4.82
Standard Deviation of Log Transformed Data	0.819

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.773
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.273
Lilliefors Critical (0.95) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.615
A-D Critical (0.95) Value	0.751
K-S Test Statistic	0.199
K-S Critical(0.95) Value	0.225

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.951
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.143
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	9
Minimum	0.17
Maximum	0.34
Mean of Raw Data	0.262
Standard Deviation of Raw Data	0.0531
Kstar	19.99
Mean of Log Transformed Data	-1.36
Standard Deviation of Log Transformed Data	0.211

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.189
Lilliefors Critical (0.95) Value	0.229

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.416
A-D Critical (0.95) Value	0.735
K-S Test Statistic	0.166
K-S Critical(0.95) Value	0.221

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.929
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.175
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	15
Minimum	20
Maximum	1200
Mean of Raw Data	145.8
Standard Deviation of Raw Data	300.6
Kstar	0.615
Mean of Log Transformed Data	4.138
Standard Deviation of Log Transformed Data	1.105

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.445
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.388
Lilliefors Critical (0.95) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	1.737
A-D Critical (0.95) Value	0.778
K-S Test Statistic	0.306
K-S Critical(0.95) Value	0.231

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.851
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.196
Lilliefors Critical (0.95) Value	0.229

Data not Lognormal at (0.05) Significance Level

Table D.2-3a
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Samples	15
Number of Unique Samples	14
Minimum	34
Maximum	3700
Mean of Raw Data	611.3
Standard Deviation of Raw Data	995.5
Kstar	0.494
Mean of Log Transformed Data	5.306
Standard Deviation of Log Transformed Data	1.562

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.643
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.297
Lilliefors Critical (0.95) Value	0.229

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.796
A-D Critical (0.95) Value	0.789
K-S Test Statistic	0.214
K-S Critical(0.95) Value	0.233

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical (0.95) Value	0.881
Lilliefors Test Statistic	0.14
Lilliefors Critical (0.95) Value	0.229

Data appear Lognormal at (0.05) Significance Level

Table D.2-3b
Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Cadmium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cadmium Data	15	0	15	14	1	6.67%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	14	0.118	120	17.61	3.4	33.05
Statistics (All: NDs treated as DL value)	15	0.11	120	16.44	1.8	32.16
Statistics (All: NDs treated as DL/2 value)	15	0.055	120	16.44	1.8	32.16
Statistics (Normal ROS Estimated Data)	15	-46.01	120	13.37	1.8	35.83
Statistics (Gamma ROS Estimated Data)	15	0	120	16.43	1.8	32.17
Statistics (Lognormal ROS Estimated Data)	15	0.023	120	16.43	1.8	32.17

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.411	0.373	42.87	1.273	2.049	1.61
Statistics (NDs = DL)	0.378	0.347	43.54	1.041	2.17	2.085
Statistics (NDs = DL/2)	0.369	0.34	44.51	0.995	2.25	2.262
Statistics (Gamma ROS Estimates)	0.239	0.236	68.75	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	0.936	2.366	2.526

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.593	0.874	Data Not Normal
Lilliefors (Detects Only)	0.344	0.237	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.574	0.881	Data Not Normal
Lilliefors (NDs = DL)	0.352	0.229	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.574	0.881	Data Not Normal
Lilliefors (NDs = DL/2)	0.352	0.229	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.735	0.881	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.307	0.229	Data Not Normal

Gamma Distribution Test Results

Table D.2-3b
Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.553	0.811	
Kolmogorov-Smirnov (Detects Only)	0.211	0.244	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.588	0.819	
Kolmogorov-Smirnov (NDs = DL)	0.201	0.238	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.52	0.821	
Kolmogorov-Smirnov (NDs = DL/2)	0.196	0.238	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.56	0.861	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.173	0.243	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.969	0.874	Data Appear Lognormal
Lilliefors (Detects Only)	0.131	0.237	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.956	0.881	Data Appear Lognormal
Lilliefors (NDs = DL)	0.118	0.229	Data Appear Lognormal
Shapiro-Wilks (NDs = DL/2)	0.971	0.881	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.13	0.229	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.976	0.881	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.145	0.229	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Selenium

Table D.2-3b
Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Selenium Data	15	0	15	10	5	33.33%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	0.089	0.089	0.089	0.089	N/A
Statistics (Detects Only)	10	0.14	0.89	0.495	0.54	0.233
Statistics (All: NDs treated as DL value)	15	0.089	0.89	0.359	0.35	0.272
Statistics (All: NDs treated as DL/2 value)	15	0.0445	0.89	0.345	0.35	0.288
Statistics (Normal ROS Estimated Data)	15	-0.319	0.89	0.297	0.35	0.354
Statistics (Gamma ROS Estimated Data)	15	0.108	0.89	0.431	0.4	0.222
Statistics (Lognormal ROS Estimated Data)	15	0.0621	0.89	0.366	0.35	0.266

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	3.82	3.1	0.129	-0.841	0.604	-0.718
Statistics (NDs = DL)	1.602	1.326	0.224	-1.367	0.91	-0.665
Statistics (NDs = DL/2)	1.075	0.905	0.32	-1.598	1.209	-0.757
Statistics (Gamma ROS Estimates)	3.418	2.779	0.126	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.313	0.866	-0.659

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.964	0.842	Data Appear Normal
Lilliefors (Detects Only)	0.127	0.28	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.867	0.881	Data Not Normal
Lilliefors (NDs = DL)	0.223	0.229	Data Appear Normal
Shapiro-Wilks (NDs = DL/2)	0.878	0.881	Data Not Normal
Lilliefors (NDs = DL/2)	0.194	0.229	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.969	0.881	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.127	0.229	Data Appear Normal

Gamma Distribution Test Results

Table D.2-3b
Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.44	0.73	
Kolmogorov-Smirnov (Detects Only)	0.192	0.268	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.96	0.752	
Kolmogorov-Smirnov (NDs = DL)	0.208	0.225	Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL/2)	0.96	0.762	
Kolmogorov-Smirnov (NDs = DL/2)	0.226	0.228	Data appear Approximate Gamma Distribution
Anderson-Darling (Gamma ROS Estimates)	0.273	0.743	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.115	0.223	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.881	0.842	Data Appear Lognormal
Lilliefors (Detects Only)	0.209	0.28	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.835	0.881	Data Not Lognormal
Lilliefors (NDs = DL)	0.21	0.229	Data Appear Lognormal
Shapiro-Wilks (NDs = DL/2)	0.818	0.881	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.228	0.229	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.915	0.881	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.17	0.229	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Aluminum

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	25
Minimum	11900
Maximum	38000
Mean of Raw Data	24648
Standard Deviation of Raw Data	6377
Kstar	12.81
Mean of Log Transformed Data	10.08
Standard Deviation of Log Transformed Data	0.284

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.974
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.08
Lilliefors Critical (0.95) Value	0.138

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.541
A-D Critical (0.95) Value	0.748
K-S Test Statistic	0.105
K-S Critical(0.95) Value	0.138

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.125
Lilliefors Critical (0.95) Value	0.138

Data not Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	31
Minimum	0.82
Maximum	12
Mean of Raw Data	2.975
Standard Deviation of Raw Data	1.994
Kstar	2.686
Mean of Log Transformed Data	0.907
Standard Deviation of Log Transformed Data	0.615

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.804
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.14
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.504
A-D Critical (0.95) Value	0.755
K-S Test Statistic	0.101
K-S Critical(0.95) Value	0.139

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.111
Lilliefors Critical (0.95) Value	0.138

Data appear Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Barium

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	32
Minimum	25
Maximum	230
Mean of Raw Data	84.79
Standard Deviation of Raw Data	43.49
Kstar	4.479
Mean of Log Transformed Data	4.333
Standard Deviation of Log Transformed Data	0.46

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.844
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.168
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.644
A-D Critical (0.95) Value	0.752
K-S Test Statistic	0.105
K-S Critical(0.95) Value	0.138

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.974
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.0817
Lilliefors Critical (0.95) Value	0.138

Data appear Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	25
Minimum	0.42
Maximum	2.6
Mean of Raw Data	1.151
Standard Deviation of Raw Data	0.54
Kstar	4.186
Mean of Log Transformed Data	0.0252
Standard Deviation of Log Transformed Data	0.502

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.942
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.123
Lilliefors Critical (0.95) Value	0.138

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.477
A-D Critical (0.95) Value	0.752
K-S Test Statistic	0.135
K-S Critical(0.95) Value	0.138

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.943
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.165
Lilliefors Critical (0.95) Value	0.138

Data appear Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	32
Minimum	9.3
Maximum	1500
Mean of Raw Data	90.51
Standard Deviation of Raw Data	238.4
Kstar	0.705
Mean of Log Transformed Data	3.698
Standard Deviation of Log Transformed Data	0.943

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.319
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.412
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	6.295
A-D Critical (0.95) Value	0.79
K-S Test Statistic	0.354
K-S Critical(0.95) Value	0.143

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.795
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.241
Lilliefors Critical (0.95) Value	0.138

Data not Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	33
Minimum	1.8
Maximum	51
Mean of Raw Data	14.69
Standard Deviation of Raw Data	11.59
Kstar	1.771
Mean of Log Transformed Data	2.4
Standard Deviation of Log Transformed Data	0.783

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.851
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.162
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.379
A-D Critical (0.95) Value	0.761
K-S Test Statistic	0.0932
K-S Critical(0.95) Value	0.14

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.985
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.0729
Lilliefors Critical (0.95) Value	0.138

Data appear Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Copper

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	27
Minimum	1.4
Maximum	110
Mean of Raw Data	19.4
Standard Deviation of Raw Data	20.1
Kstar	1.915
Mean of Log Transformed Data	2.702
Standard Deviation of Log Transformed Data	0.691

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.538
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.327
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	2.572
A-D Critical (0.95) Value	0.759
K-S Test Statistic	0.217
K-S Critical(0.95) Value	0.14

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.89
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.165
Lilliefors Critical (0.95) Value	0.138

Data not Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	33
Minimum	7100
Maximum	87000
Mean of Raw Data	40160
Standard Deviation of Raw Data	18896
Kstar	3.827
Mean of Log Transformed Data	10.47
Standard Deviation of Log Transformed Data	0.549

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.948
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.162
Lilliefors Critical (0.95) Value	0.138

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.58
A-D Critical (0.95) Value	0.752
K-S Test Statistic	0.109
K-S Critical(0.95) Value	0.139

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.926
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.14
Lilliefors Critical (0.95) Value	0.138

Data not Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	27
Minimum	0.86
Maximum	680
Mean of Raw Data	45.63
Standard Deviation of Raw Data	110.9
Kstar	0.661
Mean of Log Transformed Data	2.952
Standard Deviation of Log Transformed Data	1.127

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.364
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.387
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	4.503
A-D Critical (0.95) Value	0.794
K-S Test Statistic	0.296
K-S Critical(0.95) Value	0.144

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.904
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.191
Lilliefors Critical (0.95) Value	0.138

Data not Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	34
Minimum	487
Maximum	4280
Mean of Raw Data	1291
Standard Deviation of Raw Data	763.4
Kstar	3.593
Mean of Log Transformed Data	7.028
Standard Deviation of Log Transformed Data	0.51

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.82
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.172
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.613
A-D Critical (0.95) Value	0.753
K-S Test Statistic	0.108
K-S Critical(0.95) Value	0.139

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.968
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.0865
Lilliefors Critical (0.95) Value	0.138

Data appear Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	40
Minimum	79
Maximum	7700
Mean of Raw Data	1372
Standard Deviation of Raw Data	1693
Kstar	0.89
Mean of Log Transformed Data	6.607
Standard Deviation of Log Transformed Data	1.136

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.718
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.273
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	1.055
A-D Critical (0.95) Value	0.781
K-S Test Statistic	0.161
K-S Critical(0.95) Value	0.142

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.975
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.0821
Lilliefors Critical (0.95) Value	0.138

Data appear Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	27
Minimum	4.9
Maximum	28
Mean of Raw Data	10.67
Standard Deviation of Raw Data	4.429
Kstar	6.534
Mean of Log Transformed Data	2.295
Standard Deviation of Log Transformed Data	0.379

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.882
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.146
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.405
A-D Critical (0.95) Value	0.75
K-S Test Statistic	0.103
K-S Critical(0.95) Value	0.138

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.975
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.0837
Lilliefors Critical (0.95) Value	0.138

Data appear Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	27
Minimum	528
Maximum	3020
Mean of Raw Data	1127
Standard Deviation of Raw Data	425.5
Kstar	8.875
Mean of Log Transformed Data	6.974
Standard Deviation of Log Transformed Data	0.316

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.8
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.196
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	1.02
A-D Critical (0.95) Value	0.748
K-S Test Statistic	0.145
K-S Critical(0.95) Value	0.138

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.122
Lilliefors Critical (0.95) Value	0.138

Data appear Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Silver

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	31
Minimum	0.014
Maximum	0.2
Mean of Raw Data	0.0521
Standard Deviation of Raw Data	0.0359
Kstar	2.622
Mean of Log Transformed Data	-3.143
Standard Deviation of Log Transformed Data	0.616

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.817
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.168
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.395
A-D Critical (0.95) Value	0.756
K-S Test Statistic	0.0917
K-S Critical(0.95) Value	0.139

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.978
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.105
Lilliefors Critical (0.95) Value	0.138

Data appear Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	37
Minimum	33
Maximum	1100
Mean of Raw Data	282.3
Standard Deviation of Raw Data	307.9
Kstar	1.084
Mean of Log Transformed Data	5.15
Standard Deviation of Log Transformed Data	0.977

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.725
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.252
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	1.824
A-D Critical (0.95) Value	0.775
K-S Test Statistic	0.171
K-S Critical(0.95) Value	0.142

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.126
Lilliefors Critical (0.95) Value	0.138

Data not Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	28
Minimum	0.041
Maximum	0.77
Mean of Raw Data	0.237
Standard Deviation of Raw Data	0.123
Kstar	4.01
Mean of Log Transformed Data	-1.56
Standard Deviation of Log Transformed Data	0.517

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.851
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.141
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.479
A-D Critical (0.95) Value	0.752
K-S Test Statistic	0.0969
K-S Critical(0.95) Value	0.138

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.956
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.102
Lilliefors Critical (0.95) Value	0.138

Data appear Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	31
Minimum	11
Maximum	1200
Mean of Raw Data	73.89
Standard Deviation of Raw Data	187.2
Kstar	0.819
Mean of Log Transformed Data	3.624
Standard Deviation of Log Transformed Data	0.862

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.304
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.381
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	5.286
A-D Critical (0.95) Value	0.784
K-S Test Statistic	0.288
K-S Critical(0.95) Value	0.143

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.818
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.202
Lilliefors Critical (0.95) Value	0.138

Data not Lognormal at (0.05) Significance Level

Table D.2-3c
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Samples	41
Number of Unique Samples	35
Minimum	9.3
Maximum	3700
Mean of Raw Data	256.1
Standard Deviation of Raw Data	650.6
Kstar	0.475
Mean of Log Transformed Data	4.262
Standard Deviation of Log Transformed Data	1.34

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.413
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.376
Lilliefors Critical (0.95) Value	0.138

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	5.248
A-D Critical (0.95) Value	0.814
K-S Test Statistic	0.302
K-S Critical(0.95) Value	0.146

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.852
Shapiro Wilk Critical (0.95) Value	0.941
Lilliefors Test Statistic	0.239
Lilliefors Critical (0.95) Value	0.138

Data not Lognormal at (0.05) Significance Level

Table D.2-3d
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Antimony

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Antimony Data	41	0	41	40	1	2.44%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	40	0.045	340	23.82	0.53	70.14
Statistics (All: NDs treated as DL value)	41	0.045	340	23.24	0.52	69.35
Statistics (All: NDs treated as DL/2 value)	41	0.0259	340	23.24	0.52	69.35
Statistics (Normal ROS Estimated Data)	41	-69.8	340	21.54	0.52	70.78
Statistics (Gamma ROS Estimated Data)	41	0	340	23.24	0.52	69.35
Statistics (Lognormal ROS Estimated Data)	41	0.00988	340	23.24	0.52	69.35

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.254	0.251	93.85	0.379	2.339	6.176
Statistics (NDs = DL)	0.249	0.247	93.17	0.297	2.368	7.964
Statistics (NDs = DL/2)	0.248	0.246	93.65	0.28	2.394	8.537
Statistics (Gamma ROS Estimates)	0.221	0.221	105.3	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	0.257	2.438	9.49

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.387	0.94	Data Not Normal
Lilliefors (Detects Only)	0.414	0.14	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.382	0.941	Data Not Normal
Lilliefors (NDs = DL)	0.414	0.138	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.382	0.941	Data Not Normal
Lilliefors (NDs = DL/2)	0.414	0.138	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.445	0.941	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.404	0.138	Data Not Normal

Table D.2-3d
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.045	0.879	
Kolmogorov-Smirnov (Detects Only)	0.261	0.153	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	4.126	0.881	
Kolmogorov-Smirnov (NDs = DL)	0.263	0.151	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	4.038	0.882	
Kolmogorov-Smirnov (NDs = DL/2)	0.261	0.151	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.248	0.894	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.227	0.152	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.9	0.94	Data Not Lognormal
Lilliefors (Detects Only)	0.196	0.14	Data Not Lognormal
Shapiro-Wilks (NDs = DL)	0.904	0.941	Data Not Lognormal
Lilliefors (NDs = DL)	0.192	0.138	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.916	0.941	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.188	0.138	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.931	0.941	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.182	0.138	Data Not Lognormal

Note: DL/2 is not a recommended method.

Table D.2-3d
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cadmium Data	41	0	41	24	17	41.46%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	17	0.11	0.11	0.11	0.11	0
Statistics (Detects Only)	24	0.118	120	11.24	1.7	26.1
Statistics (All: NDs treated as DL value)	41	0.11	120	6.627	0.24	20.56
Statistics (All: NDs treated as DL/2 value)	41	0.055	120	6.604	0.24	20.56
Statistics (Normal ROS Estimated Data)	41	-76.82	120	-10.25	0.24	34.21
Statistics (Gamma ROS Estimated Data)	41	0	120	7.776	1.5	20.47
Statistics (Lognormal ROS Estimated Data)	41	0.00050559	120	6.595	0.24	20.57

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.396	0.383	28.41	0.754	1.875	2.488
Statistics (NDs = DL)	0.293	0.288	22.64	-0.474	2.05	-4.325
Statistics (NDs = DL/2)	0.266	0.262	24.87	-0.761	2.312	-3.036
Statistics (Gamma ROS Estimates)	0.122	0.13	63.56	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.283	3.002	-2.34

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.472	0.916	Data Not Normal
Lilliefors (Detects Only)	0.361	0.181	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.367	0.941	Data Not Normal
Lilliefors (NDs = DL)	0.379	0.138	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.368	0.941	Data Not Normal
Lilliefors (NDs = DL/2)	0.378	0.138	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.888	0.941	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.204	0.138	Data Not Normal

Table D.2-3d
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.321	0.83	
Kolmogorov-Smirnov (Detects Only)	0.228	0.191	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	4.614	0.862	
Kolmogorov-Smirnov (NDs = DL)	0.234	0.15	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.884	0.874	
Kolmogorov-Smirnov (NDs = DL/2)	0.218	0.151	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.23	0.95	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.223	0.156	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.97	0.916	Data Appear Lognormal
Lilliefors (Detects Only)	0.108	0.181	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.812	0.941	Data Not Lognormal
Lilliefors (NDs = DL)	0.252	0.138	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.84	0.941	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.237	0.138	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.983	0.941	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0916	0.138	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-3d
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Calcium Data	41	0	41	39	2	4.88%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	16.6	16.6	16.6	16.6	N/A
Statistics (Detects Only)	39	57	4440	1014	640	1113
Statistics (All: NDs treated as DL value)	41	16.6	4440	965.2	600	1107
Statistics (All: NDs treated as DL/2 value)	41	8.3	4440	964.8	600	1107
Statistics (Normal ROS Estimated Data)	41	-1657	4440	892.1	600	1215
Statistics (Gamma ROS Estimated Data)	41	0	4440	964.4	600	1107
Statistics (Lognormal ROS Estimated Data)	41	20.23	4440	965.6	600	1106

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.893	0.844	1136	6.266	1.261	0.201
Statistics (NDs = DL)	0.77	0.73	1254	6.097	1.442	0.236
Statistics (NDs = DL/2)	0.742	0.704	1301	6.064	1.526	0.252
Statistics (Gamma ROS Estimates)	0.35	0.341	2756	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.117	1.398	0.229

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.8	0.939	Data Not Normal
Lilliefors (Detects Only)	0.2	0.142	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.792	0.941	Data Not Normal
Lilliefors (NDs = DL)	0.201	0.138	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.793	0.941	Data Not Normal
Lilliefors (NDs = DL/2)	0.2	0.138	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.891	0.941	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.197	0.138	Data Not Normal

Table D.2-3d
Goodness of Fit - Total Soil
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.431	0.783	
Kolmogorov-Smirnov (Detects Only)	0.0875	0.146	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.29	0.788	
Kolmogorov-Smirnov (NDs = DL)	0.0797	0.143	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.232	0.79	
Kolmogorov-Smirnov (NDs = DL/2)	0.0709	0.143	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.138	0.847	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.239	0.149	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.951	0.939	Data Appear Lognormal
Lilliefors (Detects Only)	0.0887	0.142	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.957	0.941	Data Appear Lognormal
Lilliefors (NDs = DL)	0.0945	0.138	Data Appear Lognormal
Shapiro-Wilks (NDs = DL/2)	0.945	0.941	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.0986	0.138	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.962	0.941	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0914	0.138	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-3d
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
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Mercury

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Mercury Data	41	0	41	40	1	2.44%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	40	0.012	0.76	0.091	0.06	0.12
Statistics (All: NDs treated as DL value)	41	0.0075	0.76	0.0889	0.058	0.119
Statistics (All: NDs treated as DL/2 value)	41	0.00375	0.76	0.0888	0.058	0.119
Statistics (Normal ROS Estimated Data)	41	-0.124	0.76	0.0857	0.058	0.123
Statistics (Gamma ROS Estimated Data)	41	0	0.76	0.0887	0.058	0.119
Statistics (Lognormal ROS Estimated Data)	41	0.00707	0.76	0.0889	0.058	0.119

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.402	1.316	0.0649	-2.795	0.851	-0.304
Statistics (NDs = DL)	1.316	1.236	0.0676	-2.846	0.902	-0.317
Statistics (NDs = DL/2)	1.273	1.196	0.0698	-2.863	0.946	-0.331
Statistics (Gamma ROS Estimates)	0.741	0.703	0.12	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-2.847	0.905	-0.318

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.52	0.94	Data Not Normal
Lilliefors (Detects Only)	0.255	0.14	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.524	0.941	Data Not Normal
Lilliefors (NDs = DL)	0.247	0.138	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.527	0.941	Data Not Normal
Lilliefors (NDs = DL/2)	0.237	0.138	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.589	0.941	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.25	0.138	Data Not Normal

Table D.2-3d
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.962	0.768	
Kolmogorov-Smirnov (Detects Only)	0.137	0.142	Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL)	0.846	0.771	
Kolmogorov-Smirnov (NDs = DL)	0.129	0.141	Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL/2)	0.81	0.772	
Kolmogorov-Smirnov (NDs = DL/2)	0.125	0.141	Data appear Approximate Gamma Distribution
Anderson-Darling (Gamma ROS Estimates)	2.248	0.79	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.206	0.143	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.967	0.94	Data Appear Lognormal
Lilliefors (Detects Only)	0.0772	0.14	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.976	0.941	Data Appear Lognormal
Lilliefors (NDs = DL)	0.0855	0.138	Data Appear Lognormal
Shapiro-Wilks (NDs = DL/2)	0.974	0.941	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.102	0.138	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.977	0.941	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0868	0.138	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-3d
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
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Selenium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Selenium Data	41	0	41	25	16	39.02%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	16	0.089	0.089	0.089	0.089	0
Statistics (Detects Only)	25	0.095	0.89	0.37	0.33	0.205
Statistics (All: NDs treated as DL value)	41	0.089	0.89	0.26	0.17	0.211
Statistics (All: NDs treated as DL/2 value)	41	0.0445	0.89	0.243	0.17	0.226
Statistics (Normal ROS Estimated Data)	41	-0.512	0.89	0.164	0.17	0.321
Statistics (Gamma ROS Estimated Data)	41	0	0.89	0.329	0.33	0.189
Statistics (Lognormal ROS Estimated Data)	41	0.026	0.89	0.256	0.17	0.216

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	3.259	3.037	0.113	-1.157	0.603	-0.522
Statistics (NDs = DL)	1.801	1.686	0.144	-1.649	0.779	-0.472
Statistics (NDs = DL/2)	1.13	1.063	0.215	-1.92	1.073	-0.559
Statistics (Gamma ROS Estimates)	0.939	0.887	0.351	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.739	0.918	-0.528

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.935	0.918	Data Appear Normal
Lilliefors (Detects Only)	0.178	0.177	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.803	0.941	Data Not Normal
Lilliefors (NDs = DL)	0.209	0.138	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.833	0.941	Data Not Normal
Lilliefors (NDs = DL/2)	0.2	0.138	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.988	0.941	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.0635	0.138	Data Appear Normal

Table D.2-3d
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.317	0.751	
Kolmogorov-Smirnov (Detects Only)	0.108	0.176	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	2.535	0.762	
Kolmogorov-Smirnov (NDs = DL)	0.229	0.14	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.158	0.775	
Kolmogorov-Smirnov (NDs = DL/2)	0.248	0.142	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.977	0.781	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.237	0.142	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.961	0.918	Data Appear Lognormal
Lilliefors (Detects Only)	0.132	0.177	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.829	0.941	Data Not Lognormal
Lilliefors (NDs = DL)	0.232	0.138	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.829	0.941	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.257	0.138	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.961	0.941	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.12	0.138	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Aluminum(site)

Background Data: Aluminum(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	15	28
Number of Distinct Observations	13	28
Minimum	11900	3620
Maximum	33300	20100
Mean	25663	8300
Median	26000	6705
SD	5870	4279
SE of Mean	1516	808.6

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	533
WMW Test U-Stat	413
WMW Critical Value (0.050)	319
Approximate P-Value	1.2336E-07

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Arsenic(site)

Background Data: Arsenic(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	15	28
Number of Distinct Observations	14	24
Minimum	1.035	1.5
Maximum	5.2	10.2
Mean	3.202	3.732
Median	3.4	2.75
SD	1.405	2.33
SE of Mean	0.363	0.44

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	324.5
WMW Test U-Stat	204.5
WMW Critical Value (0.050)	319
Approximate P-Value	0.561

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Barium(site)

Background Data: Barium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	15	28
Number of Non-Detect Data	0	4
Number of Detect Data	15	24
Minimum Non-Detect	N/A	0.36
Maximum Non-Detect	N/A	1
Percent Non detects	0.00%	14.29%
Minimum Detected	51	23.4
Maximum Detected	220	174
Mean of Detected Data	105.7	75.55
Median of Detected Data	99	61.85
SD of Detected Data	42.43	43.2

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	432
WMW Test U-Stat	312
WMW Critical Value (0.050)	319
Approximate P-Value	0.00485

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Beryllium(site)

Background Data: Beryllium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	15	28
Number of Non-Detect Data	0	13
Number of Detect Data	15	15
Minimum Non-Detect	N/A	0.022
Maximum Non-Detect	N/A	0.03
Percent Non detects	0.00%	46.43%
Minimum Detected	0.42	0.61
Maximum Detected	2.2	1.5
Mean of Detected Data	0.852	0.887
Median of Detected Data	0.65	0.87
SD of Detected Data	0.498	0.246

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.03 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	401
WMW Test U-Stat	281
WMW Critical Value (0.050)	319
Approximate P-Value	0.0362

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Calcium(site)

Background Data: Calcium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	15	28
Number of Distinct Observations	15	27
Minimum	372	4.6
Maximum	4440	7340
Mean	1776	983.9
Median	1530	761.5
SD	1145	1380
SE of Mean	295.6	260.8

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	441
WMW Test U-Stat	321
WMW Critical Value (0.050)	319
Approximate P-Value	0.00243

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Chromium(site)

Background Data: Chromium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	15	28
Number of Distinct Observations	15	27
Minimum	20	6.3
Maximum	1500	53.3
Mean	187.7	21.09
Median	45	22.4
SD	380.9	10.5
SE of Mean	98.35	1.985

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	486
WMW Test U-Stat	366
WMW Critical Value (0.050)	319
Approximate P-Value	3.7083E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cobalt(site)

Background Data: Cobalt(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	15	28
Number of Non-Detect Data	0	8
Number of Detect Data	15	20
Minimum Non-Detect	N/A	0.11
Maximum Non-Detect	N/A	0.75
Percent Non detects	0.00%	28.57%
Minimum Detected	1.8	5.9
Maximum Detected	41.5	45.4
Mean of Detected Data	12.1	15.95
Median of Detected Data	7	12.1
SD of Detected Data	12.47	10.07

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.75 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	322.5
WMW Test U-Stat	202.5
WMW Critical Value (0.050)	319
Approximate P-Value	0.581

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Copper(site)

Background Data: Copper(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	15	28
Number of Non-Detect Data	0	2
Number of Detect Data	15	26
Minimum Non-Detect	N/A	0.17
Maximum Non-Detect	N/A	0.17
Percent Non detects	0.00%	7.14%
Minimum Detected	4.9	2.2
Maximum Detected	110	13.6
Mean of Detected Data	27.74	6.919
Median of Detected Data	18	5.35
SD of Detected Data	30.97	3.696

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	495
WMW Test U-Stat	375
WMW Critical Value (0.050)	319
Approximate P-Value	1.3835E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Iron(site)

Background Data: Iron(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	15	28
Number of Distinct Observations	15	26
Minimum	7100	7250
Maximum	78700	63000
Mean	35590	20108
Median	36000	19750
SD	20569	11869
SE of Mean	5311	2243

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	433.5
WMW Test U-Stat	313.5
WMW Critical Value (0.050)	319
Approximate P-Value	0.00434

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Lead(site)

Background Data: Lead(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	15	28
Number of Distinct Observations	11	26
Minimum	13	8.9
Maximum	680	225
Mean	97.97	26.96
Median	20	15.15
SD	174.2	41.34
SE of Mean	44.99	7.813

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	442.5
WMW Test U-Stat	322.5
WMW Critical Value (0.050)	319
Approximate P-Value	0.00216

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Magnesium(site)

Background Data: Magnesium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	15	28
Number of Non-Detect Data	0	3
Number of Detect Data	15	25
Minimum Non-Detect	N/A	4.7
Maximum Non-Detect	N/A	5
Percent Non detects	0.00%	10.71%
Minimum Detected	710	158
Maximum Detected	2700	20400
Mean of Detected Data	1387	2498
Median of Detected Data	1400	913
SD of Detected Data	485.7	4334

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 5 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	397
WMW Test U-Stat	277
WMW Critical Value (0.050)	319
Approximate P-Value	0.0451

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Manganese(site)

Background Data: Manganese(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	15	28
Number of Distinct Observations	15	28
Minimum	85	43
Maximum	4400	2040
Mean	1008	695.9
Median	630	490
SD	1218	591.5
SE of Mean	314.6	111.8

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	348
WMW Test U-Stat	228
WMW Critical Value (0.050)	319
Approximate P-Value	0.328

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Nickel(site)

Background Data: Nickel(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	15	28
Number of Non-Detect Data	0	11
Number of Detect Data	15	17
Minimum Non-Detect	N/A	0.21
Maximum Non-Detect	N/A	1.3
Percent Non detects	0.00%	39.29%
Minimum Detected	5.5	4.6
Maximum Detected	17	18.1
Mean of Detected Data	9.757	9.935
Median of Detected Data	10	9.4
SD of Detected Data	3.47	4.294

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1.3 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	419
WMW Test U-Stat	299
WMW Critical Value (0.050)	319
Approximate P-Value	0.0121

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Potassium(site)

Background Data: Potassium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	15	28
Number of Non-Detect Data	0	6
Number of Detect Data	15	22
Minimum Non-Detect	N/A	201
Maximum Non-Detect	N/A	271
Percent Non detects	0.00%	21.43%
Minimum Detected	528	166
Maximum Detected	1700	2350
Mean of Detected Data	1011	735.4
Median of Detected Data	968	509.5
SD of Detected Data	270.6	632.6

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 271 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	446
WMW Test U-Stat	326
WMW Critical Value (0.050)	319
Approximate P-Value	0.00162

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Vanadium(site)

Background Data: Vanadium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	15	28
Number of Distinct Observations	15	27
Minimum	20	12.2
Maximum	1200	101
Mean	145.8	33.89
Median	58	33.8
SD	300.6	17.78
SE of Mean	77.61	3.36

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	415
WMW Test U-Stat	295
WMW Critical Value (0.050)	319
Approximate P-Value	0.0156

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-4a
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Zinc(site)

Background Data: Zinc(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	15	28
Number of Distinct Observations	14	28
Minimum	34	7.1
Maximum	3700	216
Mean	611.3	41.21
Median	160	29.7
SD	995.5	40.24
SE of Mean	257	7.605

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	480
WMW Test U-Stat	360
WMW Critical Value (0.050)	319
Approximate P-Value	6.9592E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Aluminum(site)

Background Data: Aluminum(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	41	79
Number of Distinct Observations	25	75
Minimum	11900	3620
Maximum	38000	47900
Mean	24648	14204
Median	25000	12100
SD	6377	9433
SE of Mean	995.9	1061

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	3606
WMW Test U-Stat	6.222
WMW Critical Value (0.050)	1.645
P-Value	2.449E-10

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Arsenic(site)

Background Data: Arsenic(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	41	79
Number of Non-Detect Data	0	3
Number of Detect Data	41	76
Minimum Non-Detect	N/A	0.09
Maximum Non-Detect	N/A	0.12
Percent Non detects	0.00%	3.80%
Minimum Detected	0.82	1.2
Maximum Detected	12	35.9
Mean of Detected Data	2.975	4.989
Median of Detected Data	2.7	3.2
SD of Detected Data	1.994	5.36

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.12 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2119
WMW Test U-Stat	-2.006
WMW Critical Value (0.050)	1.645
P-Value	0.978

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Barium(site)

Background Data: Barium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	41	79
Number of Non-Detect Data	0	16
Number of Detect Data	41	63
Minimum Non-Detect	N/A	0.36
Maximum Non-Detect	N/A	1.1
Percent Non detects	0.00%	20.25%
Minimum Detected	25	23.4
Maximum Detected	230	174
Mean of Detected Data	84.79	68.4
Median of Detected Data	73	56.7
SD of Detected Data	43.49	40.39

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1.1 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	3188
WMW Test U-Stat	3.909
WMW Critical Value (0.050)	1.645
P-Value	4.6272E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Beryllium(site)

Background Data: Beryllium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	41	79
Number of Non-Detect Data	0	39
Number of Detect Data	41	40
Minimum Non-Detect	N/A	0.022
Maximum Non-Detect	N/A	0.03
Percent Non detects	0.00%	49.37%
Minimum Detected	0.42	0.61
Maximum Detected	2.6	5.4
Mean of Detected Data	1.151	1.449
Median of Detected Data	1.1	1.1
SD of Detected Data	0.54	1.086

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.03 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	3197
WMW Test U-Stat	3.959
WMW Critical Value (0.050)	1.645
P-Value	3.7608E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cadmium(site)

Background Data: Cadmium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	41	79
Number of Non-Detect Data	17	66
Number of Detect Data	24	13
Minimum Non-Detect	0.11	0.02
Maximum Non-Detect	0.11	0.05
Percent Non detects	41.46%	83.54%
Minimum Detected	0.118	0.57
Maximum Detected	120	2.5
Mean of Detected Data	11.24	1.152
Median of Detected Data	1.7	1.1
SD of Detected Data	26.1	0.585

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.11 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	3210
WMW Test U-Stat	4.034
WMW Critical Value (0.050)	1.645
P-Value	2.7435E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Calcium(site)

Background Data: Calcium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	41	79
Number of Non-Detect Data	2	16
Number of Detect Data	39	63
Minimum Non-Detect	16.6	4.6
Maximum Non-Detect	16.6	6.7
Percent Non detects	4.88%	20.25%
Minimum Detected	57	116
Maximum Detected	4440	25700
Mean of Detected Data	1014	1392
Median of Detected Data	640	717
SD of Detected Data	1113	3322

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 16.6 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2596
WMW Test U-Stat	0.636
WMW Critical Value (0.050)	1.645
P-Value	0.262

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Chromium(site)

Background Data: Chromium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	41	79
Number of Distinct Observations	32	70
Minimum	9.3	6.3
Maximum	1500	75.8
Mean	90.51	26.86
Median	33	26
SD	238.4	12.51
SE of Mean	37.23	1.408

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	3010
WMW Test U-Stat	2.927
WMW Critical Value (0.050)	1.645
P-Value	0.00171

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cobalt(site)

Background Data: Cobalt(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	41	79
Number of Non-Detect Data	0	23
Number of Detect Data	41	56
Minimum Non-Detect	N/A	0.11
Maximum Non-Detect	N/A	0.84
Percent Non detects	0.00%	29.11%
Minimum Detected	1.8	5.9
Maximum Detected	51	130
Mean of Detected Data	14.69	22.23
Median of Detected Data	11	13.3
SD of Detected Data	11.59	23.94

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.84 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2647
WMW Test U-Stat	0.919
WMW Critical Value (0.050)	1.645
P-Value	0.179

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Copper(site)

Background Data: Copper(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	41	79
Number of Non-Detect Data	0	2
Number of Detect Data	41	77
Minimum Non-Detect	N/A	0.17
Maximum Non-Detect	N/A	0.17
Percent Non detects	0.00%	2.53%
Minimum Detected	1.4	1.6
Maximum Detected	110	38.7
Mean of Detected Data	19.4	12.25
Median of Detected Data	15	9.1
SD of Detected Data	20.1	9.397

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	3043
WMW Test U-Stat	3.11
WMW Critical Value (0.050)	1.645
P-Value	0.00093615

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

Area of Concern Data: Iron(site)

Background Data: Iron(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	41	79
Number of Distinct Observations	33	72
Minimum	7100	7250
Maximum	87000	67700
Mean	40160	26963
Median	36000	25200
SD	18896	11990
SE of Mean	2951	1349

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	118	4.664	1.658	0
Satterthwaite (Unequal Variance)	57.2	4.067	1.672	0

Pooled SD 14698.816

Conclusion with Alpha = 0.050

* Student t (Pooled) Test: Reject H0, Conclude Site > Background

* Satterthwaite Test: Reject H0, Conclude Site > Background

Test of Equality of Variances

Numerator DF	Denominator DF	F-Test Value	P-Value
40	78	2.484	0.001

Conclusion with Alpha = 0.05

* Two variances are not equal

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Lead(site)

Background Data: Lead(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	41	79
Number of Distinct Observations	27	70
Minimum	0.86	2.1
Maximum	680	256
Mean	45.63	22.04
Median	18	12
SD	110.9	39.85
SE of Mean	17.33	4.483

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2979
WMW Test U-Stat	2.756
WMW Critical Value (0.050)	1.645
P-Value	0.00293

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Magnesium(site)

Background Data: Magnesium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	41	79
Number of Non-Detect Data	0	7
Number of Detect Data	41	72
Minimum Non-Detect	N/A	3.8
Maximum Non-Detect	N/A	5
Percent Non detects	0.00%	8.86%
Minimum Detected	487	139
Maximum Detected	4280	58100
Mean of Detected Data	1291	6394
Median of Detected Data	1100	1270
SD of Detected Data	763.4	12925

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 5 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2494
WMW Test U-Stat	0.0719
WMW Critical Value (0.050)	1.645
P-Value	0.471

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Manganese(site)

Background Data: Manganese(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	41	79
Number of Distinct Observations	40	78
Minimum	79	16.7
Maximum	7700	2040
Mean	1372	471.4
Median	690	359
SD	1693	467.1
SE of Mean	264.5	52.55

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	3173
WMW Test U-Stat	3.829
WMW Critical Value (0.050)	1.645
P-Value	6.4302E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Mercury(site)

Background Data: Mercury(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	41	79
Number of Non-Detect Data	1	61
Number of Detect Data	40	18
Minimum Non-Detect	0.0075	0.019
Maximum Non-Detect	0.0075	0.06
Percent Non detects	2.44%	77.22%
Minimum Detected	0.012	0.038
Maximum Detected	0.76	1.2
Mean of Detected Data	0.091	0.187
Median of Detected Data	0.06	0.125
SD of Detected Data	0.12	0.259

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.06 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2901
WMW Test U-Stat	2.324
WMW Critical Value (0.050)	1.645
P-Value	0.0101

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Nickel(site)

Background Data: Nickel(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	41	79
Number of Non-Detect Data	0	18
Number of Detect Data	41	61
Minimum Non-Detect	N/A	0.21
Maximum Non-Detect	N/A	1.4
Percent Non detects	0.00%	22.78%
Minimum Detected	4.9	4.6
Maximum Detected	28	94.2
Mean of Detected Data	10.67	17.95
Median of Detected Data	10	13.2
SD of Detected Data	4.429	15.68

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1.4 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2531
WMW Test U-Stat	0.277
WMW Critical Value (0.050)	1.645
P-Value	0.391

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Potassium(site)

Background Data: Potassium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	41	79
Number of Non-Detect Data	0	12
Number of Detect Data	41	67
Minimum Non-Detect	N/A	201
Maximum Non-Detect	N/A	271
Percent Non detects	0.00%	15.19%
Minimum Detected	528	123
Maximum Detected	3020	10900
Mean of Detected Data	1127	1690
Median of Detected Data	1000	694
SD of Detected Data	425.5	2232

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 271 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2944
WMW Test U-Stat	2.562
WMW Critical Value (0.050)	1.645
P-Value	0.0052

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Thallium(site)

Background Data: Thallium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	41	79
Number of Non-Detect Data	0	64
Number of Detect Data	41	15
Minimum Non-Detect	N/A	0.13
Maximum Non-Detect	N/A	0.45
Percent Non detects	0.00%	81.01%
Minimum Detected	0.041	1.3
Maximum Detected	0.77	5
Mean of Detected Data	0.237	2.527
Median of Detected Data	0.23	2.2
SD of Detected Data	0.123	0.932

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.45 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2237
WMW Test U-Stat	-1.35
WMW Critical Value (0.050)	1.645
P-Value	0.912

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Vanadium(site)

Background Data: Vanadium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	41	79
Number of Distinct Observations	31	76
Minimum	11	12.2
Maximum	1200	114
Mean	73.89	45.84
Median	29	41.4
SD	187.2	20.38
SE of Mean	29.23	2.293

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2066
WMW Test U-Stat	-2.296
WMW Critical Value (0.050)	1.645
P-Value	0.989

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-4b
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Zinc(site)

Background Data: Zinc(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	41	79
Number of Distinct Observations	35	76
Minimum	9.3	4.7
Maximum	3700	598
Mean	256.1	54.94
Median	40	30.2
SD	650.6	87.15
SE of Mean	101.6	9.805

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	3048
WMW Test U-Stat	3.135
WMW Critical Value (0.050)	1.645
P-Value	0.00086023

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

APPENDIX E

HUMAN HEALTH RISK ASSESSMENT

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APPENDIX E.1

SWMU 57 HHRA – RAGS D TABLES

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TABLE E.1-1
Selection of Exposure Pathways
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil	Surface Soil	Surface Soil	Maintenance Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
						Dermal Absorption	Quant	Receptor could come into contact with surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
		Air	Ambient Air Above Surface Soil (Particulates) [2]	Maintenance Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil. [2]
	Subsurface Soil	Subsurface Soil	Subsurface Soil	Maintenance Worker	Adult	Ingestion	None	Receptor is not likely to ingest subsurface soil from the site since maintenance does not include excavation.
						Dermal Absorption	None	Receptor is not likely to come into contact with subsurface soil from the site since maintenance does not include excavation.
		Air	Ambient Air Above Subsurface Soil (Particulates) [2]	Maintenance Worker	Adult	Inhalation	None	Receptor is not likely to inhale particulates from ambient air above the subsurface soil since maintenance activities do not include excavation. [2]
	Groundwater [1]	Groundwater	Groundwater	Maintenance Worker	Adult	Ingestion	None	Receptor is not likely to ingest groundwater from the site during maintenance activities.
						Dermal Absorption	None	Receptor is not likely to come into contact with groundwater from the site during maintenance activities.
		Air	Upward Migration of Vapors from Groundwater (Outdoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is not like to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
			Upward Migration of Vapors from Groundwater (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors.
			Vapors while Showering	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
Future	Surface Soil	Surface Soil	Surface Soil	Construction Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil from the site during construction activities.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil from the site during construction activities.
				Commerical/Industrial Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil while working on site.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil while working on site.
				Resident	Child	Ingestion	Quant	Receptor could ingest surface soil while living on site.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil while living on site.
					Adult	Ingestion	Quant	Receptor could ingest surface soil while living on site.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil while living on site.
					Lifetime	Ingestion	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to surface soil. The non-cancer hazard evaluations are treated separately for child and adult resident.
						Dermal Absorption	Quant	
			Ambient Air Above Surface Soil (Particulates) [2]	Construction Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil. [2]
				Commerical/Industrial Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while working on site. [2]
				Resident	Child	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while living on site. [2]
					Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while living on site. [2]
					Lifetime	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to surface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [2]
		Air	Upward Migration of Vapors from Soil (Indoors) [2]	Construction Worker	Adult	Inhalation	None	Receptor assumed to be outdoors.
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into building. [2]
				Resident	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [2]
					Child	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [2]
					Lifetime	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [2]

TABLE E.1-1
Selection of Exposure Pathways
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Cont.	Subsurface Soil	Subsurface Soil	Subsurface Soil	Construction Worker	Adult	Ingestion	Quant	Receptor could ingest subsurface soil from the site while during construction activities.
						Dermal Absorption	Quant	Receptor could come into contact with subsurface soil from the site during construction activities.
				Commerical/Industrial Worker	Adult	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction of a commercial/industrial facility.
						Dermal Absorption	Quant	Receptor could come into contact with subsurface soil when mixed with surface soil from construction of a commercial/industrial facility.
				Resident	Child	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction of a residence.
						Dermal Absorption	Quant	Receptor could come into contact with subsurface soil when mixed with surface soil from construction of a residence.
					Adult	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction of a residence.
						Dermal Absorption	Quant	Receptor could come into contact with subsurface soil when mixed with surface soil from construction of a residence.
					Lifetime	Ingestion	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to subsurface soil. The non-cancer hazard evaluations are treated separately for child and adult resident.
						Dermal Absorption	Quant	
		Air	Ambient Air Above Subsurface Soil (Particulates) [2]	Construction Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil during construction activities. [2]
				Commerical/Industrial Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction of a commercial/industrial facility. [2]
				Resident	Child	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction of a residence. [2]
					Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction of a residence. [2]
					Lifetime	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to subsurface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [2]
			Upward Migration of Vapors from Soil (Indoors) [2]	Construction Worker	Adult	Inhalation	None	Receptor assumed to be outdoors.
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into building. [2]
				Resident	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [2]
					Child	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [2]
					Lifetime	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. (2)

TABLE E.1-1
Selection of Exposure Pathways
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Cont.	Groundwater[1]	Groundwater	Groundwater	Construction Worker	Adult	Ingestion	Quant	Due to the depth to groundwater (approximately 21.5-35.5 ft bgs), the receptor is not likely to ingest groundwater during excavation activities.
						Dermal Absorption	Quant	Due to the depth to groundwater (approximately 21.5-35.5 ft bgs), the receptor is not likely to contact groundwater during excavation activities.
				Commercial/Industrial Worker	Adult	Ingestion	Quant	Receptor could ingest groundwater used as a water supply.
						Dermal Absorption	Quant	Receptor could come into contact with groundwater used as a water supply for industrial process.
				Resident	Adult	Ingestion	Quant	Receptor could ingest groundwater used as a water supply.
						Dermal Absorption	Quant	Receptor could come into contact with groundwater used as a water supply.
					Child	Ingestion	Quant	Receptor could ingest groundwater used as a water supply.
						Dermal Absorption	Quant	Receptor could come into contact with groundwater used as a water supply.
					Child/Adult	Ingestion	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.
						Dermal Absorption	Quant	
		Air	Upward Migration of Vapors from Groundwater (Outdoors)	Construction Worker	Adult	Inhalation	Quant	Receptor could inhale VOCs that migrated upward from groundwater to ambient air during excavation activities.
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
				Resident	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
					Child	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
					Lifetime	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
			Upward Migration of Vapors from Groundwater (Indoors)	Construction Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors.
				Commercial/Industrial Worker	Adult	Inhalation	Quant	Receptor could inhale VOCs from groundwater via vapor intrusion into building.
				Resident	Adult	Inhalation	Quant	Receptor could inhale VOCs from groundwater via vapor intrusion into residence.
					Child	Inhalation	Quant	Receptor could inhale VOCs from groundwater via vapor intrusion into residence.
					Lifetime	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.
			Vapors while Showering	Construction Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
				Resident	Adult	Inhalation	Quant	Receptor could inhale vapors from groundwater while showering.
					Child	Inhalation	None	Receptor is assumed not to shower.
					Lifetime	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident. For the vapors while showering pathway, the child resident is assumed not to shower; therefore, the cancer risk estimate for the lifetime resident is equivalent to that of the adult resident.

Notes:
[1] Groundwater from the surface aquifer is not currently used at the sites for potable or non-potable water supply.
[2] VOCs not identified as COPC for soil; therefore, vapor inhalation pathway not assessed quantitatively.

Table E.1-2.1
COPC Determination - Surface Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Surface Soil

Exposure point	CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Screening Toxicity Value (N/C)		Potential ARAR/TBC Value		Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Surface Soil		**TAL Metals**														
	7429-90-5	Aluminum	11,900	33,300	mg/kg	57SB4A2	15/15	1.83 - 210	33,300	7,821	N	102,200	N	IND	Y	**ARES**
	7440-36-0	Antimony	0.305	340	mg/kg	57SB7A	15/15	0.042 - 0.42	340	3.13	N	40.88	N	IND	Y	***ARES/IND***
	7440-38-2	Arsenic	1.035	5.2	mg/kg	57SB3A DUP AVG	15/15	0.0232 - 0.14	5.2	0.426	C	1.91	C	IND	Y	***ARES/IND***
	7440-39-3	Barium	51	220	mg/kg	57SB7A	15/15	0.106 - 0.17	220	1,564	N	20,440	N	IND	N	BSL
	7440-41-7	Beryllium	0.42	2.2	mg/kg	57SB8A	15/15	0.021 - 0.0391	2.2	15.64	N	204.4	N	IND	N	BSL
	7440-43-9	Cadmium	0.1175	120	mg/kg	57SB7A	14/15	0.11 - 0.182	120	3.911	N	51.1	N	IND	Y	***ARES/IND***
	7440-70-2	Calcium	372	4,440	mg/kg	57SB1A	15/15	4.2 - 16.6	4,440	--	--	1,095,000	--	RDA	N	BSL
	7440-47-3	Chromium [1]	20	1500	mg/kg	57SB7A	15/15	0.72 - 0.912	1,500	23.46	N	306.6	N	IND	Y	***ARES/IND***
	7440-48-4	Cobalt	1.8	41.5	mg/kg	57SB3A DUP AVG	15/15	0.208 - 0.37	41.5	--	--	--	--	--	Y	NSV
	7440-50-8	Copper	4.9	110	mg/kg	57SB7A	15/15	0.044 - 0.368	110	312.9	N	4,088	N	IND	N	BSL
	7439-89-6	Iron	7,100	78,700	mg/kg	57SB4A	15/15	0.48 - 480	78,700	5,475	N	71,540	N	IND	Y	***ARES/IND***
	7439-92-1	Lead [2]	13	680	mg/kg	57SB7A	15/15	0.0218 - 0.9	680	400	--	750	--	USEPA	Y	**ARES**
	7439-95-4	Magnesium	710	2,700	mg/kg	57SB1A	15/15	3.21 - 5	2,700	--	--	156,400	--	RDA	N	BSL
	7439-96-5	Manganese	85	4400	mg/kg	57SB8A	15/15	0.16 - 16	4,400	156.4	N	2,044	N	IND	Y	***ARES/IND***
	7439-97-6	Mercury [3]	0.041	0.76	mg/kg	57SB9A	15/15	0.0075 - 0.0077	0.76	2.35	--	30.66	--	IND	N	BSL
	7440-02-0	Nickel	5.5	17	mg/kg	57SB5A	15/15	0.0356 - 0.071	17	156.4	N	2,044	N	IND	N	BSL
	7440-09-7	Potassium	528	1,700	mg/kg	57SB5A	15/15	5 - 5.3	1,700	--	--	2,607,000	--	RDA	N	BSL
	7782-49-2	Selenium	0.14	0.89	mg/kg	57SB6A	10/15	0.0502 - 0.18	0.89	39.11	N	511	N	IND	N	BSL
	7440-22-4	Silver	0.023	0.2	mg/kg	57SB7A	15/15	0.0044 - 0.013	0.2	39.11	N	511	N	IND	N	BSL
	7440-23-5	Sodium	33	520	mg/kg	57SB8A	15/15	8.92 - 66	520	--	--	625,700	--	RDA	N	BSL
	7440-28-0	Thallium	0.17	0.34	mg/kg	57SB5A	15/15	0.0049 - 0.027	0.34	0.548	N	7.154	N	IND	N	BSL
	7440-62-2	Vanadium	20	1200	mg/kg	57SB7A	15/15	0.034 - 1.4	1,200	7.821	N	102.2	N	IND	Y	***ARES/IND***
	7440-66-6	Zinc	34	3700	mg/kg	57SB7A	15/15	0.517 - 1	3,700	2,346	N	30,660	N	IND	Y	**ARES**
		Pesticides/PCBs (ug/kg)														
	60-57-1	Dieldrin	5.4E-03	5.4E-03	mg/kg	57SB8A	1/5	0.000464 - 0.0012	5.4E-03	4.0E-02	C	1.8E-01	C	IND	N	BSL
	33213-65-9	Endosulfan II [4]	1.4E-01	1.4E-01	mg/kg	57SB6A	1/5	0.000321 - 0.0023	1.4E-01	4.7E+01	N	6.1E+02	N	IND	N	BSL
	72-20-8	Endrin	2.7E-03	2.7E-03	mg/kg	57SB8A	1/5	0.000447 - 0.0014	2.7E-03	2.3E+00	N	3.1E+01	N	IND	N	BSL
	1024-57-3	Heptachlor epoxide	9.6E-03	9.6E-03	mg/kg	57SB5A	1/5	0.00056 - 0.0011	9.6E-03	7.0E-02	C	3.1E-01	C	IND	N	BSL
	11097-69-1	Aroclor 1254 [5]	1.2E-02	2.0E+00	mg/kg	57SB6A	5/5	0.0042 - 0.012	2.0E+00	1.6E-01	N	1.4E+00	C	IND	Y	***ARES/IND***
	11096-82-5	Aroclor 1260	7.3E-02	2.0E+00	mg/kg	57SB6A	4/5	0.0098 - 0.043	2.0E+00	3.2E-01	C	1.4E+00	C	IND	Y	***ARES/IND***
		TCL VOCs (ug/kg)														
	78-93-3	2-Butanone	5.3E-03	3.0E-02	mg/kg	57SB2A	9/15	0.0027 - 0.021	3.0E-02	4.7E+03	N	6.1E+04	N	IND	N	BSL
	67-64-1	Acetone	3.4E-02	1.9E-01	mg/kg	57SB6A	15/15	0.0048 - 0.076	1.9E-01	7.0E+03	N	9.2E+04	N	IND	N	BSL
	71-43-2	Benzene	2.4E-04	2.4E-04	mg/kg	57SB11A DUP AVG	1/15	0.00014 - 0.0075	2.4E-04	1.2E+01	C	5.2E+01	C	IND	N	BSL
	75-15-0	Carbon disulfide	6.4E-04	5.2E-03	mg/kg	57SB5A	4/15	0.0003 - 0.018	5.2E-03	7.8E+02	N	1.0E+04	N	IND	N	BSL
	74-87-3	Chloromethane	1.8E-02	1.9E-02	mg/kg	57SB9A	2/15	0.00028 - 0.0038	1.9E-02	--	--	--	--	--	Y	NSV
	100-41-4	Ethylbenzene	4.7E-04	4.7E-04	mg/kg	57SB3A DUP AVG	1/15	0.00014 - 0.0084	4.7E-04	7.8E+02	N	1.0E+04	N	IND	N	BSL
	79-20-9	Methyl acetate	4.1E-03	9.5E-02	mg/kg	57SB18A	9/15	0.00094 - 0.011	9.5E-02	7.8E+03	N	1.0E+05	N	IND	N	BSL
	75-09-2	Methylene chloride	3.6E-03	2.4E-02	mg/kg	57SB9A	5/15	0.00326 - 0.011	2.4E-02	8.5E+01	C	3.8E+02	C	IND	N	BSL
	108-88-3	Toluene	2.0E-03	2.0E-03	mg/kg	57SB3A DUP AVG	1/15	0.00045 - 0.0046	2.0E-03	6.3E+02	N	8.2E+03	N	IND	N	BSL
	79-01-6	Trichloroethene	1.8E-03	1.8E-03	mg/kg	57SB3A DUP AVG	1/15	0.00063 - 0.011	1.8E-03	1.6E+00	C	7.2E+00	C	IND	N	BSL
	1330-20-7	Xylenes (total)	6.2E-03	6.2E-03	mg/kg	57SB7A	1/15	0.000488 - 0.023	6.2E-03	1.6E+03	N	2.0E+04	N	IND	N	BSL
		TCL SVOCs (ug/kg)														
	92-52-4	1,1'-Biphenyl	9.3E-04	9.3E-04	mg/kg	57SB8A	1/9	0.00062 - 0.00394	9.3E-04	3.9E+02	N	5.1E+03	N	IND	N	BSL
	91-57-6	2-Methylnaphthalene	9.0E-04	9.0E-03	mg/kg	57SB3A DUP AVG	5/9	0.00065 - 0.00438	9.0E-03	3.1E+01	N	4.1E+02	N	IND	N	BSL
	59-50-7	4-Chloro-3-Methylphenol [6]	1.7E-02	4.2E-02	mg/kg	57SB3A DUP AVG	5/9	0.0024 - 0.00834	4.2E-02	3.9E+05	N	5.1E+06	N	IND	N	BSL
	83-32-9	Acenaphthene	9.0E-04	1.2E-02	mg/kg	57SB6A	3/9	0.00054 - 0.00275	1.2E-02	4.7E+02	N	6.1E+03	N	IND	N	BSL
	208-96-8	Acenaphthylene [7]	2.0E-03	6.5E-03	mg/kg	57SB3A DUP AVG	2/9	0.00081 - 0.00242	6.5E-03	2.3E+02	N	3.1E+03	N	IND	N	BSL
	98-86-2	Acetophenone	5.6E-02	5.6E-02	mg/kg	57SB3A DUP AVG	1/9	0.00228 - 0.018	5.6E-02	7.8E+02	N	1.0E+04	N	IND	N	BSL
	120-12-7	Anthracene	6.0E-03	2.0E-02	mg/kg	57SB6A	2/9	0.00058 - 0.0088	2.0E-02	2.3E+03	N	3.1E+04	N	IND	N	BSL
	56-55-3	Benzo(a)anthracene	9.0E-04	4.2E-02	mg/kg	57SB6A	4/9	0.00073 - 0.0213	4.2E-02	2.2E-01	C	3.9E+00	C	IND	N	BSL
	50-32-8	Benzo(a)pyrene	8.9E-03	3.1E-02	mg/kg	57SB6A	5/9	0.0014 - 0.00914	3.1E-02	2.2E-02	C	3.9E-01	C	IND	Y	**ARES**
	205-99-2	Benzo(b)fluoranthene	1.9E-03	5.5E-02	mg/kg	57SB2A	6/9	0.0012 - 0.0156	5.5E-02	2.2E-01	C	3.9E+00	C	IND	N	BSL
	191-24-2	Benzo(g,h,i)perylene [7]	8.0E-03	1.5E-02	mg/kg	57SB6A	3/9	0.0031 - 0.014	1.5E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
	207-08-9	Benzo(k)fluoranthene	7.1E-03	1.9E-02	mg/kg	57SB6A	2/9	0.00097 - 0.0214	1.9E-02	2.2E+00	C	3.9E+01	C	IND	N	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	2.1E-02	5.6E-01	mg/kg	57SB6A	9/9	0.0018 - 0.0035	5.6E-01	4.6E+01	C	2.0E+02	C	IND	N	BSL
	85-68-7	Butyl Benzyl Phthalate	4.4E-02	4.4E-02	mg/kg	57SB2A	1/9	0.0029 - 0.00717	4.4E-02	1.6E+03	N	2.0E+04	N	IND	N	BSL
	105-60-2	Caprolactam	1.5E-02	3.4E-02	mg/kg	57SB3A DUP AVG	2/9	0.00766 - 0.061	3.4E-02	3.9E+03	N	5.1E+04	N	IND	N	BSL
	218-01-9	Chrysene	9.0E-04	4.0E-02	mg/kg	57SB6A	5/9	0.00065 - 0.0163	4.0E-02	2.2E+01	C	3.9E+02	C	IND	N	BSL
	84-74-2	Di-n-butylphthalate	1.5E-02	3.3E-01	mg/kg	57SB1A	9/9	0.0016 - 0.00611	3.3E-01	7.8E+02	N	1.0E+04	N	IND	N	BSL
	53-70-3	Dibenz(a,h)anthracene	2.7E-03	3.5E-03	mg/kg	57SB6A	2/9	0.00073 - 0.00944	3.5E-03	2.2E-02	C	3.9E-01	C	IND	N	BSL

Table E.1-2.1
COPC Determination - Surface Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Surface Soil

Exposure point	CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Screening Toxicity Value (N/C)		Potential ARAR/TBC Value		Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
	132-64-9	Dibenzofuran	5.8E-03	5.8E-03	mg/kg	57SB6A	1/9	0.00036 - 0.00506	5.8E-03	7.8E+00	N	1.0E+02	N	IND	N	BSL
	84-66-2	Diethylphthalate	1.8E-03	2.0E-02	mg/kg	57SB3A DUP AVG	8/9	0.0005 - 0.00304	2.0E-02	6.3E+03	N	8.2E+04	N	IND	N	BSL
	206-44-0	Fluoranthene	1.2E-02	9.9E-02	mg/kg	57SB6A	5/9	0.00282 - 0.01	9.9E-02	3.1E+02	N	4.1E+03	N	IND	N	BSL
	86-73-7	Fluorene	2.0E-03	1.0E-02	mg/kg	57SB6A	3/9	0.00038 - 0.00269	1.0E-02	3.1E+02	N	4.1E+03	N	IND	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	2.7E-03	4.2E-02	mg/kg	57SB2A	5/9	0.00095 - 0.00627	4.2E-02	2.2E-01	C	3.9E+00	C	IND	N	BSL
	91-20-3	Naphthalene	4.5E-04	7.0E-03	mg/kg	57SB6A	5/9	0.00032 - 0.00442	7.0E-03	1.6E+02	N	2.0E+03	N	IND	N	BSL
	85-01-8	Phenanthrene[7]	1.3E-02	9.7E-02	mg/kg	57SB6A	4/9	0.00276 - 0.0097	9.7E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
	108-95-2	Phenol	1.4E-03	1.4E-03	mg/kg	57SB8A	1/9	0.00095 - 0.00634	1.4E-03	2.3E+03	N	3.1E+04	N	IND	N	BSL
	129-00-0	Pyrene	1.8E-03	8.1E-02	mg/kg	57SB6A	7/9	0.00043 - 0.00237	8.1E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
		Cyanide (mg/kg)														
	57-12-5	Cyanide	5.0E-02	1.7E-01	mg/kg	57SB3A DUP AVG	4/5	0.0356 - 0.0356	1.7E-01	1.6E+02	N	2.0E+03	N	IND	N	BSL

Notes:

COPC = Chemical of Potential Concern
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
mg/kg = Milligram Per Kilogram
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
N/C = Noncarcinogenic/Carcinogenic per EPA RBC Table (October 2007)
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Endosulfan soil RBC value used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol soil RBC value used
[7] = Pyrene RBC value was used

ARAR = Applicable, Relevant, and Appropriate Requirement
USEPA = U.S. Environmental Protection Agency
TBC = To-Be-Considered
RDA = Recommended Daily Allowance
IND = Adjusted Industrial RBC
AL = USEPA Action Level

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table E.1-2.2
COPC Determination - Total Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure point	CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Total Samples Analyzed	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Screening Toxicity Value (N/C)		Potential ARAR/TBC Value		Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Total Soil		**TAL Metals**															
	7429-90-5	Aluminum	11,900	38,000	mg/kg	57SB7AB	41	41/41	1.83 - 210	38,000	7,821	N	102,200	N	IND	Y	**ARES**
	7440-36-0	Antimony	0.045	340	mg/kg	57SB7A	41	40/41	0.042 - 1.3	340	3.13	N	40.88	N	IND	Y	***ARES/IND***
	7440-38-2	Arsenic	0.82	12	mg/kg	57SB3B	41	41/41	0.0232 - 0.14	12	0.426	C	1.91	C	IND	Y	***ARES/IND***
	7440-39-3	Barium	25	230	mg/kg	57SB8B	41	41/41	0.106 - 0.17	230	1,564	N	20,440	N	IND	N	BSL
	7440-41-7	Beryllium	0.42	2.6	mg/kg	57SB8C	41	41/41	0.021 - 0.0391	2.6	15.6	N	204.4	N	IND	N	BSL
	7440-43-9	Cadmium	0.1175	120	mg/kg	57SB7A	41	24/41	0.11 - 0.182	120	3.91	N	51.1	N	IND	Y	***ARES/IND***
	7440-70-2	Calcium	57	4,440	mg/kg	57SB1A	41	39/41	4.2 - 16.6	4,440	--	--	1,095,000	--	RDA	N	BSL
	7440-47-3	Chromium [1]	9.3	1500	mg/kg	57SB7A	41	41/41	0.72 - 4.56	1500	23.46	N	306.6	N	IND	Y	***ARES/IND***
	7440-48-4	Cobalt	1.8	51	mg/kg	57SB6AB	41	41/41	0.208 - 0.37	51	--	--	--	--	--	Y	NSV
	7440-50-8	Copper	1.4	110	mg/kg	57SB7A	41	41/41	0.044 - 0.368	110	312.9	N	4,088	N	IND	N	BSL
	7439-89-6	Iron	7,100	87,000	mg/kg	57SB4B	41	41/41	0.48 - 480	87,000	5,475	N	71,540	N	IND	Y	***ARES/IND***
	7439-92-1	Lead [2]	0.86	680	mg/kg	57SB7A	41	41/41	0.0218 - 1.09	680	400	--	750	--	USEPA	Y	**ARES**
	7439-95-4	Magnesium	487	4,280	mg/kg	57SB3B	41	41/41	3.21 - 5	4,280	--	--	156,400	--	RDA	N	BSL
	7439-96-5	Manganese	79	7700	mg/kg	57SB6AB	41	41/41	0.16 - 16	7700	156.4	N	2,044	N	IND	Y	***ARES/IND***
	7439-97-6	Mercury [3]	0.012	0.76	mg/kg	57SB9A	41	40/41	0.0075 - 0.0077	0.76	2.35	--	30.66	--	IND	N	BSL
	7440-02-0	Nickel	4.9	28.00	mg/kg	57SB3B	41	41/41	0.0356 - 0.071	28	156.4	N	2,044	N	IND	N	BSL
	7440-09-7	Potassium	528	3,020	mg/kg	57SB3B	41	41/41	5 - 5.3	3,020	--	--	2,607,000	--	RDA	N	BSL
	7782-49-2	Selenium	0.0698	0.89	mg/kg	57SB6A	41	25/41	0.0502 - 0.18	0.89	39.11	N	511	N	IND	N	BSL
	7440-22-4	Silver	0.014	0.2	mg/kg	57SB7A	41	41/41	0.0044 - 0.013	0.2	39.11	N	511	N	IND	N	BSL
	7440-23-5	Sodium	33	1,100	mg/kg	57SB8AB	41	41/41	8.92 - 66	1,100	--	--	625,700	--	RDA	N	BSL
	7440-28-0	Thallium	0.041	0.77	mg/kg	57SB6AB	41	41/41	0.0049 - 0.027	0.77	0.548	N	7.154	N	IND	Y	**ARES**
	7440-62-2	Vanadium	11	1200	mg/kg	57SB7A	41	41/41	0.034 - 1.4	1200	7.821	N	102.2	N	IND	Y	***ARES/IND***
	7440-66-6	Zinc	9.3	3700	mg/kg	57SB7A	41	41/41	0.517 - 5.17	3700	2,346	N	30,660	N	IND	Y	**ARES**
		Pesticides/PCBs (ug/kg)															
	60-57-1	Dieldrin	1.6E-03	1.3E-02	mg/kg	57SB6B	20	5/20	0.000464 - 0.0016	1.3E-02	4.0E-02	C	1.8E-01	C	IND	N	BSL
	33213-65-9	Endosulfan II [4]	1.4E-01	1.4E-01	mg/kg	57SB6A	20	1/20	0.000321 - 0.003	1.4E-01	4.7E+01	N	6.1E+02	N	IND	N	BSL
	72-20-8	Endrin	2.7E-03	6.2E-03	mg/kg	57SB6B	20	2/20	0.000447 - 0.0019	6.2E-03	2.3E+00	N	3.1E+01	N	IND	N	BSL
	1024-57-3	Heptachlor epoxide	3.4E-03	9.6E-03	mg/kg	57SB5A	20	2/20	0.00051 - 0.0014	9.6E-03	7.0E-02	C	3.1E-01	C	IND	N	BSL
	11097-69-1	Aroclor 1254 [5]	1.2E-02	2.0E+00	mg/kg	57SB6A	20	11/20	0.0042 - 0.031	2.0E+00	1.6E-01	N	1.4E+00	C	IND	Y	***ARES/IND***
	11096-82-5	Aroclor 1260	6.0E-02	2.0E+00	mg/kg	57SB6A	20	6/20	0.0098 - 0.11	2.0E+00	3.2E-01	C	1.4E+00	C	IND	Y	***ARES/IND***
		TCL VOCs (ug/kg)															
	78-93-3	2-Butanone	5.3E-03	3.0E-02	mg/kg	57SB2A	41	16/41	0.0027 - 0.021	3.0E-02	4.7E+03	N	6.1E+04	N	IND	N	BSL
	67-64-1	Acetone	8.2E-03	2.3E-01	mg/kg	57SB8B	41	40/41	0.0048 - 0.076	2.3E-01	7.0E+03	N	9.2E+04	N	IND	N	BSL
	71-43-2	Benzene	1.9E-04	2.5E-04	mg/kg	57SB5C	41	3/41	0.00014 - 0.0075	2.5E-04	1.2E+01	C	5.2E+01	C	IND	N	BSL
	75-15-0	Carbon disulfide	5.4E-04	5.2E-03	mg/kg	57SB5A	41	13/41	0.0003 - 0.018	5.2E-03	7.8E+02	N	1.0E+04	N	IND	N	BSL
	67-66-3	Chloroform	1.2E-03	1.7E-02	mg/kg	57SB1B	41	2/41	0.00017 - 0.0039	1.7E-02	7.8E+01	N	1.0E+03	N	IND	N	BSL
	74-87-3	Chloromethane	1.8E-02	1.9E-02	mg/kg	57SB9A	41	2/41	0.00028 - 0.0038	1.9E-02	--	--	--	--	--	Y	NSV
	100-41-4	Ethylbenzene	4.7E-04	4.7E-04	mg/kg	57SB3A DUP AVG	41	1/41	0.00014 - 0.0084	4.7E-04	7.8E+02	N	1.0E+04	N	IND	N	BSL
	79-20-9	Methyl acetate	1.8E-03	9.5E-02	mg/kg	57SB18A	41	26/41	0.00094 - 0.011	9.5E-02	7.8E+03	N	1.0E+05	N	IND	N	BSL
	75-09-2	Methylene chloride	3.6E-03	2.4E-02	mg/kg	57SB9A	41	10/41	0.00326 - 0.014	2.4E-02	8.5E+01	C	3.8E+02	C	IND	N	BSL
	127-18-4	Tetrachloroethene	5.9E-04	5.9E-04	mg/kg	57SB5AB DUP AVG	41	1/41	0.0005 - 0.0095	5.9E-04	1.2E+00	C	5.3E+00	C	IND	N	BSL
	108-88-3	Toluene	2.0E-03	2.0E-03	mg/kg	57SB3A DUP AVG	41	1/41	0.00045 - 0.0046	2.0E-03	6.3E+02	N	8.2E+03	N	IND	N	BSL
	79-01-6	Trichloroethene	1.8E-03	3.7E-03	mg/kg	57SB5AB DUP AVG	41	2/41	0.00063 - 0.011	3.7E-03	1.6E+00	C	7.2E+00	C	IND	N	BSL
	1330-20-7	Xylenes (total)	6.2E-03	6.2E-03	mg/kg	57SB7A	41	1/41	0.000488 - 0.023	6.2E-03	1.6E+03	N	2.0E+04	N	IND	N	BSL
		TCL SVOCs (ug/kg)															
	92-52-4	1,1'-Biphenyl	6.0E-04	1.4E-03	mg/kg	57SB8B	27	5/27	0.00057 - 0.00394	1.4E-03	3.9E+02	N	5.1E+03	N	IND	N	BSL
	91-57-6	2-Methylnaphthalene	8.1E-04	9.0E-03	mg/kg	57SB3A DUP AVG	27	12/27	0.00059 - 0.00438	9.0E-03	3.1E+01	N	4.1E+02	N	IND	N	BSL
	59-50-7	4-Chloro-3-Methylphenol [6]	1.6E-02	4.2E-02	mg/kg	57SB3A DUP AVG	27	8/27	0.0022 - 0.00834	4.2E-02	3.9E+02	N	5.1E+03	N	IND	N	BSL
	83-32-9	Acenaphthene	5.6E-04	1.2E-02	mg/kg	57SB6A	27	8/27	0.0005 - 0.00275	1.2E-02	4.7E+02	N	6.1E+03	N	IND	N	BSL
	208-96-8	Acenaphthylene [7]	2.0E-03	6.5E-03	mg/kg	57SB3A DUP AVG	27	2/27	0.00075 - 0.00242	6.5E-03	2.3E+02	N	3.1E+03	N	IND	N	BSL
	98-86-2	Acetophenone	5.6E-02	5.6E-02	mg/kg	57SB3A DUP AVG	27	1/27	0.00228 - 0.023	5.6E-02	7.8E+02	N	1.0E+04	N	IND	N	BSL
	120-12-7	Anthracene	6.0E-03	2.0E-02	mg/kg	57SB6A	27	2/27	0.00053 - 0.0088	2.0E-02	2.3E+03	N	3.1E+04	N	IND	N	BSL
	56-55-3	Benzo(a)anthracene	8.6E-04	4.2E-02	mg/kg	57SB6A	27	8/27	0.00067 - 0.0213	4.2E-02	2.2E-01	C	3.9E+00	C	IND	N	BSL
	50-32-8	Benzo(a)pyrene	1.8E-03	3.1E-02	mg/kg	57SB6A	27	7/27	0.0013 - 0.00914	3.1E-02	2.2E-02	C	3.9E-01	C	IND	Y	**ARES**
	205-99-2	Benzo(b)fluoranthene	1.9E-03	5.5E-02	mg/kg	57SB2A	27	7/27	0.0011 - 0.0156	5.5E-02	2.2E-01	C	3.9E+00	C	IND	N	BSL
	191-24-2	Benzo(g,h,i)perylene [7]	8.0E-03	1.5E-02	mg/kg	57SB6A	27	3/27	0.0028 - 0.014	1.5E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
	207-08-9	Benzo(k)fluoranthene	7.1E-03	1.9E-02	mg/kg	57SB6A	27	2/27	0.00089 - 0.0214	1.9E-02	2.2E+00	C	3.9E+01	C	IND	N	BSL
	117-81-7	Bis(2-ethylhexyl)phthalate	1.7E-02	5.6E-01	mg/kg	57SB6A	27	27/27	0.0016 - 0.0045	5.6E-01	4.6E+01	C	2.0E+02	C	IND	N	BSL
	85-68-7	Butyl Benzyl Phthalate	3.0E-03	4.4E-02	mg/kg	57SB2A	27	9/27	0.0026 - 0.0073	4.4E-02	1.6E+03	N	2.0E+04	N	IND	N	BSL
	105-60-2	Caprolactam	1.1E-02	3.4E-02	mg/kg	57SB3A DUP AVG	27	3/27	0.00766 - 0.08	3.4E-02	3.9E+03	N	5.1E+04	N	IND	N	BSL
	218-01-9	Chrysene	8.1E-04	4.0E-02	mg/kg	57SB6A	27	9/27	0.00059 - 0.0163	4.0E-02	2.2E+01	C	3.9E+02	C	IND	N	BSL

Table E.1-2.2
COPC Determination - Total Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure point	CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Total Samples Analyzed	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Screening Toxicity Value (N/C)		Potential ARAR/TBC Value		Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
	84-74-2	Di-n-butylphthalate	9.0E-03	4.3E-01	mg/kg	57SB1B	27	27/27	0.0015 - 0.00611	4.3E-01	7.8E+02	N	1.0E+04	N	IND	N	BSL
	53-70-3	Dibenz(a,h)anthracene	2.7E-03	3.5E-03	mg/kg	57SB6A	27	2/27	0.00067 - 0.00944	3.5E-03	2.2E-02	C	3.9E-01	C	IND	N	BSL
	132-64-9	Dibenzofuran	5.8E-03	5.8E-03	mg/kg	57SB6A	27	1/27	0.00033 - 0.00506	5.8E-03	7.8E+00	N	1.0E+02	N	IND	N	BSL
	84-66-2	Diethylphthalate	5.5E-04	2.0E-02	mg/kg	57SB3A DUP AVG	27	19/27	0.00046 - 0.00304	2.0E-02	6.3E+03	N	8.2E+04	N	IND	N	BSL
	206-44-0	Fluoranthene	1.2E-02	9.9E-02	mg/kg	57SB6A	27	5/27	0.00282 - 0.013	9.9E-02	3.1E+02	N	4.1E+03	N	IND	N	BSL
	86-73-7	Fluorene	2.0E-03	1.0E-02	mg/kg	57SB6A	27	7/27	0.00035 - 0.00269	1.0E-02	3.1E+02	N	4.1E+03	N	IND	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	2.7E-03	4.2E-02	mg/kg	57SB2A	27	5/27	0.00087 - 0.00627	4.2E-02	2.2E-01	C	3.9E+00	C	IND	N	BSL
	91-20-3	Naphthalene	2.9E-04	7.0E-03	mg/kg	57SB6A	27	19/27	0.00029 - 0.00442	7.0E-03	1.6E+02	N	2.0E+03	N	IND	N	BSL
	85-01-8	Phenanthrene [7]	1.3E-02	9.7E-02	mg/kg	57SB6A	27	4/27	0.00276 - 0.013	9.7E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
	108-95-2	Phenol	8.8E-04	2.3E-03	mg/kg	57SB8C	27	4/27	0.00087 - 0.00634	2.3E-03	2.3E+03	N	3.1E+04	N	IND	N	BSL
	129-00-0	Pyrene	4.3E-04	8.1E-02	mg/kg	57SB6A	27	11/27	0.00039 - 0.00237	8.1E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
		Cyanide (mg/kg)															
	57-12-5	Cyanide	5.0E-02	1.7E-01	mg/kg	57SB3A DUP AVG	8	6/8	0.0356 - 0.0356	1.7E-01	1.6E+02	N	2.0E+03	N	IND	N	BSL

Notes:

COPC = Chemical of Potential Concern
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
mg/kg = Milligram Per Kilogram
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
N/C = Noncarcinogenic/Carcinogenic per EPA RBC Table (October 2007)
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Endosulfan soil RBC value used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol soil RBC value used
[7] = Pyrene RBC value was used

USEPA = U.S. Environmental Protection Agency
ARAR = Applicable, Relevant, and Appropriate Requirement
TBC = To-Be-Considered
RDA = Recommended Daily Allowance
IND = Adjusted Industrial RBC
AL = USEPA Action Level

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table E.1-2.3
Non-detected Chemicals MDL Screening for SWMU 57 - Total Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adjusted R-RBC	Maximum MDL Exceeds SL
TAL Metals (mg/kg)								
Antimony	7440-36-0	mg/kg	1	41	0.0518	0.0518	3.13	N
Cadmium	7440-43-9	mg/kg	17	41	0.11	0.11	3.91	N
Calcium	7440-70-2	mg/kg	2	41	16.6	16.6	--	NS
Mercury [1]	7439-97-6	mg/kg	1	41	0.0075	0.0075	2.35	N
Selenium	7782-49-2	mg/kg	16	41	0.089	0.089	39.11	N
Pesticides/PCBs (ug/kg)								
4,4'-DDD	72-54-8	ug/kg	20	20	0.357	3.9	2.7E+03	N
4,4'-DDE	72-55-9	ug/kg	20	20	0.263	3.1	1.9E+03	N
4,4'-DDT	50-29-3	ug/kg	20	20	0.27	3.6	1.9E+03	N
Aldrin	309-00-2	ug/kg	20	20	0.456	1.9	3.8E+01	N
alpha-BHC	319-84-6	ug/kg	20	20	0.44	1.2	1.0E+02	N
alpha-Chlordane [2]	5103-71-9	ug/kg	20	20	0.651	2.4	1.8E+03	N
beta-BHC	319-85-7	ug/kg	20	20	0.84	2.3	3.5E+02	N
delta-BHC [3]	319-86-8	ug/kg	20	20	1.2	3.3	1.0E+02	N
Dieldrin	60-57-1	ug/kg	15	20	0.464	1.6	4.0E+01	N
Endosulfan I [4]	959-98-8	ug/kg	20	20	1.1	3.1	4.7E+04	N
Endosulfan II [4]	33213-65-9	ug/kg	19	20	0.321	2.3	4.7E+04	N
Endosulfan Sulfate [4]	1031-07-8	ug/kg	20	20	0.755	3.5	4.7E+04	N
Endrin	72-20-8	ug/kg	18	20	0.447	1.9	2.3E+03	N
Endrin Aldehyde [5]	7421-93-4	ug/kg	20	20	1.3	3.6	2.3E+03	N
Endrin Ketone [5]	53494-70-5	ug/kg	20	20	0.413	3.6	2.3E+03	N
gamma-BHC (Lindane)	58-89-9	ug/kg	20	20	0.291	2.2	4.9E+02	N
gamma-Chlordane [2]	5103-74-2	ug/kg	20	20	0.58	1.6	1.8E+03	N
Heptachlor	76-44-8	ug/kg	20	20	1.06	4.2	1.4E+02	N
Heptachlor Epoxide	1024-57-3	ug/kg	18	20	0.51	1.4	7.0E+01	N
Methoxychlor	72-43-5	ug/kg	20	20	0.42	4.5	3.9E+04	N
Toxaphene	8001-35-2	ug/kg	20	20	28	78	5.8E+02	N
Aroclor 1016	12674-11-2	ug/kg	20	20	5.2	29	5.5E+02	N
Aroclor 1221	11104-28-2	ug/kg	20	20	2.8	52	3.2E+02	N
Aroclor 1232	11141-16-5	ug/kg	20	20	7	59	3.2E+02	N
Aroclor 1242	53469-21-9	ug/kg	20	20	4.2	110	3.2E+02	N
Aroclor 1248	12672-29-6	ug/kg	20	20	6.6	37	3.2E+02	N
Aroclor 1254 [6]	11097-69-1	ug/kg	9	20	5.5	6.4	1.6E+02	N
Aroclor 1260	11096-82-5	ug/kg	14	20	9.8	23	3.2E+02	N
Aroclor 1262	37324-23-5	ug/kg	19	19	6.5	36	--	NS
Aroclor 1268	11100-14-4	ug/kg	19	19	5.5	31	--	NS
Herbicides (ug/kg)								
2,4,5-T	93-76-5	ug/kg	1	1	2.8	2.8	7.8E+04	N
2,4,5-TP (Silvex)	93-72-1	ug/kg	1	1	5.6	5.6	6.3E+04	N
2,4-D	94-75-7	ug/kg	1	1	22.4	22.4	7.8E+04	N
2,4-DB	94-82-6	ug/kg	1	1	86.8	86.8	6.3E+04	N
Dalapon	75-99-0	ug/kg	1	1	79.8	79.8	2.3E+05	N
Dicamba	1918-00-9	ug/kg	1	1	2.8	2.8	2.3E+05	N
Dichlorprop	120-36-5	ug/kg	1	1	23.8	23.8	---	NS
Dinoseb	88-85-7	ug/kg	1	1	29.4	29.4	7.8E+03	N
MCPA	94-74-6	ug/kg	1	1	1,950	1,950	3.9E+03	N
MCPP	93-65-2	ug/kg	1	1	7,080	7,080	7.8E+03	N
TCL VOCs (ug/kg)								
1,1,1-Trichloroethane	71-55-6	mg/kg	41	41	0.23	7	1.6E+07	N
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	41	41	0.23	6.4	3.2E+03	N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/kg	41	41	0.37	9.2	2.3E+08	N
1,1,2-Trichloroethane	79-00-5	ug/kg	41	41	0.688	13	1.1E+04	N
1,1-Dichloroethane	75-34-3	ug/kg	41	41	0.22	4.8	1.6E+06	N
1,1-Dichloroethene	75-35-4	ug/kg	41	41	0.42	8.8	3.9E+05	N
1,2,3-Trichlorobenzene	87-61-6	ug/kg	41	41	0.23	8.5	--	NS
1,2,4-Trichlorobenzene	120-82-1	ug/kg	41	41	0.27	10	7.8E+04	N
1,2-Dibromo-3-chloropropane	96-12-8	ug/kg	41	41	0.92	18	2.0E+02	N
1,2-Dibromoethane	106-93-4	ug/kg	41	41	0.795	14	3.2E+02	N
1,2-Dichlorobenzene	95-50-1	ug/kg	41	41	0.28	4.2	7.0E+05	N
1,2-Dichloroethane	107-06-2	ug/kg	41	41	0.33	9.8	7.0E+03	N
1,2-Dichloropropane	78-87-5	ug/kg	41	41	0.68	6.6	9.4E+03	N
1,3-Dichlorobenzene	541-73-1	ug/kg	41	41	0.27	7.6	2.3E+04	N
1,4-Dichlorobenzene	106-46-7	ug/kg	41	41	0.25	8.5	2.7E+04	N
2-Butanone	78-93-3	ug/kg	25	41	2.9	21	4.7E+06	N
2-Hexanone	591-78-6	ug/kg	41	41	2.62	27	--	NS
4-Methyl-2-pentanone	108-10-1	ug/kg	41	41	1.69	24	--	NS
Acetone	67-64-1	ug/kg	1	41	5.1	5.1	7.0E+06	N
Benzene	71-43-2	ug/kg	38	41	0.14	7.5	1.2E+04	N
Bromochloromethane	74-97-5	ug/kg	41	41	0.14	12	--	NS
Bromodichloromethane	75-27-4	ug/kg	41	41	0.28	12	1.0E+04	N
Bromoform	75-25-2	ug/kg	41	41	0.55	15	8.1E+04	N
Bromomethane	74-83-9	ug/kg	41	41	1.4	12	1.1E+04	N
Carbon Disulfide	75-15-0	ug/kg	28	41	0.3	18	7.8E+05	N
Carbon Tetrachloride	56-23-5	ug/kg	41	41	0.32	9.7	4.9E+03	N
Chlorobenzene	108-90-7	ug/kg	41	41	0.23	7.6	1.6E+05	N

Table E.1-2.3
Non-detected Chemicals MDL Screening for SWMU 57 - Total Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adjusted R-RBC	Maximum MDL Exceeds SL
Chloroethane	75-00-3	ug/kg	41	41	0.4	13	2.2E+05	N
Chloroform	67-66-3	ug/kg	39	41	0.17	3.9	7.8E+04	N
Chloromethane	74-87-3	ug/kg	39	41	0.28	1.33	--	NS
cis-1,2-Dichloroethene	156-59-2	ug/kg	41	41	0.18	11	7.8E+04	N
cis-1,3-Dichloropropene [7]	10061-01-5	ug/kg	41	41	0.29	9	6.4E+03	N
Cyclohexane	110-82-7	ug/kg	41	41	0.367	8.8	--	NS
Dibromochloromethane	124-48-1	ug/kg	41	41	0.4	8.8	7.6E+03	N
Dichlorodifluoromethane	75-71-8	ug/kg	41	41	0.37	11	1.6E+06	N
Ethylbenzene	100-41-4	ug/kg	40	41	0.14	8.4	7.8E+05	N
Isopropylbenzene	98-82-8	ug/kg	41	41	0.14	7.9	7.8E+05	N
Methyl Acetate	79-20-9	ug/kg	15	41	0.99	9.7	7.8E+06	N
Methyl tert-Butyl Ether	1634-04-4	ug/kg	41	41	0.26	6.1	1.6E+05	N
Methylcyclohexane	108-87-2	ug/kg	41	41	0.9	9.4	--	NS
Methylene Chloride	75-09-2	ug/kg	31	41	3.79	14	8.5E+04	N
Styrene	100-42-5	ug/kg	41	41	0.25	6.9	1.6E+06	N
Tetrachloroethene	127-18-4	ug/kg	40	41	0.5	9.5	1.2E+03	N
Toluene	108-88-3	ug/kg	40	41	0.45	4.6	6.3E+05	N
trans-1,2-Dichloroethene	156-60-5	ug/kg	41	41	0.26	10	1.6E+05	N
trans-1,3-Dichloropropene [7]	10061-02-6	ug/kg	41	41	0.604	9.9	6.4E+03	N
Trichloroethene	79-01-6	ug/kg	39	41	0.63	11	1.6E+03	N
Trichlorofluoromethane	75-69-4	ug/kg	41	41	0.24	11	2.3E+06	N
Vinyl Chloride	75-01-4	ug/kg	41	41	0.429	11	9.0E+01	N
Xylenes	1330-20-7	ug/kg	40	41	0.488	23	1.6E+06	N
TCL SVOCs (ug/kg)								
1,1'-Biphenyl	92-52-4	ug/kg	22	27	0.57	3.94	3.9E+05	N
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/kg	27	27	0.99	45.9	2.3E+03	N
2,3,4,6-Tetrachlorophenol	58-90-2	ug/kg	19	19	20	57	2.3E+05	N
2,2'-oxybis(1-Chloropropane)	108-60-1	ug/kg	8	8	1.58	2.11	9.1E+03	N
2,4,5-Trichlorophenol	95-95-4	ug/kg	27	27	4.01	21	7.8E+05	N
2,4,6-Trichlorophenol [8]	88-06-2	ug/kg	27	27	3.14	16	7.8E+03	N
2,4-Dichlorophenol	120-83-2	ug/kg	27	27	4.22	23	2.3E+04	N
2,4-Dimethylphenol	105-67-9	ug/kg	27	27	7.1	20	1.6E+05	N
2,4-Dinitrophenol	51-28-5	ug/kg	27	27	3.84	120	1.6E+04	N
2,4-Dinitrotoluene	121-14-2	ug/kg	27	27	3.78	46	1.6E+04	N
2,6-Dinitrotoluene	606-20-2	ug/kg	27	27	2.1	44.3	7.8E+03	N
2-Chloronaphthalene	91-58-7	ug/kg	27	27	0.54	3.68	6.3E+05	N
2-Chlorophenol	95-57-8	ug/kg	27	27	0.48	3.22	3.9E+04	N
2-Methylnaphthalene	91-57-6	ug/kg	15	27	0.59	4.38	3.1E+04	N
2-Methylphenol	95-48-7	ug/kg	27	27	5.81	28	3.9E+05	N
2-Nitroaniline	88-74-4	ug/kg	27	27	5.52	46	--	NS
2-Nitrophenol	88-75-5	ug/kg	27	27	2.04	43	--	NS
3,3'-Dichlorobenzidine	91-94-1	ug/kg	27	27	66.5	270	1.4E+03	N
3-Nitroaniline	99-09-2	ug/kg	27	27	14	53.3	--	NS
4,6-Dinitro-2-methylphenol	534-52-1	ug/kg	27	27	5.41	130	--	NS
4-Bromophenyl-phenylether	101-55-3	ug/kg	27	27	1.6	5.41	--	NS
4-Chloro-3-methylphenol [9]	59-50-7	ug/kg	19	27	2.2	6.2	3.9E+05	N
4-Chloroaniline	106-47-8	ug/kg	27	27	1.51	68	3.1E+04	N
4-Chlorophenyl-phenylether	7005-72-3	ug/kg	27	27	0.56	5.23	--	NS
4-Methylphenol	106-44-5	ug/kg	27	27	7.64	32	3.9E+04	N
4-Nitroaniline	100-01-6	ug/kg	27	27	8.7	80	--	NS
4-Nitrophenol	100-02-7	ug/kg	27	27	3.4	39	--	NS
Acenaphthene	83-32-9	ug/kg	19	27	0.5	2.75	4.7E+05	N
Acenaphthylene [10]	208-96-8	ug/kg	25	27	0.75	2.4	2.3E+05	N
Acetophenone	98-86-2	ug/kg	26	27	2.28	23	7.8E+05	N
Anthracene	120-12-7	ug/kg	25	27	0.53	7.39	2.3E+06	N
Atrazine	1912-24-9	ug/kg	27	27	1.9	11	2.9E+03	N
Benzaldehyde	100-52-7	ug/kg	27	27	4.86	91	7.8E+05	N
Benzo(a)anthracene	56-55-3	ug/kg	19	27	0.67	21.3	2.2E+02	N
Benzo(a)pyrene	50-32-8	ug/kg	20	27	1.3	9.14	2.2E+01	N
Benzo(b)fluoranthene	205-99-2	ug/kg	20	27	1.1	15.6	2.2E+02	N
Benzo(g,h,i)perylene [10]	191-24-2	ug/kg	24	27	2.8	14	2.3E+05	N
Benzo(k)fluoranthene	207-08-9	ug/kg	25	27	0.89	21.4	2.2E+03	N
Bis(2-chloroethoxy)methane	111-91-1	ug/kg	27	27	0.99	5.02	--	NS
Bis(2-chloroethyl)ether	111-44-4	ug/kg	27	27	1.1	3.1	5.8E+02	N
Bis(2-chloroisopropyl)ether	39638-32-9	ug/kg	19	19	0.39	1.1	--	NS
ButylBenzylPhthalate	85-68-7	ug/kg	18	27	2.6	7.3	1.6E+06	N
Caprolactam	105-60-2	ug/kg	24	27	8.29	80	3.9E+06	N
Carbazole	86-74-8	ug/kg	27	27	0.62	9.76	3.2E+04	N
Chrysene	218-01-9	ug/kg	18	27	0.59	16.3	2.2E+04	N
Di-n-octylphthalate	117-84-0	ug/kg	27	27	3.72	34	--	NS
Dibenz(a,h)anthracene	53-70-3	ug/kg	25	27	0.67	9.44	2.2E+01	N
Dibenzofuran	132-64-9	ug/kg	26	27	0.33	5.06	7.8E+03	N
Diethylphthalate	84-66-2	ug/kg	8	27	0.46	3.04	6.3E+06	N
Dimethylphthalate	131-11-3	ug/kg	27	27	0.42	5.3	--	NS
Fluoranthene	206-44-0	ug/kg	22	27	3.06	5.4	3.1E+05	N
Fluorene	86-73-7	ug/kg	20	27	0.35	2.69	3.1E+05	N

Table E.1-2.3
Non-detected Chemicals MDL Screening for SWMU 57 - Total Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adjusted R-RBC	Maximum MDL Exceeds SL
Hexachlorobenzene	118-74-1	ug/kg	27	27	0.99	4.02	4.0E+02	N
Hexachlorobutadiene [11]	87-68-3	ug/kg	27	27	0.86	6.19	7.8E+03	N
Hexachlorocyclopentadiene	77-47-4	ug/kg	27	27	2.38	14	4.7E+04	N
Hexachloroethane [12]	67-72-1	ug/kg	27	27	0.99	3.73	7.8E+03	N
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	22	27	0.87	6.27	2.2E+02	N
Isophorone	78-59-1	ug/kg	27	27	0.5	2.77	6.7E+05	N
N-Nitrosodi-n-propylamine	621-64-7	ug/kg	27	27	0.89	5.26	9.1E+01	N
N-Nitrosodiphenylamine	86-30-6	ug/kg	27	27	0.99	7.6	1.3E+05	N
Naphthalene	91-20-3	ug/kg	8	27	0.3	4.4	1.6E+05	N
Nitrobenzene	98-95-3	ug/kg	27	27	1.9	44	3.9E+03	N
Pentachlorophenol	87-86-5	ug/kg	27	27	4.6	13	5.3E+03	N
Phenanthrene [10]	85-01-8	ug/kg	23	27	2.99	9.7	2.3E+05	N
Phenol	108-95-2	ug/kg	23	27	0.87	6.34	2.3E+06	N
Pyrene	129-00-0	ug/kg	16	27	0.39	2.37	2.3E+05	N
Explosives (mg/kg)								
2,4-Dinitrotoluene	121-14-2	mg/kg	27	27	0.1	0.142	1.6E+01	N
2,6-Dinitrotoluene	606-20-2	mg/kg	27	27	0.2	0.25	7.8E+00	N
1,3,5-Trinitrobenzene	99-35-4	mg/kg	27	27	0.074	0.14	2.3E+02	N
1,3-Dinitrobenzene	99-65-0	mg/kg	27	27	0.076	0.159	7.8E-01	N
2,4,6-Trinitrotoluene [13]	118-96-7	mg/kg	27	27	0.15	0.167	3.9E+00	N
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	27	27	0.151	0.22	1.6E+01	N
2-Nitrotoluene	88-72-2	mg/kg	27	27	0.17	0.266	7.8E+01	N
3-Nitrotoluene	99-08-1	mg/kg	27	27	0.184	0.21	--	NS
4-Amino-2,6-dinitrotoluene	1946-51-0	mg/kg	27	27	0.162	0.3	1.6E+01	N
4-Nitrotoluene [14]	99-99-0	mg/kg	27	27	0.2	0.251	3.1E+01	N
HMX	2691-41-0	mg/kg	27	27	0.066	0.229	3.9E+02	N
Nitrobenzene	98-95-3	mg/kg	27	27	0.03	0.102	3.9E+00	N
RDX	121-82-4	mg/kg	27	27	0.048	0.131	5.8E+00	N
Tetryl	479-45-8	mg/kg	27	27	0.065	0.169	3.1E+01	N
Nitroglycerin/PETN (mg/kg)								
Nitroglycerin	55-63-0	mg/kg	27	27	0.181	0.39	7.8E-01	N
PETN	78-11-5	mg/kg	27	27	0.23	0.357	--	NS
Cyanide (mg/kg)								
Cyanide	57-12-5	mg/kg	2	8	0.0356	0.0356	1.6E+02	N

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
ug/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
MDL = Method Detection Limit
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
R-RBC = Residential RBC
SL = Screening Level

Y = MDL exceeds screening level
N = MDL does not exceed screening level
NS = No screening level available

[1] = Mercuric chloride RBC value was used
[2] = Chlordane RBC value was used
[3] = Alpha-BHC RBC value was used
[4] = Endosulfan RBC value was used
[5] = Endrin RBC value was used
[6] = Noncarcinogenic RBC value for Aroclor 1254 was used
[7] = 1,3-Dichloropropene RBC value was used
[8] = Noncarcinogenic RBC value for 2,4,6-Trichlorophenol was used
[9] = 3-Methylphenol RBC value was used
[10] = Pyrene RBC value was used
[11] = Noncarcinogenic RBC value for Hexachlorobutadiene was used
[12] = Noncarcinogenic RBC value for Hexachloroethane was used
[13] = Noncarcinogenic RBC value for 2,4,6-Trinitrotoluene was used
[14] = Noncarcinogenic RBC value for 4-Nitrotoluene was used

Table E.1-2.4
Groundwater COPC Selection
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted Tap Water RBC	MCL	COPC Flag (Y/N)	Rationale for Selection or Deletion
Perchlorate													
Perchlorate	14797-73-0	0.16	0.16	ug/L	57MW3	1/2	0.08 - 0.08	0.16	N	2.555	--	N	BSL
TAL Metals													
Aluminum, Total	7429-90-5	266.5	1,400	ug/L	57MW3	2/2	44 - 44	1,400	N	3,650	--	N	BSL
Antimony, Dissolved	7440-36-0	0.48	5.3	ug/L	57MW2 DUP AVG	2/2	0.44 - 0.44	5.3	N	1.46	6	Y	**ARBC**
Antimony	7440-36-0	4.45	4.45	ug/L	57MW2 DUP AVG	1/2	0.44 - 0.44	4.45	N	1.46	6	Y	**ARBC**
Arsenic, Dissolved	7440-38-2	0.94	2.15	ug/L	57MW2 DUP AVG	2/2	0.74 - 0.74	2.15	C	0.0446	10	Y	**ARBC**
Arsenic	7440-38-2	1.1	2.65	ug/L	57MW2 DUP AVG	2/2	0.74 - 0.74	2.65	C	0.0446	10	Y	**ARBC**
Barium, Dissolved	7440-39-3	7.95	11	ug/L	57MW3	2/2	0.52 - 0.52	11	N	730	2,000	N	BSL
Barium	7440-39-3	10.25	17	ug/L	57MW3	2/2	0.52 - 0.52	17	N	730	2,000	N	BSL
Cadmium, Dissolved	7440-43-9	0.14	0.14	ug/L	57MW2 DUP AVG	1/2	0.062 - 0.062	0.14	N	1.825	5	N	BSL
Cadmium	7440-43-9	0.19	0.19	ug/L	57MW2 DUP AVG	1/2	0.062 - 0.062	0.19	N	1.825	5	N	BSL
Calcium, Dissolved	7440-70-2	25,000	30,000	ug/L	57MW2 DUP AVG	2/2	40 - 40	30,000	--	--	--	Y	Nutrient
Calcium	7440-70-2	33,500	44,000	ug/L	57MW3	2/2	40 - 40	44,000	--	--	--	Y	Nutrient
Chromium, Dissolved [1]	7440-47-3	2.7	6.6	ug/L	57MW3	2/2	0.31 - 0.31	6.6	C	10.95	100	N	BSL
Chromium [1]	7440-47-3	4.45	17	ug/L	57MW3	2/2	0.31 - 0.31	17	C	10.95	100	Y	**ARBC**
Cobalt, Dissolved	7440-48-4	0.92	1.6	ug/L	57MW3	2/2	0.096 - 0.096	1.6	--	--	--	Y	NSV
Cobalt	7440-48-4	1.24	2.2	ug/L	57MW3	2/2	0.096 - 0.096	2.2	--	--	--	Y	NSV
Copper, Dissolved	7440-50-8	2.2	3	ug/L	57MW2 DUP AVG	2/2	0.33 - 0.33	3	N	146	1,300	N	BSL
Copper	7440-50-8	3.1	4.8	ug/L	57MW2 DUP AVG	2/2	0.33 - 0.33	4.8	N	146	1,300	N	BSL
Iron, Dissolved	7439-89-6	10	41.4	ug/L	57MW2 DUP AVG	2/2	5.7 - 5.7	41.4	N	2,555	--	N	BSL
Iron	7439-89-6	390	2,200	ug/L	57MW3	2/2	5.7 - 5.7	2,200	N	2,555	--	N	BSL
Lead [2]	7439-92-1	0.4375	0.71	ug/L	57MW3	2/2	0.33 - 0.33	0.71	--	15	--	N	BSL
Magnesium, Dissolved	7439-95-4	11,000	12,000	ug/L	57MW3	2/2	38 - 38	12,000	--	--	--	Y	Nutrient
Magnesium	7439-95-4	13,000	23,000	ug/L	57MW3	2/2	38 - 38	23,000	--	--	--	Y	Nutrient
Manganese, Dissolved	7439-96-5	8.6	175	ug/L	57MW2 DUP AVG	2/2	0.43 - 0.43	175	N	73	--	Y	**ARBC**
Manganese	7439-96-5	37	230	ug/L	57MW2 DUP AVG	2/2	0.43 - 0.43	230	N	73	--	Y	**ARBC**
Nickel, Dissolved	7440-02-0	5.25	6.7	ug/L	57MW3	2/2	0.28 - 0.28	6.7	N	73	--	N	BSL
Nickel	7440-02-0	6.15	10	ug/L	57MW3	2/2	0.28 - 0.28	10	N	73	--	N	BSL
Potassium, Dissolved	7440-09-7	2,250	2,400	ug/L	57MW3	2/2	54 - 54	2,400	--	--	--	Y	Nutrient
Potassium	7440-09-7	2,550	3,000	ug/L	57MW3	2/2	54 - 54	3,000	--	--	--	Y	Nutrient
Sodium, Dissolved	7440-23-5	19,000	21,000	ug/L	57MW3	2/2	84 - 84	21,000	--	--	--	Y	Nutrient
Sodium	7440-23-5	19,000	22,000	ug/L	57MW3	2/2	84 - 84	22,000	--	--	--	Y	Nutrient
Vanadium, Dissolved	7440-62-2	0.89	2.5	ug/L	57MW2 DUP AVG	2/2	0.83 - 0.83	2.5	N	3.65	--	N	BSL
Vanadium	7440-62-2	3.3	3.4	ug/L	57MW2 DUP AVG	2/2	0.83 - 0.83	3.4	N	3.65	--	N	BSL
Zinc, Dissolved	7440-66-6	5.1	5.3	ug/L	57MW2 DUP AVG	2/2	0.84 - 0.84	5.3	N	1,095	--	N	BSL
Zinc	7440-66-6	10	17.5	ug/L	57MW2 DUP AVG	2/2	0.84 - 0.84	17.5	N	1,095	--	N	BSL
Pesticides													
Endosulfan II [3]	33213-65-9	0.00185	0.00185	ug/L	57MW2 DUP AVG	1/2	0.0018 - 0.0018	0.00185	N	21.9	--	N	BSL
TCL VOCs													
1,3-Dichlorobenzene	541-73-1	0.18	0.18	ug/L	57MW3	1/2	0.12 - 0.12	0.18	N	1.825	--	N	BSL
Acetone	67-64-1	9.1	9.1	ug/L	57MW3	1/2	1.2 - 1.2	9.1	N	547.5	--	N	BSL
Chloroform	67-66-3	0.39	57	ug/L	57MW3	2/2	0.061 - 0.061	57	C	0.155	80	Y	**ARBC**
Toluene	108-88-3	0.26	0.64	ug/L	57MW3	2/2	0.072 - 0.072	0.64	N	227.1	1,000	N	BSL
TCL SVOCs													
2-Methylnaphthalene	91-57-6	0.019	0.019	ug/L	57MW3	1/2	0.015 - 0.015	0.019	N	2.433	--	N	BSL
Acetophenone	98-86-2	0.057	0.057	ug/L	57MW3	1/2	0.043 - 0.043	0.057	N	60.83	--	N	BSL
Benzaldehyde	100-52-7	0.04125	0.085	ug/L	57MW3	2/2	0.051 - 0.051	0.085	N	365	--	N	BSL
Butyl Benzyl Phthalate	85-68-7	0.0895	0.0895	ug/L	57MW2 DUP AVG	1/2	0.029 - 0.029	0.0895	N	730	--	N	BSL
Diethylphthalate	84-66-2	0.038	0.085	ug/L	57MW3	2/2	0.034 - 0.034	0.085	N	2,920	--	N	BSL
Di-n-butylphthalate	84-74-2	1.545	2.1	ug/L	57MW3	2/2	0.38 - 0.38	2.1	N	365	--	N	BSL
Isophorone	78-59-1	0.0715	0.075	ug/L	57MW3	2/2	0.031 - 0.031	0.075	C	70.5	--	N	BSL
Naphthalene	91-20-3	0.02475	0.038	ug/L	57MW3	2/2	0.023 - 0.023	0.038	N	0.651	--	N	BSL

Table E.1-2.4
Groundwater COPC Selection
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2007)
N = Noncarcinogenic per EPA RBC Table (October 2007)
MCL = Maximum Contaminant Level
BSL = Below Tap Water RBC/MCL
DUP AVG = averaged result for duplicate samples

ARBC = Above Tap Water RBC

[1] = Chromium VI RBC used for screening
[2] = USEPA Action Level used for screening
[3] = Endosulfan RBC used for screening

Table E.1-2.5
Groundwater Non-detects Screening
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adj. Tap Water RBC	Maximum MDL Exceeds SL
Perchlorate								
Perchlorate	14797-73-0	ug/L	1	2	0.08	0.08	2.555	N
TAL Metals								
Aluminum, Dissolved	7429-90-5	ug/L	2	2	44	44	3,650	N
Antimony, Total	7440-36-0	ug/L	1	2	0.44	0.44	1.46	N
Beryllium, Dissolved	7440-41-7	ug/L	2	2	0.31	0.31	7.3	N
Beryllium, Total	7440-41-7	ug/L	2	2	0.31	0.31	7.3	N
Cadmium, Dissolved	7440-43-9	ug/L	1	2	0.062	0.062	1.825	N
Cadmium, Total	7440-43-9	ug/L	1	2	0.062	0.062	1.825	N
Lead, Dissolved [1]	7439-92-1	ug/L	2	2	0.33	0.33	15	N
Mercury, Dissolved [2]	7439-97-6	ug/L	2	2	0.046	0.046	0.37	N
Mercury, Total [2]	7439-97-6	ug/L	2	2	0.046	0.046	0.37	N
Selenium, Dissolved	7782-49-2	ug/L	2	2	0.92	0.92	18.25	N
Selenium, Total	7782-49-2	ug/L	2	2	0.92	0.92	18.25	N
Silver, Dissolved	7440-22-4	ug/L	2	2	0.12	0.12	18.25	N
Silver, Total	7440-22-4	ug/L	2	2	0.12	0.12	18.25	N
Thallium, Dissolved	7440-28-0	ug/L	2	2	0.17	0.17	0.256	N
Thallium, Total	7440-28-0	ug/L	2	2	0.17	0.17	0.256	N
Pesticides/PCBs								
4,4'-DDD	72-54-8	ug/L	2	2	0.0019	0.0019	2.8E-01	N
4,4'-DDE	72-55-9	ug/L	2	2	0.0027	0.0027	2.0E-01	N
4,4'-DDT	50-29-3	ug/L	2	2	0.002	0.002	2.0E-01	N
Aldrin	309-00-2	ug/L	2	2	0.0079	0.0079	3.9E-03	**Y**
alpha-BHC	319-84-6	ug/L	2	2	0.0019	0.0019	1.1E-02	N
alpha-Chlordane [3]	5103-71-9	ug/L	2	2	0.0021	0.0021	1.9E-01	N
beta-BHC	319-85-7	ug/L	2	2	0.0032	0.0032	3.7E-02	N
delta-BHC [4]	319-86-8	ug/L	2	2	0.0023	0.0023	1.1E-02	N
Dieldrin	60-57-1	ug/L	2	2	0.002	0.002	4.2E-03	N
Endosulfan I	959-98-8	ug/L	2	2	0.0023	0.0023	2.2E+01	N
Endosulfan II [5]	33213-65-9	ug/L	1	2	0.0018	0.0018	2.2E+01	N
Endosulfan Sulfate [5]	1031-07-8	ug/L	2	2	0.0033	0.0033	2.2E+01	N
Endrin	72-20-8	ug/L	2	2	0.002	0.002	1.1E+00	N
Endrin Aldehyde [6]	7421-93-4	ug/L	2	2	0.0029	0.0029	1.1E+00	N
Endrin Ketone [6]	53494-70-5	ug/L	2	2	0.0033	0.0033	1.1E+00	N
gamma-BHC (Lindane)	58-89-9	ug/L	2	2	0.0018	0.0018	5.2E-02	N
gamma-Chlordane [3]	5103-74-2	ug/L	2	2	0.0021	0.0021	1.9E-01	N
Heptachlor	76-44-8	ug/L	2	2	0.003	0.003	1.5E-02	N
Heptachlor Epoxide	1024-57-3	ug/L	2	2	0.0021	0.0021	7.4E-03	N
Methoxychlor	72-43-5	ug/L	2	2	0.0052	0.0052	1.8E+01	N
Toxaphene	8001-35-2	ug/L	2	2	0.1	0.1	6.1E-02	**Y**
Aroclor 1016 [7]	12674-11-2	ug/L	2	2	0.05	0.05	2.6E-01	N
Aroclor 1221	11104-28-2	ug/L	2	2	0.068	0.068	3.3E-02	**Y**
Aroclor 1232	11141-16-5	ug/L	2	2	0.031	0.031	3.3E-02	N
Aroclor 1242	53469-21-9	ug/L	2	2	0.035	0.035	3.3E-02	**Y**
Aroclor 1248	12672-29-6	ug/L	2	2	0.04	0.04	3.3E-02	**Y**
Aroclor 1254	11097-69-1	ug/L	2	2	0.034	0.034	3.3E-02	**Y**
Aroclor 1260	11096-82-5	ug/L	2	2	0.034	0.034	3.3E-02	**Y**
Aroclor 1262	37324-23-5	ug/L	2	2	0.022	0.022	--	NS
Aroclor 1268	11100-14-4	ug/L	2	2	0.049	0.049	--	NS
TCL VOCs								
1,1,1-Trichloroethane	71-55-6	ug/L	2	2	0.11	0.11	9.1E+02	N
1,1,2,2-Tetrachloroethane	79-34-5	ug/L	2	2	0.1	0.1	5.3E-02	**Y**
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/L	2	2	0.14	0.14	5.9E+03	N
1,1,2-Trichloroethane	79-00-5	ug/L	2	2	0.21	0.21	1.9E-01	**Y**
1,1-Dichloroethane	75-34-3	ug/L	2	2	0.076	0.076	9.0E+01	N
1,1-Dichloroethene	75-35-4	ug/L	2	2	0.14	0.14	3.5E+01	N
1,2,3-Trichlorobenzene	87-61-6	ug/L	2	2	0.13	0.13	--	NS
1,2,4-Trichlorobenzene	120-82-1	ug/L	2	2	0.16	0.16	6.1E+00	N
1,2-Dibromo-3-chloropropane	96-12-8	ug/L	2	2	0.29	0.29	2.0E-04	**Y**
1,2-Dibromoethane	106-93-4	ug/L	2	2	0.22	0.22	5.3E-03	**Y**
1,2-Dichlorobenzene	95-50-1	ug/L	2	2	0.065	0.065	2.7E+01	N
1,2-Dichloroethane	107-06-2	ug/L	2	2	0.15	0.15	1.2E-01	**Y**
1,2-Dichloropropane	78-87-5	ug/L	2	2	0.1	0.1	2.6E-01	N
1,3-Dichlorobenzene	541-73-1	ug/L	1	2	0.12	0.12	1.8E+00	N
1,4-Dichlorobenzene	106-46-7	ug/L	2	2	0.13	0.13	2.8E-01	N
2-Butanone (MEK)	78-93-3	ug/L	2	2	0.33	0.33	7.0E+02	N
2-Hexanone	591-78-6	ug/L	2	2	0.42	0.42	--	NS
4-Methyl-2-pentanone (MIBK)	108-10-1	ug/L	2	2	0.38	0.38	6.3E+02	N
Acetone	67-64-1	ug/L	1	2	1.2	1.2	5.5E+02	N
Benzene	71-43-2	ug/L	2	2	0.12	0.12	3.4E-01	N
Bromochloromethane	74-97-5	ug/L	2	2	0.2	0.2	--	NS
Bromodichloromethane	75-27-4	ug/L	2	2	0.19	0.19	1.7E-01	**Y**
Bromoform	75-25-2	ug/L	2	2	0.23	0.23	8.5E+00	N
Bromomethane	74-83-9	ug/L	2	2	0.19	0.19	8.5E-01	N
Carbon Disulfide	75-15-0	ug/L	2	2	0.28	0.28	1.0E+02	N

Table E.1-2.5
Groundwater Non-detects Screening
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adj. Tap Water RBC	Maximum MDL Exceeds SL
Carbon Tetrachloride	56-23-5	ug/L	2	2	0.15	0.15	1.6E-01	N
Chlorobenzene	108-90-7	ug/L	2	2	0.12	0.12	9.0E+00	N
Chloroethane	75-00-3	ug/L	2	2	0.2	0.2	3.6E+00	N
Chloromethane	74-87-3	ug/L	2	2	0.06	0.06	1.9E+01	N
cis-1,2-Dichloroethene	156-59-2	ug/L	2	2	0.17	0.17	6.1E+00	N
cis-1,3-Dichloropropene	10061-01-5	ug/L	2	2	0.14	0.14	4.4E-01	N
Cyclohexane	110-82-7	ug/L	2	2	0.14	0.14	1.2E+03	N
Dibromochloromethane	124-48-1	ug/L	2	2	0.14	0.14	1.3E-01	**Y**
Dichlorodifluoromethane	75-71-8	ug/L	2	2	0.17	0.17	3.5E+01	N
Ethylbenzene	100-41-4	ug/L	2	2	0.13	0.13	1.3E+02	N
Isopropylbenzene	98-82-8	ug/L	2	2	0.12	0.12	6.6E+01	N
Methyl Acetate	79-20-9	ug/L	2	2	0.16	0.16	6.1E+02	N
Methyl tert-Butyl Ether	1634-04-4	ug/L	2	2	0.096	0.096	2.6E+00	N
Methylcyclohexane	108-87-2	ug/L	2	2	0.15	0.15	6.3E+02	N
Methylene Chloride	75-09-2	ug/L	2	2	0.051	0.051	4.1E+00	N
Styrene	100-42-5	ug/L	2	2	0.11	0.11	1.6E+02	N
Tetrachloroethene	127-18-4	ug/L	2	2	0.15	0.15	1.0E-01	**Y**
trans-1,2-Dichloroethene	156-60-5	ug/L	2	2	0.16	0.16	1.1E+01	N
trans-1,3-Dichloropropene	10061-02-6	ug/L	2	2	0.16	0.16	4.4E-01	N
Trichloroethene	79-01-6	ug/L	2	2	0.17	0.17	2.6E-02	**Y**
Trichlorofluoromethane	75-69-4	ug/L	2	2	0.18	0.18	1.3E+02	N
Vinyl Chloride	75-01-4	ug/L	2	2	0.17	0.17	1.5E-02	**Y**
Xylenes	1330-20-7	ug/L	2	2	0.36	0.36	2.1E+01	N
TCL SVOCs								
1,1'-Biphenyl	92-52-4	ug/L	2	2	0.015	0.015	3.0E+01	N
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/L	2	2	0.024	0.024	1.1E+00	N
2,3,4,6-Tetrachlorophenol	58-90-2	ug/L	2	2	0.16	0.16	1.1E+02	N
2,4,5-Trichlorophenol	95-95-4	ug/L	2	2	0.11	0.11	3.7E+02	N
2,4,6-Trichlorophenol[8]	88-06-2	ug/L	2	2	0.027	0.027	3.6E+00	N
2,4-Dichlorophenol	120-83-2	ug/L	2	2	0.015	0.015	1.1E+01	N
2,4-Dimethylphenol	105-67-9	ug/L	2	2	0.33	0.33	7.3E+01	N
2,4-Dinitrophenol	51-28-5	ug/L	2	2	1.5	1.5	7.3E+00	N
2,4-Dinitrotoluene	121-14-2	ug/L	2	2	0.21	0.21	7.3E+00	N
2,6-Dinitrotoluene	606-20-2	ug/L	2	2	0.05	0.05	3.7E+00	N
2-Chloronaphthalene	91-58-7	ug/L	2	2	0.012	0.012	4.9E+01	N
2-Chlorophenol	95-57-8	ug/L	2	2	0.016	0.016	3.0E+00	N
2-Methylnaphthalene	91-57-6	ug/L	1	2	0.015	0.015	2.4E+00	N
2-Methylphenol	95-48-7	ug/L	2	2	0.14	0.14	1.8E+02	N
2-Nitroaniline	88-74-4	ug/L	2	2	0.12	0.12	--	NS
2-Nitrophenol	88-75-5	ug/L	2	2	0.026	0.026	--	NS
3,3'-Dichlorobenzidine	91-94-1	ug/L	2	2	0.21	0.21	1.5E-01	**Y**
3-Nitroaniline	99-09-2	ug/L	2	2	0.13	0.13	--	NS
4,6-Dinitro-2-methylphenol	534-52-1	ug/L	2	2	0.12	0.12	--	NS
4-Bromophenyl-phenylether	101-55-3	ug/L	2	2	0.026	0.026	--	NS
4-Chloro-3-methylphenol	59-50-7	ug/L	2	2	0.021	0.021	1.8E+02	N
4-Chloroaniline	106-47-8	ug/L	2	2	0.021	0.021	1.5E+01	N
4-Chlorophenyl-phenylether	7005-72-3	ug/L	2	2	0.016	0.016	--	NS
4-Methylphenol	106-44-5	ug/L	2	2	0.16	0.16	1.8E+01	N
4-Nitroaniline	100-01-6	ug/L	2	2	0.14	0.14	--	NS
4-Nitrophenol	100-02-7	ug/L	2	2	1.3	1.3	--	NS
Acenaphthene	83-32-9	ug/L	2	2	0.013	0.013	3.7E+01	N
Acenaphthylene[9]	208-96-8	ug/L	2	2	0.012	0.012	1.8E+01	N
Acetophenone	98-86-2	ug/L	1	2	0.043	0.043	6.1E+01	N
Anthracene	120-12-7	ug/L	2	2	0.014	0.014	1.8E+02	N
Atrazine	1912-24-9	ug/L	2	2	0.026	0.026	3.0E-01	N
Benzo(a)anthracene	56-55-3	ug/L	2	2	0.037	0.037	3.0E-02	**Y**
Benzo(a)pyrene	50-32-8	ug/L	2	2	0.023	0.023	3.0E-03	**Y**
Benzo(b)fluoranthene	205-99-2	ug/L	2	2	0.04	0.04	3.0E-02	**Y**
Benzo(g,h,i)perylene[9]	191-24-2	ug/L	2	2	0.022	0.022	1.8E+01	N
Benzo(k)fluoranthene	207-08-9	ug/L	2	2	0.036	0.036	3.0E-01	N
Bis(2-chloroethoxy)methane	111-91-1	ug/L	2	2	0.016	0.016	--	NS
Bis(2-chloroethyl)ether	111-44-4	ug/L	2	2	0.016	0.016	9.6E-03	**Y**
Bis(2-chloroisopropyl)ether	108-60-1	ug/L	2	2	0.047	0.047	2.6E-01	N
Bis(2-ethylhexyl)phthalate	117-81-7	ug/L	2	2	0.41	0.41	4.8E+00	N
Butyl Benzyl Phthalate	85-68-7	ug/L	1	2	0.029	0.029	7.3E+02	N
Caprolactam	105-60-2	ug/L	2	2	0.14	0.14	1.8E+03	N
Carbazole	86-74-8	ug/L	2	2	0.018	0.018	3.3E+00	N
Chrysene	218-01-9	ug/L	2	2	0.02	0.02	3.0E+00	N
Di-n-octylphthalate	117-84-0	ug/L	2	2	0.34	0.34	--	NS
Dibenz(a,h)anthracene	53-70-3	ug/L	2	2	0.026	0.026	3.0E-03	**Y**
Dibenzofuran	132-64-9	ug/L	2	2	0.016	0.016	3.7E+00	N
Dimethylphthalate	131-11-3	ug/L	2	2	0.016	0.016	--	NS
Fluoranthene	206-44-0	ug/L	2	2	0.016	0.016	1.5E+02	N
Fluorene	86-73-7	ug/L	2	2	0.011	0.011	2.4E+01	N
Hexachlorobenzene	118-74-1	ug/L	2	2	0.019	0.019	4.2E-02	N
Hexachlorobutadiene	87-68-3	ug/L	2	2	0.018	0.018	8.6E-01	N

Table E.1-2.5
Groundwater Non-detects Screening
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adj. Tap Water RBC	Maximum MDL Exceeds SL
Hexachlorocyclopentadiene	77-47-4	ug/L	2	2	0.13	0.13	2.2E+01	N
Hexachloroethane	67-72-1	ug/L	2	2	0.038	0.038	3.7E+00	N
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	2	2	0.014	0.014	3.0E-02	N
N-Nitrosodi-n-propylamine	621-64-7	ug/L	2	2	0.03	0.03	9.6E-03	**Y**
N-Nitrosodiphenylamine	86-30-6	ug/L	2	2	0.019	0.019	1.4E+01	N
Nitrobenzene	98-95-3	ug/L	1	2	0.026	0.026	3.5E-01	N
Pentachlorophenol	87-86-5	ug/L	2	2	0.19	0.19	5.6E-01	N
Phenanthrene[9]	85-01-8	ug/L	2	2	0.015	0.015	1.8E+01	N
Phenol	108-95-2	ug/L	2	2	0.028	0.028	1.1E+03	N
Pyrene	129-00-0	ug/L	2	2	0.047	0.047	1.8E+01	N
Explosives								
1,3,5-Trinitrobenzene	99-35-4	ug/L	2	2	0.045	0.045	1.1E+02	N
1,3-Dinitrobenzene	99-65-0	ug/L	2	2	0.071	0.071	3.7E-01	N
2,4,6-Trinitrotoluene[10]	118-96-7	ug/L	2	2	0.1	0.1	1.8E+00	N
2,4-Dinitrotoluene	121-14-2	ug/L	2	2	0.092	0.092	7.3E+00	N
2,6-Dinitrotoluene	606-20-2	ug/L	2	2	0.16	0.16	3.7E+00	N
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	2	2	0.24	0.24	7.3E+00	N
2-Nitrotoluene	88-72-2	ug/L	2	2	0.28	0.28	6.1E+00	N
3-Nitrotoluene	99-08-1	ug/L	2	2	0.17	0.17	--	NS
4-Amino-2,6-dinitrotoluene	1946-51-0	ug/L	2	2	0.22	0.22	7.3E+00	N
4-Nitrotoluene	99-99-0	ug/L	2	2	0.49	0.49	4.2E+00	N
HMX	2691-41-0	ug/L	2	2	0.2	0.2	1.8E+02	N
Nitrobenzene	98-95-3	ug/L	2	2	0.15	0.15	3.5E-01	N
RDX	121-82-4	ug/L	2	2	0.092	0.092	6.1E-01	N
Tetryl	479-45-8	ug/L	2	2	0.15	0.15	1.5E+01	N
Nitroglycerin/PETN								
Nitroglycerin	55-63-0	ug/L	2	2	0.58	0.58	3.7E-01	**Y**
PETN	78-11-5	ug/L	2	2	0.61	0.61	--	NS

Notes:

CAS = Chemical Abstracts Service
ug/L = Microgram per liter
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PETN = Pentaerythritol Tetranitrate
MDL = Method Detection Limit
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

Y = MDL exceeds screening level
N = MDL does not exceed screening level
NS = No screening level available

[1] = Lead Action Level used for screening
[2] = Tap Water RBC for methylmercury used for screening
[3] = Chlordane RBC value was used
[4] = Alpha-BHC RBC value was used
[5] = Endosulfan RBC value was used
[6] = Endrin RBC value was used
[7] = Noncarcinogenic Tap Water RBC value for Aroclor 1016 used for screening
[8] = Noncarcinogenic Tap Water RBC value for 2,4,6-Trichlorophenol used for screening
[9] = Tap Water RBC value for pyrene used for screening
[10] = Noncarcinogenic Tap Water RBC values for 2,4,6-Trinitrotoluene used for screening

Table E.1-3.1
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Exposure to Contaminants in SWMU 57 Surface Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean of Detects	UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Surface Soil	Aluminum	mg/kg	25,663	28,333	33,300	28,333	mg/kg	95% Student's t UCL	ProUCL 4.0
	Antimony	mg/kg	59.63	178.2	340	178.2	mg/kg	95% Adjusted Gamma UCL	ProUCL 4.0
	Arsenic	mg/kg	3.202	3.841	5.2	3.841	mg/kg	95% Student's t UCL	ProUCL 4.0
	Cadmium	mg/kg	17.61	52.73	120	52.73	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.0
	Chromium	mg/kg	187.7	1,166	1,500	1,166	mg/kg	99% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Cobalt	mg/kg	12.1	21.13	41.5	21.13	mg/kg	95% H-UCL	ProUCL 4.0
	Iron	mg/kg	35,590	44,944	78,700	44,944	mg/kg	95% Student's t UCL	ProUCL 4.0
	Manganese	mg/kg	1,008	1,682	4,400	1,682	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Vanadium	mg/kg	145.8	918	1,200	918	mg/kg	99% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Zinc	mg/kg	611.3	1,269	3,700	1,269	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Aroclor 1254	mg/kg	0.584	3.34	2	2	mg/kg	Maximum Detected Concentration	UCL>MDC
	Aroclor 1260	mg/kg	0.606	2.19	2	2	mg/kg	Maximum Detected Concentration	UCL>MDC
	Benzo(a)pyrene	mg/kg	0.0196	0.0208	0.031	0.0208	mg/kg	95% KM (t) UCL	ProUCL 4.0

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram
MDC = Maximum Detected Concentration

Table E.1-3.2
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Exposure to Contaminants in SWMU 57 Total Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Medium: Total Soil
Exposure Medium: Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean of Detects	UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Surface Soil	Aluminum	mg/kg	24,648	26,325	38,000	26,325	mg/kg	95% Student's t UCL	ProUCL 4.0
	Antimony	mg/kg	23.82	131	340	131	mg/kg	99% KM (Chebyshev) UCL	ProUCL 4.0
	Arsenic	mg/kg	2.975	3.506	12.0	3.506	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Cadmium	mg/kg	11.24	26.86	120	26.86	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL 4.0
	Chromium	mg/kg	90.51	252.8	1,500	252.8	mg/kg	95% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Cobalt	mg/kg	14.69	18.02	51	18.02	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Iron	mg/kg	40,160	45,129	87,000	45,129	mg/kg	95% Student's t UCL	ProUCL 4.0
	Lead	mg/kg	45.63	218	680	218	mg/kg	99% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Manganese	mg/kg	1,372	2,220	7,700	2,220	mg/kg	95% H-UCL	ProUCL 4.0
	Thallium	mg/kg	0.237	0.271	0.77	0.271	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Vanadium	mg/kg	73.89	201.3	1,200	201.3	mg/kg	99% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Zinc	mg/kg	256.1	1,267	3,700	1,267	mg/kg	99% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Aroclor 1254	mg/kg	0.366	0.43	2	0.432	mg/kg	95% KM (BCA) UCL	ProUCL 4.0
	Aroclor 1260	mg/kg	0.479	0.37	2	0.365	mg/kg	95% KM (t) UCL	ProUCL 4.0
	Benzo(a)pyrene	mg/kg	0.0146	0.00796	0.031	0.0080	mg/kg	95% KM (t) UCL	ProUCL 4.0

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram

Table E.1-4.1a
Values used for Daily Intake Equations for Current/Future Scenario - Surface Soil - Exposure Medium Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Ingestion	Maintenance Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = $\frac{CS \times IRS \times EF \times ED \times FI \times CF1}{BW \times AT}$
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 2004	
				EF	Exposure Frequency	50	days/year	(1)	
				FI	Fraction Ingested	1	(unitless)	(2)	
				IRS	Ingestion Rate of Soil	100	mg/day	USEPA, 1991	
Dermal Absorption *	Maintenance Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.1	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 2004	
				EF	Exposure Frequency	50	days/year	(1)	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	

Notes:

(1) Best professional judgement. Based on site maintenance conducted 1 day/week with 2 weeks/year vacation.

(2) Fraction ingested assumed 100%.

*See Table E.1-4.3 for chemical specific dermal absorption fractions

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.

kg/mg = Kilogram Per Millogram

mg/kg = Milligram Per Kilogram

hr/day = hour per day

cm^2 = square centimeter

USEPA = U.S. Environmental Protection Agency

EPC = Exposure Point Concentration

Table E.1-4.1b
Values used for Daily Intake Equations for Current/Future Scenario - Surface Soil - Exposure Medium Air
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation	Maintenance Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	50	days/year	(1)	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.5	m^3/hr	USEPA, 1989	
				PEF	Particulate Emission Factor	1.32E+09	m^3/kg	(2)	

Notes:

(1) Best professional judgement. Based on site maintenance conducted 1 day/week with 2 weeks/year vacation.

(2) PEFs provided on Table E.1-4.4

Note: VOCs not identified as COPC in soil; therefore, vapor inhalation pathway not assessed.

USEPA, 1989. Risk Assessment Guidance for Superfund Volume I - Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002.

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

kg/mg = Kilogram Per Millogram

mg/kg = Milligram Per Kilogram

hr/day = hour per day

m^3/hour = cubic meters per hour

USEPA = U.S. Environmental Protection Agency

Table E.1-4.1c
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Ingestion	Construction Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = $\frac{CS \times IRS \times EF \times ED \times FI \times CF1}{BW \times AT}$
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	1	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				FI	Fraction Ingested	1	(unitless)	(1)	
				IRS	Ingestion Rate of Soil	330	mg/day	USEPA, 2002	
	Commercial Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = $\frac{CS \times IRS \times EF \times ED \times FI \times CF1}{BW \times AT}$
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	(1)	
				IRS	Ingestion Rate of Soil	50	mg/day	USEPA, 2002	
	Resident	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = $\frac{CS \times IRS \times EF \times ED \times FI \times CF1}{BW \times AT}$
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	(1)	
				IRS	Ingestion Rate of Soil	100	mg/day	USEPA, 1991	
		Child	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = $\frac{CS \times IRS \times EF \times ED \times FI \times CF1}{BW \times AT}$
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	(1)	
				IRS	Ingestion Rate of Soil	200	mg/day	USEPA, 1991	

Table E.1-4.1c
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Dermal Absorption*	Construction Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.3	mg/(cm^2-event)	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2002	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	1	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				EV	Event Frequency	1	events/day	USEPA, 2002	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	
	Commercial Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.1	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	
	Resident	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.07	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	5,700	cm^2	USEPA, 2004	

Table E.1-4.1c
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Dermal Absorption Cont.*	Resident Cont.	Child	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.2	$mg/(cm^2\text{-event})$	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2002	
				SA	Skin Surface Area Available for Contact	2,800	cm^2	USEPA, 2004	

Notes:

(1) Fraction ingested assumed 100%.

*See Table E.1-4.3 for chemical specific dermal absorption fractions

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.

kg/mg = Kilogram Per Millogram

mg/kg = Milligram Per Kilogram

hr/day = hour per day

cm^2 = square centimeter

USEPA = U.S. Environmental Protection Agency

EPC = Exposure Point Concentration

Table E.1-4.1d
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Air
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation	Construction Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = CS x IR x EF x ED x ET x 1/PEF / BW x AT
				ED	Exposure Duration	1	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	2.5	m^3/hr	USEPA, 1991	
				PEF	Particulate Emission Factor	1.17E+06	m^3/kg	(1)	
	Commercial Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = CS x IR x EF x ED x ET x 1/PEF / BW x AT
				ED	Exposure Duration	25	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.0	m^3/hr	USEPA, 1989	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(1)	
	Resident	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = CS x IR x EF x ED x ET x 1/PEF / BW x AT
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	2	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.83	m^3/hr	(2)	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(1)	
		Child	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = CS x IR x EF x ED x ET x 1/PEF / BW x AT
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	6	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.5	m^3/hr	(3)	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(1)	

Notes:

(1) PEFs provided on Table E.1-4.4

(2) The inhalation rate is calculated using a daily long term rate of 20 m^3/day (USEPA, 1991) divided by 24 hours to derive hourly inhalation rate of 0.83 m^3/hour.

(3) The inhalation rate is calculated using a daily long term rate of 12 m^3/day (USEPA, 2003) divided by 24 hours to derive hourly inhalation rate of 0.5 m^3/hour.

Note: VOCs not identified as COPC in soil; therefore, vapor inhalation pathway not assessed.

USEPA, 1989. Risk Assessment Guidance for Superfund Volume I - Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002.

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 1997. Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa through Fc.

kg/mg = Kilogram Per Millogram
mg/kg = Milligram Per Kilogram
hr/day = hour per day
m^3/hour = cubic meters per hour
USEPA = U.S. Environmental Protection Agency

Table E.1-4.2a
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Groundwater
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Ingestion	Commercial Worker	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	CDI (mg/kg-day) = $\frac{CW \times IRW \times EF \times ED \times CF1}{BW \times AT}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				IR-W	Ingestion Rate of Tap Water	1	L/day	USEPA, 1991	
	Resident	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	CDI (mg/kg-day) = $\frac{CW \times IRW \times EF \times ED \times CF1}{BW \times AT}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				IR-W	Ingestion Rate of Tap Water	2	L/day	USEPA, 1991	
		Child	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	CDI (mg/kg-day) = $\frac{CW \times IRW \times EF \times ED \times CF1}{BW \times AT}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				IR-W	Ingestion Rate of Tap Water	1	L/day	USEPA, 1991	
Dermal Absorption*	Commercial Worker	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical Specific	dimensionless	USEPA, 2004	Dermal Absorbed Dose (mg/kg-day) = $\frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$
									where
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	*Organics:*
				CF2	Conversion Factor 2	1.00E-03	L/cm^3	unit conversion	if $t_{event} \le t^*$, $DA_{event} = 2 \times CF1 \times CF2 \times FA \times Kp \times CW \times [(6 \times \tau_{event} \times t_{event})/\pi]^{1/2}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				DA_{event}	Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	if $t_{event} > t^*$, $DA_{event} = CF1 \times CF2 \times FA \times Kp \times CW \times [(t_{event}/(1+B)) + 2 \times \tau_{event}(1+3B+3B^2)/(1+B)^2]$
				EV	Event Frequency	1	events/day	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical Specific	dimensionless	USEPA, 2004	
				Kp	Skin Permeability Constant	Chemical Specific	cm/hr	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	800	cm^2	(1)	*Inorganics:*
				t*	Time to Reach Steady State	Chemical Specific	hr	USEPA, 2004	$DA_{event} = CF1 \times CF2 \times Kp \times CW \times t_{event}$
				t_{event}	Event Duration	1	hr/event	USEPA, 2004	
				τ_{event}	Lag Time per Event	Chemical Specific	hr/event	USEPA, 2004	

Table E.1-4.2a
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Groundwater
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Dermal Absorption Continued*	Resident	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical Specific	dimensionless	USEPA, 2004	Dermal Absorbed Dose (mg/kg-day) = $\frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$
									where
				BW	Body Weight	70	kg	USEPA, 1991	*Organics:*
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	if $t_{event} \le t^*$, DA_{event} = 2 x CF1 x CF2 x FA x Kp x CW x $[(6 \times \tau_{event} \times t_{event})/\pi]^{1/2}$
				CF2	Conversion Factor 2	1.00E-03	L/cm^3	unit conversion	
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				DA_{event}	Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	
				ED	Exposure Duration	24	years	USEPA, 1991	if $t_{event} > t^*$, DA_{event} = CF1 x CF2 x FA x Kp x CW x $[(t_{event}/(1+B))+ 2 \times \tau_{event}(1+3B+3B^2)/(1+B)^2]$
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical Specific	dimensionless	USEPA, 2004	
				Kp	Skin Permeability Constant	Chemical Specific	cm/hr	USEPA, 2004	*Inorganics:*
				SA	Skin Surface Area Available for Contact	18,000	cm^2	USEPA, 2004	DA_{event} = CF1 x CF2 x Kp x CW x t_{event}
				t*	Time to Reach Steady State	Chemical Specific	hr	USEPA, 2004	
				t_{event}	Event Duration	0.58	hr/event	USEPA, 2004	
				τ_{event}	Lag Time per Event	Chemical Specific	hr/event	USEPA, 2004	
		Child	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical Specific	dimensionless	USEPA, 2004	Dermal Absorbed Dose (mg/kg-day) = $\frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$
									where
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	*Organics:*
				CF2	Conversion Factor 2	1.00E-03	L/cm^3	unit conversion	if $t_{event} \le t^*$, DA_{event} = 2 x CF1 x CF2 x FA x Kp x CW x $[(6 \times \tau_{event} \times t_{event})/\pi]^{1/2}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				DA_{event}	Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	if $t_{event} > t^*$, DA_{event} = CF1 x CF2 x FA x Kp x CW x $[(t_{event}/(1+B))+ 2 \times \tau_{event}(1+3B+3B^2)/(1+B)^2]$
				EV	Event Frequency	1	events/day	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical Specific	dimensionless	USEPA, 2004	
				Kp	Skin Permeability Constant	Chemical Specific	cm/hr	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	6,600	cm^2	USEPA, 2004	*Inorganics:*
				t*	Time to Reach Steady State	Chemical Specific	hr	USEPA, 2004	DA_{event} = CF1 x CF2 x Kp x CW x t_{event}
				t_{event}	Event Duration	1	hr/event	USEPA, 2004	
				τ_{event}	Lag Time per Event	Chemical Specific	hr/event	USEPA, 2004	

Table E.1-4.2a
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Groundwater
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

(1) Best Professional Judgement. Based on the mean surface area for hands for men and women.

*See Table E.1-4.6 for chemical specific parameters used to calculate absorbed dose per event

Note that VOCs were not analytes of interest for the site; therefore, the outdoor and indoor vapor inhalation pathways are not quantitatively assessed for the site.

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final.

kg = Kilogram

ug/L = Microgram Per Liter

mg/kg = milligram per kilogram

cm^2 = square centimeter

cm^3 = Cubic Centimeter

L/day = liter/day

USEPA = U.S. Environmental Protection Agency

VDEQ = Virginia Department of Environmental Quality

EPC = Exposure Point Concentration

Table E.1-4.2b
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Air
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation	Construction Worker	Adult	Trench Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USUSEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USUSEPA, 1991	
				BW	Body Weight	70	kg	USUSEPA, 1991	
				CA	Chemical Concentration in Outdoor Air	calculated	mg/m^3	(1)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	1	years	USUSEPA, 1991	
				EF	Exposure Frequency	125	days/year	VDEQ, 2006	
				ET	Exposure Time	8	hr/day	USUSEPA, 1991	
				IR	Inhalation Rate	2.5	m^3/hr	USUSEPA, 2002	
				FI	Fraction of Exposure, Air	1	unitless	(2)	
	Commercial Worker	Adult	Indoor Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CA	Chemical Concentration in Indoor Air	calculated	mg/m^3	(3)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.0	m^3/hr	USEPA, 1997	
				FI	Fraction of Exposure, Air	1	unitless	(2)	
	Resident	Adult	Indoor Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CA	Chemical Concentration in Indoor Air	calculated	mg/m^3	(3)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	16.4	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.83	m^3/hr	(4)	
				FI	Fraction of Exposure, Air	1	unitless	(2)	
			Vapors while showering with groundwater	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	10,950	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CA	Chemical Concentration in Shower Air	calculated	mg/m^3	(5)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	0.261	hr/day	(6)	
				IR	Inhalation Rate	0.83	m^3/hr	USEPA, 1997	
				FI	Fraction of Exposure, Air	1	unitless	(2)	

Table E.1-4.2b
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Air
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation Cont.	Resident Cont.	Child	Indoor Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CA	Chemical Concentration in Indoor Air	calculated	mg/m^3	(3)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	18	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.5	m^3/hr	(7)	
				FI	Fraction of Exposure, Air	1	unitless	(2)	

Notes:

(1) See Table E.1-4.8 for trench air calculations.

(2) Best Professional Judgement. Based on 100% inhalation fraction.

(3) Chemical Concentration in Air for Indoor Vapors calculated using Johnson and Ettinger Model (See Table E.1-4.6).

(4) The inhalation rate is calculated using a daily long term rate of 20 m^3/day (USEPA, 1991) divided by 24 hours to derive hourly inhalation rate of 0.83 m^3/hour.

(5) Chemical Concentration in Air for Vapors while showering with groundwater calculated using Foster and Chrostowski Inhalation Model (See Table E.1-4.7).

(6) ET calculated using ET=(Ds+((exp(-Ra*t))/Ra - ((exp(Ra(Ds-t))/Ra)))*1hr/60min

Ds (shower time) =	30	min
t (total time in shower room) =	60	min
Ra (air exchange rate) =	0.01667	per min
ET=	0.261	hour/day

(7) The inhalation rate is calculated using a daily long term rate of 12 m^3/day (USEPA, 2003) divided by 24 hours to derive hourly inhalation rate of 0.5 m^3/hour.

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 1997. Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.

USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

VDEQ, 2006. Voluntary Remediation Program Risk Assessment Guidance. www.deq.virginia.gov/vrprisk/raguide.html.

kg = Kilogram
ug/L = Microgram Per Liter
mg/kg = milligram per kilogram
cm^3 = Cubic Centimeter
L/day = liter/day
USEPA = U.S. Environmental Protection Agency
VDEQ = Virginia Department of Environmental Quality

Table E.1-4.3.RME
Dermal Absorption Fractions and Volatilization Factors for Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	ABSd * (m^3/kg)	D_i (cm^2/s)	D_w (cm^2/s)	K_{oc} (cm^3/g)	K_d (cm^3/g)	H (unitless)	Da (cm^2/sec)	$VF_{C/I\ Worker}$/ $VF_{Maint.\ Worker}$ (m^3/kg)	$VF_{Const.\ Worker}$ (m^3/kg)	$VF_{Adult\ Resident}$ (m^3/kg)	$VF_{Child\ Resident}$ (m^3/kg)
Aluminum	7429-90-5	1.00E-02	--	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	1.00E-02	--	--	--	--	--	--	--	--	--	--
Arsenic	7440-38-2	3.00E-02	--	--	--	--	--	--	--	--	--	--
Cadmium	7440-43-9	1.00E-03	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	1.00E-02	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	1.00E-02	--	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	1.00E-02	--	--	--	--	--	--	--	--	--	--
Manganese	7439-96-5	1.00E-02	--	--	--	--	--	--	--	--	--	--
Thallium	7440-28-0	1.00E-02	--	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	1.00E-02	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	1.00E-02	--	--	--	--	--	--	--	--	--	--
								--				
Aroclor 1254	11097-69-1	1.40E-01	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	11096-82-5	1.40E-01	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	1.30E-01	--	--	--	--	--	--	--	--	--	--

Notes:
CAS = Chemical Abstract Service
ABS_d = Dermal Absorption Fraction
VF = Volatilization Factor
D_a = Apparent Diffusivity
m^3/kg = cubic meters per kilogram
cm2/s = centimeter squared per second

*ABS_d values are taken from Exhibit 3-4, Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation and Manual, Part E; Supplemental Guidance for Dermal Risk Assessment, July 2004, and Region III Technical Guidance, Assessing Dermal Exposure in Soil, December 1995.

Table E.1-4.3.RME
Dermal Absorption Fractions and Volatilization Factors for Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Notes continued:

D_a values calculated using the following equation and values from the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. USEPA, 2002.
Equation 4-8 from USEPA, 2002:

$D_a = [((\Theta_a^{10/3} \times Di \times H) + (\Theta_w^{10/3} \times D_w))/n^2]/[(\rho_b \times K_d) + \Theta_w + (\Theta_a \times H)]$

Θ_a (L_{air}/L_{soil}) =	0.28	default
Θ_w (L_{water}/L_{soil}) =	0.15	default
D_i(cm2/sec) =	varies	
D_w(cm2/sec) =	varies	
H(unitless) =	varies	
n (L_{Pore}/L_{soil}) =	0.43	default
ρ_b (g/cm^3) =	1.50	default
K_d (cm^3/g) =	varies	
K_{oc} (cm^3/g) =	varies	
foc (g/g) =	0.00235	

VF (soil only) values for commercial/industrial worker, adult resident, and child resident, and adolescent tresspasser calculated using the following equations and values from the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. USEPA, 2002.
Equation 4-8 from USEPA, 2002:

$VF = Q/C_{vol} * (3.14 * D_A * T)^{1/2} * CF/(2 * \rho_b * D_a)$

Q/C_{vol} (g/m2-s)/kg/m3) =	72.08	calculated value
D_A (cm^2/sec) =	varies	chemical specific (see above)
T (sec) =	varies	receptor specific exposure interval (T= ED(yrs)*365 days/year*24 hours/day*60 min/hour*60sec/min)
		(Maintenance Worker=7.88E+08 sec, Commercial/Industrial Worker=7.88E+08 sec, Adult Resident=7.56E+08, and Child Resident=1.89E+08)
CF (m^2/cm^2) =	1.00E-04	default
ρ_b (g/cm^3)	1.5	default

Exhibit D-3 from USEPA, 2002:

$Q/C_{vol} = A * e^{((\ln A_{site} - B)^2/C)}$ =

	72.08	
A =	9.9253	Huntington value
B =	18.6636	Huntington value
C =	211.8862	Huntington value
A_{site} (acres)=	0.16	contaminated site area

VF (soil only) values for construction worker were calculated using the following equations and values from the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. USEPA, 2002.
Equation 5-14 from USEPA 2002:

$VF = Q/C_{sa} * 1/F_D * (3.14 * D_A * T)^{1/2} * CF/(2 * \rho_b * D_A)$

Q/C_{sa} (g/m^2-s)/kg/m^3) =	17.96	calculated value
F_D (unitless) =	0.185	default
D_A (cm^2/sec) =	varies	chemical specific (see above)
T (sec) =	3.15E+07	receptor specific exposure interval (T= ED(yrs)*365 days/year*24 hours/day*60 min/hour*60sec/min)
CF (m^2/cm^2) =	1.00E-04	default
ρ_b (kg/L) =	1.5	default

Equation 5-15 from USEPA, 2002:

$Q/C_{sa} = A * e^{((\ln A_c - B)^2/C)}$ =

	17.96	
A=	2.4538	default
B =	17.566	default
C =	189.0426	default
A_c (acres)=	0.16	contaminated site area

Table E.1-4.4.RME
PEF Calculations
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Commercial/Industrial Worker

Equation 4-5 from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. USEPA, 2002.

$$PEF = Q / C_{wind} \cdot \frac{3{,}600 s/h}{0.036 \cdot (1-V) \cdot (U_m / U_t)\text{^}3 \cdot F(x)}$$

Parameter	Value	
PEF	1.04E+09	
Q/C_{wind}	72.08	calculated below
V	0.5	default
U_m	4.69	default
U_t	11.32	default
F(x)	0.194	default

PEF = particulate emission factor (m^3/kg)
s/h = seconds per hour
Q/Cwind = Inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source (g/m^3-s per kg/m^3)
V = fraction of vegatative cover (unitless)
U_m = mean annual windspeed (m/s)
U_t = equivalent threshold value of windspeed at 7m (m/s)
F(x) = function dependent on U_m/U_t derived using Cowherd et al. (1985)
Site Area = 0.16 acres

Q/C_{wind} calculated in accordance with Exhibit D-2 from USEPA, 2002 using A, B, and C values for Huntington, WV:
$Q/C_{wind} = A*e\text{^}((\ln A_{site} - B)^2/C))$

Q/C_{wind}=	72.08	
A =	9.9253	unitless
B =	18.6636	unitless
C =	211.8862	unitless
A_{site}=	0.16	acres

Table E.1-4.4.RME
PEF Calculations
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Construction Worker

Equation 5-5 from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. USEPA, 2002.

$$PEF_{sc} = Q / C_{sr} \cdot \frac{1}{F_D} \cdot \left[\frac{T \cdot A_R}{556 \cdot (W/3)^{0.4} \cdot \frac{(365\ d/yr - p)}{365\ d/yr} \cdot \sum VKT} \right]$$

Parameter	Value	
PEF_{sc}	1.82E+06	
Q/C_{sr}	28.75	calculated
F_D	0.185	default
T (sec)	7,488,000	assumed-see below
A_R (m^2)	155	calculated
W (tons)	8	assumed-see below
p (days/yr)	140	determined-see below
sumVKT (km)	195	assumed-see below

PEF_{sr} = subchronic road particulate emission factor (m^3/kg)
Q/C_{sr} = Inverse of the ratio of the 1-h geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/m2-s per kg/m3)
F_D = dispersion correction factor (unitless)
T = total time over which construction occurs-total time period assumed to be 6 months (52wks x 5days per week x 8 hours per day x 3,600 s per hour)
A_R = surface area of contaminated road segment (m^2)
L_R = length of road segment (assumed to equal to (0.16 acres*43,560 ft^2/acre)$^{1/2}$)
W_R = width of road segment (assumed to be 20 ft)
$A_R = L_R \times W_R \times 0.092903 m^2/ft^2$
A_R= 155 m^2
W = mean vehicle weight assumed to be 8 tons ([(20 cars * 2 tons/car)+(10 trucks*20 tons/truck)]/30 vehicles)
p = number of days with at least 0.01 inches of precipitation (from Exhibit 5-2 140 days/year)
sumVKT = sum of fleet vehicle kilometers traveled during the exposure duration (km)
(30 of vehicles x 0.025 km/day x 52wks x 5 days/wk)

Q/C_{sr} calculated in accordance with Equation 5-6:
using A, B, and C default values:
$Q/C_{sr} = A*e^{((\ln A_s - B)^2/C)}$

Q/C_{sr}=	28.75	g/m^2-s per kg/m^3
A =	12.9351	unitless
B =	5.7383	unitless
C =	71.7711	unitless
A_s =	0.16	acres

Table E.1-4.5
Parameter Values Used for Groundwater
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	FA	Kp (cm/hr)	tau $_{event}$ (hr)	B	t* (hr)
Antimony	7440-36-0	--	1.0E-03	--	--	--
Arsenic	7440-38-2	--	1.0E-03	--	--	--
Manganese	7439-96-5	--	1.0E-03	--	--	--
Chloroform	67-66-3	1.0	6.8E-03	5.0E-01	2.9E-02	1.2E+00

Notes:

CAS = Chemical Abstract Service

FA = Fraction Absorbed

Kp = Permeability Coefficient

cm/hr = Centimeter per Hour

tau_{event} = Lag Time per Event

B = Permeability Ratio

t* = Time to Reach Steady State

Organic parameter values are taken from Organic values from Organic Chemicals in Water Spreadsheet (http://www.epa.gov/oswer/riskassessment/ragse/index.htm)

Inorganic parameters were taken from Exhibit 3-1, Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual, Part E; Supplemental Guidance for Dermal Risk Assessment. July 2004.

TABLE E.1-4.6
Groundwater Inhalation Indoor Air Concentration Summary
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	C_W ug/L	C_a mg/m^3
Chloroform	67-66-3	5.70E+01	3.71E-04

Notes:
CAS = Chemical Abstract Service
C_w = Concentration in Water
C_a = Concentration in Air
ug/L = Microgram per Liter
mg/m3 = Milligram per Cubic Meter
Indoor Air Concentrations Modeled Using Johnson and Ettinger Model.
Non-default Model Inputs: Depth below grade to bottom of enclosed floor space (15 cm)
Depth below grade to water table (1,432 cm)
Soil Type (CL)

TABLE E.1-4.7
Groundwater Inhalation Shower Stall Air Concentration Calculations
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	C_W ug/L	MW g/mole	H atm-m^3/mole	k_l cm/hour	k_g cm/hour	K_L cm/hour	K_{aL} cm/hour	C_{wd} ug/L	S ug/m^3-min	C_a mg/m^3
Chloroform	67-66-3	5.70E+01	119.4	3.7E-03	12.14	1164.91	1.14E+01	1.52E+01	2.26E+01	7.55E+01	4.53E+00

Equations:

k_l (liquid-film transfer coefficient) = $20*(44/MW)^{0.5}$

k_g (gas-film transfer coefficient) = $3000*(18/MW)^{0.5}$

K_L (overall mass transfer coefficient) = $(1/k_l+(R*t/H*k_g))^{-1}$

K_{aL} (overall mass transfer coefficient adjusted to shower water temperature) = $K_L*((T*u_s/T_s*u_l)^{-0.5}$

C_{wd} (VOC concentration leaving shower droplet) = $C_w*(1-\exp(-K_{aL}*t_s/60*d)$

S (VOC generation rate) = $C_{wd}*FR/SV$

C_a (VOC concentration in shower air) =$(S/R_a)*(1mg/1000ug)$

Constants:

R (gas constant)	8.20E-05	atm-m^3/mole-K
T (room temperature)	298	K
T_s (water temp)	318	K
u_s (water viscosity at T_s)	0.596	centapoise
u_l (water viscosity at T)	1.002	centapoise
t_s (shower droplet drop time)	2	sec
d (droplet diameter)	1	mm
FR (shower flow rate)	20	L/min
SV (shower room air volume)	6	m^3
R_a (air exchange rate)	0.01667	permin

TABLE E.1-4.8
Groundwater Inhalation Construction Worker Trench Gas Concentration Calculations
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	C_W ug/L	H_i atm-m^3/mole	D_{air} cm^2/sec	VF L/m^3	C_a mg/m^3
Chloroform	67-66-3	5.70E+01	3.67E-03	1.04E-01	3.22E-03	1.84E-04

Notes:

Exposure-point Concentrations calculated using VDEQ VRP Model for construction/utility workers in a trench: deep Goundwater greater than 15 feet

Equations:

$VF = (H_i * D_{air} * AC_{vad}^{3.33} * A * F * CF1 * CF2 * CF3)/(R * T * L_d * ACH * V * Por_{vad}^2)$

$C_a = C_W * VF * CF4$

Constants:

H_i (Henry's Law Constant)	chem spec	atm-m^3/mol
D_{air} (diffusion coefficient in air)	chem spec	cm^2/s
AC_{vad} (volumetric air content in vadose zone soil)	0.25	cm^3/cm^3
L (length of trench)	2.44	m
W (width of trench)	0.91	m
A (area of trench - L*W)	2.23	m^2
F (fraction of floor through which contaminant can enter)	1	untiless
R (gas constant)	8.2E-05	atm-m^3/mole-K
T (average system absolute temp)	298	K
L_d (dist. b/w trench bottom and groundwater)	975	cm
d (depth of trench)	4.57	m
V (volume of trench)	10.19	m^3
ACH (air changes per hour)	2	per hour
Por_{vad} (total soil porosity in vadose zone)	0.44	cm^3/cm^3
CF1	0.001	L/cm^3
CF2	10,000	cm^2/m^2
CF3	3600	sec/hour
CF4	0.001	mg/ug

Table E.1-5.1
Non-Cancer Toxicity Data - Oral/Dermal
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
			Value	Units		Value	Units			Source(s)	Date(s)
Aluminum	7429-90-5	Chronic	1.00E+00	mg/kg-day	1	1.00E+00	mg/kg-day	developmental CNS	100	PPRTV	07/26/2001
Antimony	7440-36-0	Chronic	4.00E-04	mg/kg-day	0.15	6.00E-05	mg/kg-day	blood	1000	IRIS	03/18/2008
Antimony	7440-36-0	Subchronic	2.00E-04	mg/kg-day	0.15	3.00E-05	mg/kg-day	blood	300	PPRTV	07/26/1999
Arsenic	7440-38-2	Chronic	3.00E-04	mg/kg-day	1	3.00E-04	mg/kg-day	skin/ vascular	3	IRIS	03/18/2008
Arsenic	7440-38-2	Subchronic	3.00E-04	mg/kg-day	1	3.00E-04	mg/kg-day	skin	3	HEAST	07/31/1997
Cadmium	7440-43-9	Chronic	1.00E-03	mg/kg-day	0.025	2.50E-05	mg/kg-day	kidney	10	IRIS	03/18/2008
Chromium[(2)]	7440-47-3	Chronic	3.00E-03	mg/kg-day	0.025	7.50E-05	mg/kg-day	GI tract/fetus/bone marrow/liver	900	IRIS	03/18/2008
Chromium[(2)]	7440-47-3	Subchronic	2.00E-02	mg/kg-day	0.025	5.00E-04	mg/kg-day	GI tract/fetus/bone marrow/liver	100	HEAST	07/31/1997
Cobalt	7440-48-4	Chronic	2.00E-02	mg/kg-day	1	2.00E-02	mg/kg-day	blood	10	PPRTV	01/15/2002
Iron	7439-89-6	Chronic	7.00E-01	mg/kg-day	1	7.00E-01	mg/kg-day	blood/ liver/ GI tract	1	PPTRV	01/05/1999
Manganese	7439-96-5	Chronic	2.00E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	CNS	1	IRIS	03/18/2008
Thallium	7440-28-0	Chronic	7.00E-05	mg/kg-day	1	7.00E-05	mg/kg-day	liver/ blood/ hair	3000	Other, Region III	10/11/2007
Vanadium	7440-62-2	Chronic	1.00E-03	mg/kg-day	0.026	2.60E-05	mg/kg-day	kidney	NA	NCEA, Region III	10/25/2005
Vanadium	7440-62-2	Subchronic	7.00E-03	mg/kg-day	0.026	1.80E-04	mg/kg-day	kidney/ blood	100	HEAST	07/31/1997
Zinc	7440-66-6	Chronic	3.00E-01	mg/kg-day	1	3.00E-01	mg/kg-day	blood	3	IRIS	03/18/2008
Zinc	7440-66-6	Subchronic	3.00E-01	mg/kg-day	1	3.00E-01	mg/kg-day	blood	3	HEAST	07/31/1997
Aroclor 1254	11097-69-1	Chronic	2.00E-05	mg/kg-day	1	2.00E-05	mg/kg-day	eyes	300	IRIS	03/18/2008
Aroclor 1254	11097-69-1	Subchronic	5.00E-05	mg/kg-day	1	5.00E-05	mg/kg-day	immune system	100	HEAST	07/31/1997
Aroclor 1260	11096-82-5	NA	NA	NA	1	NA	NA	NA	NA	NA	NA
Chloroform	67-66-3	Chronic	1.00E-02	mg/kg-day	1	1.00E-02	mg/kg-day	liver	100	IRIS	03/18/2008
Chloroform	67-66-3	Subchronic	1.00E-02	mg/kg-day	1	1.00E-02	mg/kg-day	liver	1000	HEAST	07/31/1997
Benzo(a)pyrene	50-32-8	NA	NA	NA	1	NA	NA	NA	NA	NA	NA

Notes:

CAS = Chemical Abstract Service
RfD = Reference Dose
mg/(kg-d) = milligrams per kilogram day
Region III = U.S. Environmental Protection Agency, Region III
NCEA = National Center for Environmental Assessment
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables

PPRTV = Provisional Peer Reviewed Toxicity Values
NA = Not Available
(1) Oral absorption efficiency for dermal from Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005. 2004.
(2) Chromium VI toxicity value used
CNS = Central Nervous System

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III, and HEAST.
For IRIS values, the date of the IRIS search is provided.
For HEAST values, the date of HEAST is provided.
For Region III values, the date of the Region III RBC Table is provided.
For PPRTV/NCEA, date of paper is provided.

Table E.1-5.2
Non-Cancer Toxicity Data - Inhalation
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
			Value	Units	Value	Units			Source(s)	Date(s)
Aluminum	7429-90-5	Chronic	1.00E-03	mg/m3	1.00E-03	mg/kg-day	CNS	300	PPRTV, Region III	10/11/2007
Antimony	7440-36-0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	7440-36-0	Subchronic	4.00E-04	mg/m3	0.00011	mg/kg-day	respiratory	100	PPRTV	07/26/1999
Arsenic	7440-38-2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	7440-43-9	Chronic	2.00E-04	mg/m3	5.70E-05	mg/kg-day	respiratory/ kidney/ liver	NA	NCEA	03/20/1996
Chromium(1)	7440-47-3	Chronic	1.00E-04	mg/m3	2.90E-05	mg/kg-day	respiratory	300	IRIS	03/18/2008
Cobalt	7440-48-4	Chronic	2.00E-05	mg/m3	5.70E-06	mg/kg-day	respiratory	100	PPRTV	01/15/2002
Iron	7439-89-6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	7439-96-5	Chronic	5.00E-05	mg/m3	1.43E-05	mg/kg-day	CNS	1000	IRIS	03/18/2008
Thallium	7440-28-0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	7440-66-6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	67-66-3	Chronic	4.90E-02	mg/m3	1.40E-02	mg/kg-day	respiratory	NA	NCEA, Region III	10/11/2007
Benzo(a)pyrene	50-32-8	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

RfC = Reference Concentration
RfD = Reference Dose
mg/m^3 = milligrams per cubic meter
mg/(kg-d) = milligrams per kilogram day
Region III = U.S. Environmental Protection Agency, Region III
NCEA = National Center for Environmental Assessment
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
PPRTV = Provisional Peer Reviewed Toxicity Values
NA = Not Available
CNS = Central Nervous System

(1) Toxicity data for chromium VI particulates
Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III, VDEQ, and HEAST.
For IRIS values, the date of the IRIS search is provided.
For PPRTV values, the date of the paper is provided.
For Region III values, the date of the Region III RBC Table is provided.
RfDi (mg/kg-day) = RfC (mg/m3) x 20 m3/day x 1/70 kg

Table E.1-6.1
Cancer Toxicity Data - Oral/Dermal
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
		Value	Units		Value	Units		Source(s)	Date(s)
Aluminum	7429-90-5	NA	NA	1	NA	NA	NA	NA	NA
Antimony	7440-36-0	NA	NA	0.15	NA	NA	NA	NA	NA
Arsenic	7440-38-2	1.50E+00	1/(mg/kg-day)	1	1.50E+00	1/(mg/kg-day)	A	IRIS	03/18/2008
Cadmium	7440-43-9	NA	NA	0.025	NA	NA	NA	NA	NA
Chromium[(2)]	7440-47-3	NA	NA	0.025	NA	NA	Cannot Be Determined	NA	NA
Cobalt	7440-48-4	NA	NA	1	NA	NA	NA	NA	NA
Iron	7439-89-6	NA	NA	1	NA	NA	NA	NA	NA
Manganese	7439-96-5	NA	NA	0.04	NA	NA	D	NA	NA
Thallium	7440-28-0	NA	NA	1	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NA	NA	0.026	NA	NA	NA	NA	NA
Zinc	7440-66-6	NA	NA	1	NA	NA	D	NA	NA
Aroclor 1254	11097-69-1	2.00E+00	1/(mg/kg-day)	1	2.00E+00	1/(mg/kg-day)	B2	IRIS	03/18/2008
Aroclor 1260	11096-82-5	2.00E+00	1/(mg/kg-day)	1	2.00E+00	1/(mg/kg-day)	B2	IRIS	03/18/2008
Chloroform	67-66-3	NA	NA	1	NA	NA	B2	NA	NA
Benzo(a)pyrene	50-32-8	7.30E+00	1/(mg/kg-day)	1	7.30E+00	1/(mg/kg-day)	B2	IRIS	03/18/2008

Notes:

CSF = Cancer Slope Factor
mg/(kg-d) = Milligrams Per Kilogram Day
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NA = Not Available
1986 Cancer Guideline Description:
A = Human carcinogen
B1 = Probable human carcinogen - indicates that limited human data are available.
B2 = Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C = Possible human carcinogen
D = Not classifiable as a human carcinogen

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III and VDEQ.
For IRIS values, the date of the IRIS search is provided.

(1) Oral absorption efficiency for dermal from Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. . EPA/540/R/99/005. 2004
(2) Chromium VI toxicity data used.

Table E.1-6.2
Cancer Toxicity Data - Inhalation
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	CSF	
		Value	Units	Value	Units		Source(s)	Date(s)
Aluminum	7429-90-5	NA	NA	NA	NA	NA	NA	NA
Antimony	7440-36-0	NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	4.30E+00	1/(mg/m3)	1.50E+01	1/(mg/kg-day)	A	IRIS	03/18/2008
Cadmium	7440-43-9	1.80E+00	1/(mg/m3)	6.30E+00	1/(mg/kg-day)	B1	IRIS	03/18/2008
Chromium(1)	7440-47-3	1.20E+01	1/(mg/m3)	4.10E+01	1/(mg/kg-day)	A	IRIS	03/18/2008
Cobalt	7440-48-4	2.80E+00	1/(mg/m3)	9.80E+00	1/(mg/kg-day)	B1	PPRTV	01/15/2002
Iron	7439-89-6	NA	NA	NA	NA	NA	NA	NA
Manganese	7439-96-5	NA	NA	NA	NA	D	NA	NA
Thallium	7440-28-0	NA	NA	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NA	NA	NA	NA	NA	NA	NA
Zinc	7440-66-6	NA	NA	NA	NA	D	NA	NA
Aroclor 1254	11097-69-1	5.71E-01	1/(mg/m3)	2.00E+00	1/(mg/kg-day)	B2	IRIS	03/18/2008
Aroclor 1260	11096-82-5	5.71E-01	1/(mg/m3)	2.00E+00	1/(mg/kg-day)	B2	IRIS	03/18/2008
Chloroform	67-66-3	2.31E-02	1/(mg/m3)	8.10E-02	1/(mg/kg-day)	B2	IRIS	03/18/2008
Benzo(a)pyrene	50-32-8	8.86E-01	1/(mg/m3)	3.10E+00	1/(mg/kg-day)	B2	NCEA, Region III	10/11/2007

Notes:

CSF = Cancer Slope Factor
mg/(kg-d) = Milligrams Per Kilogram Day
USEPA = U.S. Environmental Protection Agency
Region III = U.S. Environmental Protection Agency, Region III
NCEA = National Center for Environmental Assessment
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
PPRTV = Provisional Peer Reviewed Toxicity Values
NA = Not Available
(1) = Chromium VI toxicity data used
CSF = Unit Risk ($1/mg/m^3$) x 70 kg x 1 day/20 m^3

1986 Cancer Guideline Description:
A = Human carcinogen
B1 = Probable human carcinogen - indicates that limited human data are available.
B2 = Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C = Possible human carcinogen
D = Not classifiable as a human carcinogen

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III and VDEQ.
For IRIS values, the date of the IRIS search is provided.
For NCEA, Region III values, the date of the Region III RBC Table is provided.
For PPRTV values, the date of the paper is provided.

TABLE E.1-7.1.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure - Maintenance Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Soil	Soil	Ingestion	Aluminum	28,333	mg/kg	1.98E-03	mg/kg-day	--	--	--	5.54E-03	mg/kg-day	1.00E+00	mg/kg-day	6.E-03
				Antimony	178.2	mg/kg	1.25E-05	mg/kg-day	--	--	--	3.49E-05	mg/kg-day	4.00E-04	mg/kg-day	9.E-02
				Arsenic	3.841	mg/kg	2.68E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	4.0.E-07	7.52E-07	mg/kg-day	3.00E-04	mg/kg-day	3.E-03
				Cadmium	52.73	mg/kg	3.69E-06	mg/kg-day	--	--	--	1.03E-05	mg/kg-day	1.00E-03	mg/kg-day	1.E-02
				Chromium	1,166	mg/kg	8.15E-05	mg/kg-day	--	--	--	2.28E-04	mg/kg-day	3.00E-03	mg/kg-day	8.E-02
				Cobalt	21.13	mg/kg	1.48E-06	mg/kg-day	--	--	--	4.14E-06	mg/kg-day	2.00E-02	mg/kg-day	2.E-04
				Iron	44,944	mg/kg	3.14E-03	mg/kg-day	--	--	--	8.80E-03	mg/kg-day	7.00E-01	mg/kg-day	1.E-02
				Manganese	1,682	mg/kg	1.18E-04	mg/kg-day	--	--	--	3.29E-04	mg/kg-day	2.00E-02	mg/kg-day	2.E-02
				Vanadium	918	mg/kg	6.42E-05	mg/kg-day	--	--	--	1.80E-04	mg/kg-day	1.00E-03	mg/kg-day	2.E-01
				Zinc	1,269	mg/kg	8.87E-05	mg/kg-day	--	--	--	2.48E-04	mg/kg-day	3.00E-01	mg/kg-day	8.E-04
				Aroclor 1254	2	mg/kg	1.40E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.8.E-07	3.91E-07	mg/kg-day	2.00E-05	mg/kg-day	2.E-02
				Aroclor 1260	2	mg/kg	1.40E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.8.E-07	3.91E-07	mg/kg-day	--	--	--
				Benzo(a)pyrene	0.0208	mg/kg	1.45E-09	mg/kg-day	7.30E+00	mg/kg-day $^{-1}$	1.1.E-08	4.07E-09	mg/kg-day	--	--	--
			Exp. Route Total								1.E-06					4.E-01
			Dermal Absorption	Aluminum	28,333	mg/kg	6.53E-05	mg/kg-day	--	--	--	1.83E-04	mg/kg-day	1.00E+00	mg/kg-day	2.E-04
				Antimony	178.2	mg/kg	4.11E-07	mg/kg-day	--	--	--	1.15E-06	mg/kg-day	6.00E-05	mg/kg-day	2.E-02
				Arsenic	3.841	mg/kg	2.66E-08	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	4.E-08	7.44E-08	mg/kg-day	3.00E-04	mg/kg-day	2.E-04
				Cadmium	52.73	mg/kg	1.22E-08	mg/kg-day	--	--	--	3.41E-08	mg/kg-day	2.50E-05	mg/kg-day	1.E-03
				Chromium	1,166	mg/kg	2.69E-06	mg/kg-day	--	--	--	7.53E-06	mg/kg-day	7.50E-05	mg/kg-day	1.E-01
				Cobalt	21.13	mg/kg	4.87E-08	mg/kg-day	--	--	--	1.36E-07	mg/kg-day	2.00E-02	mg/kg-day	7.E-06
				Iron	44,944	mg/kg	1.04E-04	mg/kg-day	--	--	--	2.90E-04	mg/kg-day	7.00E-01	mg/kg-day	4.E-04
				Manganese	1,682	mg/kg	3.88E-06	mg/kg-day	--	--	--	1.09E-05	mg/kg-day	8.00E-04	mg/kg-day	1.E-02
				Vanadium	918	mg/kg	2.12E-06	mg/kg-day	--	--	--	5.93E-06	mg/kg-day	2.60E-05	mg/kg-day	2.E-01
				Zinc	1,269	mg/kg	2.93E-06	mg/kg-day	--	--	--	8.20E-06	mg/kg-day	3.00E-01	mg/kg-day	3.E-05
				Aroclor 1254	2	mg/kg	6.46E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-07	1.81E-07	mg/kg-day	2.00E-05	mg/kg-day	9.E-03
				Aroclor 1260	2	mg/kg	6.46E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-07	1.81E-07	mg/kg-day	--	--	--
				Benzo(a)pyrene	0.0208	mg/kg	6.24E-10	mg/kg-day	7.30E+00	mg/kg-day $^{-1}$	5.E-09	1.75E-09	mg/kg-day	--	--	--
			Exp. Route Total								3.E-07					4.E-01
		Exposure Point Total									1.E-06					8.E-01
	Exposure Medium Total										1.3.E-06					8.E-01
Surface Soil Cont.	Air	Fugitive Dust	Inhalation	Aluminum	28,333	mg/kg	1.80E-07	mg/kg-day	--	--	--	5.04E-07	mg/kg-day	1.00E-03	mg/kg-day	5.E-04
				Antimony	178.2	mg/kg	1.13E-09	mg/kg-day	--	--	--	3.17E-09	mg/kg-day	--	--	--
				Arsenic	3.841	mg/kg	2.44E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	4.E-10	6.83E-11	mg/kg-day	--	--	--
				Cadmium	52.73	mg/kg	3.35E-10	mg/kg-day	6.30E+00	mg/kg-day $^{-1}$	2.E-09	9.38E-10	mg/kg-day	5.70E-05	mg/kg-day	2.E-05
				Chromium	1,166	mg/kg	7.41E-09	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	3.E-07	2.07E-08	mg/kg-day	2.90E-05	mg/kg-day	7.E-04
				Cobalt	21.13	mg/kg	1.34E-10	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	1.E-09	3.76E-10	mg/kg-day	5.70E-06	mg/kg-day	7.E-05
				Iron	44,944	mg/kg	2.86E-07	mg/kg-day	--	--	--	8.00E-07	mg/kg-day	--	--	--
				Manganese	1,682	mg/kg	1.07E-08	mg/kg-day	--	--	--	2.99E-08	mg/kg-day	1.43E-05	mg/kg-day	2.E-03
				Vanadium	918	mg/kg	5.83E-09	mg/kg-day	--	--	--	1.63E-08	mg/kg-day	--	--	--
				Zinc	1,269	mg/kg	8.06E-09	mg/kg-day	--	--	--	2.26E-08	mg/kg-day	--	--	--

TABLE E.1-7.1.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure - Maintenance Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
				Aroclor 1254	2	mg/kg	1.27E-11	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	3.E-11	3.56E-11	mg/kg-day	--	--	--
				Aroclor 1260	2	mg/kg	1.27E-11	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	3.E-11	3.56E-11	mg/kg-day	--	--	--
				Benzo(a)pyrene	0.0208	mg/kg	1.32E-13	mg/kg-day	3.10E+00	mg/kg-day $^{-1}$	4.E-13	3.70E-13	mg/kg-day	--	--	--
			Exp. Route Total								3.E-07					3.E-03
		Exposure Point Total									3.E-07					3.E-03
	Exposure Medium Total										3.E-07					3.E-03
Soil Total											2.E-06					8.E-01
										Total of Receptor Risks Across All Media	2.E-06			Total of Receptor Hazards Across All Media		8.E-01

TABLE E.1-7.2.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure - Commercial Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	26,325	mg/kg	4.60E-03	mg/kg-day	--	--	--	1.29E-02	mg/kg-day	1.00E+00	mg/kg-day	1.E-02
				Antimony	131	mg/kg	2.29E-05	mg/kg-day	--	--	--	6.41E-05	mg/kg-day	4.00E-04	mg/kg-day	2.E-01
				Arsenic	3.506	mg/kg	6.13E-07	mg/kg-day	1.50E+00	mg/kg-day^{-1}	9.E-07	1.72E-06	mg/kg-day	3.00E-04	mg/kg-day	6.E-03
				Cadmium	26.86	mg/kg	4.69E-06	mg/kg-day	--	--	--	1.31E-05	mg/kg-day	1.00E-03	mg/kg-day	1.E-02
				Chromium	252.8	mg/kg	4.42E-05	mg/kg-day	--	--	--	1.24E-04	mg/kg-day	3.00E-03	mg/kg-day	4.E-02
				Cobalt	18.02	mg/kg	3.15E-06	mg/kg-day	--	--	--	8.82E-06	mg/kg-day	2.00E-02	mg/kg-day	4.E-04
				Iron	45,129	mg/kg	7.89E-03	mg/kg-day	--	--	--	2.21E-02	mg/kg-day	7.00E-01	mg/kg-day	3.E-02
				Manganese	2,220	mg/kg	3.88E-04	mg/kg-day	--	--	--	1.09E-03	mg/kg-day	2.00E-02	mg/kg-day	5.E-02
				Thallium	0.271	mg/kg	4.74E-08	mg/kg-day	--	--	--	1.33E-07	mg/kg-day	7.00E-05	mg/kg-day	2.E-03
				Vanadium	201.3	mg/kg	3.52E-05	mg/kg-day	--	--	--	9.85E-05	mg/kg-day	1.00E-03	mg/kg-day	1.E-01
				Zinc	1,267	mg/kg	2.21E-04	mg/kg-day	--	--	--	6.20E-04	mg/kg-day	3.00E-01	mg/kg-day	2.E-03
				Aroclor 1254	0.432	mg/kg	7.55E-08	mg/kg-day	2.00E+00	mg/kg-day^{-1}	2.E-07	2.11E-07	mg/kg-day	2.00E-05	mg/kg-day	1.E-02
				Aroclor 1260	0.365	mg/kg	6.38E-08	mg/kg-day	2.00E+00	mg/kg-day^{-1}	1.E-07	1.79E-07	mg/kg-day	--	--	--
				Benzo(a)pyrene	0.00796	mg/kg	1.39E-09	mg/kg-day	7.30E+00	mg/kg-day^{-1}	1.E-08	3.89E-09	mg/kg-day	--	--	--
			Exp. Route Total								1.2.E-06					4.E-01
			Dermal Absorption	Aluminum	26,325	mg/kg	3.04E-04	mg/kg-day	--	--	--	8.50E-04	mg/kg-day	1.00E+00	mg/kg-day	9.E-04
				Antimony	131	mg/kg	1.51E-06	mg/kg-day	--	--	--	4.23E-06	mg/kg-day	6.00E-05	mg/kg-day	7.E-02
				Arsenic	3.506	mg/kg	1.21E-07	mg/kg-day	1.50E+00	mg/kg-day^{-1}	2.E-07	3.40E-07	mg/kg-day	3.00E-04	mg/kg-day	1.E-03
				Cadmium	26.86	mg/kg	3.10E-08	mg/kg-day	--	--	--	8.67E-08	mg/kg-day	2.50E-05	mg/kg-day	3.E-03
				Chromium	252.8	mg/kg	2.92E-06	mg/kg-day	--	--	--	8.16E-06	mg/kg-day	7.50E-05	mg/kg-day	1.E-01
				Cobalt	18.02	mg/kg	2.08E-07	mg/kg-day	--	--	--	5.82E-07	mg/kg-day	2.00E-02	mg/kg-day	3.E-05
				Iron	45,129	mg/kg	5.20E-04	mg/kg-day	--	--	--	1.46E-03	mg/kg-day	7.00E-01	mg/kg-day	2.E-03
				Manganese	2,220	mg/kg	2.56E-05	mg/kg-day	--	--	--	7.17E-05	mg/kg-day	8.00E-04	mg/kg-day	9.E-02
				Thallium	0.271	mg/kg	3.13E-09	mg/kg-day	--	--	--	8.75E-09	mg/kg-day	7.00E-05	mg/kg-day	1.E-04
				Vanadium	201.3	mg/kg	2.32E-06	mg/kg-day	--	--	--	6.50E-06	mg/kg-day	2.60E-05	mg/kg-day	2.E-01
				Zinc	1,267	mg/kg	1.46E-05	mg/kg-day	--	--	--	4.09E-05	mg/kg-day	3.00E-01	mg/kg-day	1.E-04
				Aroclor 1254	0.432	mg/kg	6.97E-08	mg/kg-day	2.00E+00	mg/kg-day^{-1}	1.E-07	1.95E-07	mg/kg-day	2.00E-05	mg/kg-day	1.E-02
				Aroclor 1260	0.365	mg/kg	5.89E-08	mg/kg-day	2.00E+00	mg/kg-day^{-1}	1.E-07	1.65E-07	mg/kg-day	--	--	--
				Benzo(a)pyrene	0.00796	mg/kg	1.19E-09	mg/kg-day	7.30E+00	mg/kg-day^{-1}	9.E-09	3.34E-09	mg/kg-day	--	--	--
			Exp. Route Total								4.E-07					5.E-01
		Exposure Point Total									2.E-06					1.E+00
	Exposure Medium Total										2.E-06					1.E+00

TABLE E.1-7.2.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure - Commercial Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Fugitive Dust	Inhalation	Aluminum	26,325	mg/kg	7.04E-07	mg/kg-day	--	--	--	1.97E-06	mg/kg-day	1.00E-03	mg/kg-day	2.E-03
				Antimony	131	mg/kg	3.51E-09	mg/kg-day	--	--	--	9.81E-09	mg/kg-day	--	--	--
				Arsenic	3.506	mg/kg	9.38E-11	mg/kg-day	1.50E+01	mg/kg-day^{-1}	1.E-09	2.63E-10	mg/kg-day	--	--	--
				Cadmium	26.86	mg/kg	7.19E-10	mg/kg-day	6.30E+00	mg/kg-day^{-1}	5.E-09	2.01E-09	mg/kg-day	5.70E-05	mg/kg-day	4.E-05
				Chromium	252.8	mg/kg	6.76E-09	mg/kg-day	4.10E+01	mg/kg-day^{-1}	3.E-07	1.89E-08	mg/kg-day	2.90E-05	mg/kg-day	7.E-04
				Cobalt	18.02	mg/kg	4.82E-10	mg/kg-day	9.80E+00	mg/kg-day^{-1}	5.E-09	1.35E-09	mg/kg-day	5.70E-06	mg/kg-day	2.E-04
				Iron	45,129	mg/kg	1.21E-06	mg/kg-day	--	--	--	3.38E-06	mg/kg-day	--	--	--
				Manganese	2,220	mg/kg	5.94E-08	mg/kg-day	--	--	--	1.66E-07	mg/kg-day	1.43E-05	mg/kg-day	1.E-02
				Thallium	0.271	mg/kg	7.25E-12	mg/kg-day	--	--	--	2.03E-11	mg/kg-day	--	--	--
				Vanadium	201.3	mg/kg	5.39E-09	mg/kg-day	--	--	--	1.51E-08	mg/kg-day	--	--	--
				Zinc	1,267	mg/kg	3.39E-08	mg/kg-day	--	--	--	9.49E-08	mg/kg-day	--	--	--
				Aroclor 1254	0.432	mg/kg	1.16E-11	mg/kg-day	2.00E+00	mg/kg-day^{-1}	2.E-11	3.24E-11	mg/kg-day	--	--	--
				Aroclor 1260	0.365	mg/kg	9.77E-12	mg/kg-day	2.00E+00	mg/kg-day^{-1}	2.E-11	2.73E-11	mg/kg-day	--	--	--
				Benzo(a)pyrene	0.00796	mg/kg	2.13E-13	mg/kg-day	3.10E+00	mg/kg-day^{-1}	7.E-13	5.96E-13	mg/kg-day	--	--	--
			Exp. Route Total								3.E-07					1.E-02
		Exposure Point Total									3.E-07					1.E-02
	Exposure Medium Total										3.E-07					1.E-02
Soil Total											2.E-06					1.E+00
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Antimony	5.3	ug/L	1.85E-05	mg/kg-day	--	--	--	5.19E-05	mg/kg-day	4.00E-04	mg/kg-day	1.E-01
				Arsenic	2.15	ug/L	7.51E-06	mg/kg-day	1.50E+00	mg/kg-day^{-1}	1.E-05	2.10E-05	mg/kg-day	3.00E-04	mg/kg-day	7.E-02
				Manganese	175	ug/L	6.12E-04	mg/kg-day	--	--	--	1.71E-03	mg/kg-day	2.00E-02	mg/kg-day	9.E-02
				Chloroform	57	ug/L	1.99E-04	mg/kg-day	--	--	--	5.58E-04	mg/kg-day	1.00E-02	mg/kg-day	6.E-02
			Exp. Route Total								1.E-05					3.E-01
			Dermal Absorption	Antimony	5.3	ug/L	1.48E-08	mg/kg-day	--	--	--	4.15E-08	mg/kg-day	6.00E-05	mg/kg-day	7.E-04
				Arsenic	2.15	ug/L	6.01E-09	mg/kg-day	1.50E+00	mg/kg-day^{-1}	9.E-09	1.68E-08	mg/kg-day	3.00E-04	mg/kg-day	6.E-05
				Manganese	175	ug/L	4.89E-07	mg/kg-day	--	--	--	1.37E-06	mg/kg-day	8.00E-04	mg/kg-day	2.E-03
				Chloroform	57	ug/L	3.04E-07	mg/kg-day	--	--	--	8.51E-07	mg/kg-day	1.00E-02	mg/kg-day	9.E-05
			Exp. Route Total								9.E-09					3.E-03
		Exposure Point Total									1.E-05					3.E-01
	Exposure Medium Total										1.E-05					3.E-01
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	3.71E-04	mg/m^3	1.04E-05	mg/kg-day	8.10E-02	mg/kg-day^{-1}	8.E-07	2.90E-05	mg/kg-day	1.40E-02	mg/kg-day	2.E-03
			Exp. Route Total								8.E-07					2.E-03
		Exposure Point Total									8.E-07					2.E-03
	Exposure Medium Total										8.E-07					2.E-03
Groundwater Total											1.E-05					3.E-01
										Total of Receptor Risks Across All Media	1.E-05	Total of Receptor Hazards Across All Media				1.E+00

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.1-4.6)

TABLE E.1-7.3.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure - Construction Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	26,325	mg/kg	1.21E-03	mg/kg-day	--	--	--	8.50E-02	mg/kg-day	1.00E+00	mg/kg-day	9.E-02
				Antimony	131	mg/kg	6.04E-06	mg/kg-day	--	--	--	4.23E-04	mg/kg-day	2.00E-04	mg/kg-day	2.E+00
				Arsenic	3.506	mg/kg	1.62E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	2.E-07	1.13E-05	mg/kg-day	3.00E-04	mg/kg-day	4.E-02
				Cadmium	26.86	mg/kg	1.24E-06	mg/kg-day	--	--	--	8.67E-05	mg/kg-day	1.00E-03	mg/kg-day	9.E-02
				Chromium	252.8	mg/kg	1.17E-05	mg/kg-day	--	--	--	8.16E-04	mg/kg-day	2.00E-02	mg/kg-day	4.E-02
				Cobalt	18.02	mg/kg	8.31E-07	mg/kg-day	--	--	--	5.82E-05	mg/kg-day	2.00E-02	mg/kg-day	3.E-03
				Iron	45,129	mg/kg	2.08E-03	mg/kg-day	--	--	--	1.46E-01	mg/kg-day	3.00E-01	mg/kg-day	5.E-01
				Manganese	2,220	mg/kg	1.02E-04	mg/kg-day	--	--	--	7.17E-03	mg/kg-day	2.00E-02	mg/kg-day	4.E-01
				Thallium	0.271	mg/kg	1.25E-08	mg/kg-day	--	--	--	8.75E-07	mg/kg-day	7.00E-05	mg/kg-day	1.E-02
				Vanadium	201.3	mg/kg	9.29E-06	mg/kg-day	--	--	--	6.50E-04	mg/kg-day	3.00E-04	mg/kg-day	2.E+00
				Zinc	1,267	mg/kg	5.84E-05	mg/kg-day	--	--	--	4.09E-03	mg/kg-day	3.00E-01	mg/kg-day	1.E-02
				Aroclor 1254	0.432	mg/kg	1.99E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	4.E-08	1.39E-06	mg/kg-day	5.00E-05	mg/kg-day	3.E-02
				Aroclor 1260	0.365	mg/kg	1.68E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	3.E-08	1.18E-06	mg/kg-day	--	--	--
				Benzo(a)pyrene	0.00796	mg/kg	3.67E-10	mg/kg-day	7.30E+00	mg/kg-day $^{-1}$	3.E-09	2.57E-08	mg/kg-day	--	--	--
			Exp. Route Total								3.E-07					5.E+00
			Dermal Absorption	Aluminum	26,325	mg/kg	3.64E-05	mg/kg-day	--	--	--	2.55E-03	mg/kg-day	1.00E+00	mg/kg-day	3.E-03
				Antimony	131	mg/kg	1.81E-07	mg/kg-day	--	--	--	1.27E-05	mg/kg-day	3.00E-05	mg/kg-day	4.E-01
				Arsenic	3.506	mg/kg	1.46E-08	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	2.E-08	1.02E-06	mg/kg-day	3.00E-04	mg/kg-day	3.E-03
				Cadmium	26.86	mg/kg	3.72E-09	mg/kg-day	--	--	--	2.60E-07	mg/kg-day	2.50E-05	mg/kg-day	1.E-02
				Chromium	252.8	mg/kg	3.50E-07	mg/kg-day	--	--	--	2.45E-05	mg/kg-day	5.00E-04	mg/kg-day	5.E-02
				Cobalt	18.02	mg/kg	2.49E-08	mg/kg-day	--	--	--	1.75E-06	mg/kg-day	2.00E-02	mg/kg-day	9.E-05
				Iron	45,129	mg/kg	6.25E-05	mg/kg-day	--	--	--	4.37E-03	mg/kg-day	3.00E-01	mg/kg-day	1.E-02
				Manganese	2,220	mg/kg	3.07E-06	mg/kg-day	--	--	--	2.15E-04	mg/kg-day	8.00E-04	mg/kg-day	3.E-01
				Thallium	0.271	mg/kg	3.75E-10	mg/kg-day	--	--	--	2.63E-08	mg/kg-day	7.00E-05	mg/kg-day	4.E-04
				Vanadium	201.3	mg/kg	2.79E-07	mg/kg-day	--	--	--	1.95E-05	mg/kg-day	1.80E-04	mg/kg-day	1.E-01
				Zinc	1,267	mg/kg	1.75E-06	mg/kg-day	--	--	--	1.23E-04	mg/kg-day	3.00E-01	mg/kg-day	4.E-04
				Aroclor 1254	0.432	mg/kg	8.37E-09	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-08	5.86E-07	mg/kg-day	5.00E-05	mg/kg-day	1.E-02
				Aroclor 1260	0.365	mg/kg	7.07E-09	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-08	4.95E-07	mg/kg-day	--	--	--
				Benzo(a)pyrene	0.00796	mg/kg	1.43E-10	mg/kg-day	7.30E+00	mg/kg-day $^{-1}$	1.E-09	1.00E-08	mg/kg-day	--	--	--
			Exp. Route Total								5.E-08					9.E-01
		Exposure Point Total									4.E-07					6.E+00
	Exposure Medium Total										4.E-07					6.E+00

TABLE E.1-7.3.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure - Construction Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Fugitive Dust	Inhalation	Aluminum	26,325	mg/kg	4.03E-05	mg/kg-day	--	--	--	2.82E-03	mg/kg-day	1.00E-03	mg/kg-day	2.8.E+00
				Antimony	131	mg/kg	2.01E-07	mg/kg-day	--	--	--	1.41E-05	mg/kg-day	1.10E-04	mg/kg-day	1.E-01
				Arsenic	3.506	mg/kg	5.37E-09	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	8.E-08	3.76E-07	mg/kg-day	--	--	--
				Cadmium	26.86	mg/kg	4.12E-08	mg/kg-day	6.30E+00	mg/kg-day $^{-1}$	3.E-07	2.88E-06	mg/kg-day	5.70E-05	mg/kg-day	5.E-02
				Chromium	252.8	mg/kg	3.87E-07	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	2.E-05	2.71E-05	mg/kg-day	2.90E-05	mg/kg-day	9.E-01
				Cobalt	18.02	mg/kg	2.76E-08	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	3.E-07	1.93E-06	mg/kg-day	5.70E-06	mg/kg-day	3.E-01
				Iron	45,129	mg/kg	6.92E-05	mg/kg-day	--	--	--	4.84E-03	mg/kg-day	--	--	--
				Manganese	2,220	mg/kg	3.40E-06	mg/kg-day	--	--	--	2.38E-04	mg/kg-day	1.43E-05	mg/kg-day	1.7.E+01
				Thallium	0.271	mg/kg	4.15E-10	mg/kg-day	--	--	--	2.91E-08	mg/kg-day	--	--	--
				Vanadium	201.3	mg/kg	3.08E-07	mg/kg-day	--	--	--	2.16E-05	mg/kg-day	--	--	--
				Zinc	1,267	mg/kg	1.94E-06	mg/kg-day	--	--	--	1.36E-04	mg/kg-day	--	--	--
				Aroclor 1254	0.432	mg/kg	6.62E-10	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-09	4.63E-08	mg/kg-day	--	--	--
				Aroclor 1260	0.365	mg/kg	5.59E-10	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-09	3.92E-08	mg/kg-day	--	--	--
				Benzo(a)pyrene	0.00796	mg/kg	1.22E-11	mg/kg-day	3.10E+00	mg/kg-day $^{-1}$	4.E-11	8.54E-10	mg/kg-day	--	--	--
			Exp. Route Total								2.E-05					2.1.E+01
		Exposure Point Total									2.E-05					2.1.E+01
	Exposure Medium Total										2.E-05					2.1.E+01
Soil Total											2.E-05					2.7.E+01
Groundwater	Air	Upward Migration of Vapors from Groundwater Trench Vapors (1)	Inhalation	Chloroform	1.84E-04	mg/m^3	2.57E-07	mg/kg-day	8.10E-02	mg/kg-day $^{-1}$	2.E-08	1.80E-05	mg/kg-day	1.10E-04	mg/kg-day	2.E-01
			Exp. Route Total								2.E-08					2.E-01
		Exposure Point Total									2.E-08					2.E-01
	Exposure Medium Total										2.E-08					2.E-01
Groundwater Total											2.E-08					2.E-01
										Total of Receptor Risks Across All Media	2.E-05			Total of Receptor Hazards Across All Media		3.E+01

(1) See Table E.1-4.8 for trench vapor calculations

TABLE E.1-7.4.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure - Adult Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	26,325	mg/kg	1.24E-02	mg/kg-day	--	--	--	3.61E-02	mg/kg-day	1.00E+00	mg/kg-day	4.E-02
				Antimony	131	mg/kg	6.15E-05	mg/kg-day	--	--	--	1.79E-04	mg/kg-day	4.00E-04	mg/kg-day	4.E-01
				Arsenic	3.506	mg/kg	1.65E-06	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	2.E-06	4.80E-06	mg/kg-day	3.00E-04	mg/kg-day	2.E-02
				Cadmium	26.86	mg/kg	1.26E-05	mg/kg-day	--	--	--	3.68E-05	mg/kg-day	1.00E-03	mg/kg-day	4.E-02
				Chromium	252.8	mg/kg	1.19E-04	mg/kg-day	--	--	--	3.46E-04	mg/kg-day	3.00E-03	mg/kg-day	1.E-01
				Cobalt	18.02	mg/kg	8.46E-06	mg/kg-day	--	--	--	2.47E-05	mg/kg-day	2.00E-02	mg/kg-day	1.E-03
				Iron	45,129	mg/kg	2.12E-02	mg/kg-day	--	--	--	6.18E-02	mg/kg-day	7.00E-01	mg/kg-day	9.E-02
				Manganese	2,220	mg/kg	1.04E-03	mg/kg-day	--	--	--	3.04E-03	mg/kg-day	2.00E-02	mg/kg-day	2.E-01
				Thallium	0.271	mg/kg	1.27E-07	mg/kg-day	--	--	--	3.71E-07	mg/kg-day	7.00E-05	mg/kg-day	5.E-03
				Vanadium	201.3	mg/kg	9.45E-05	mg/kg-day	--	--	--	2.76E-04	mg/kg-day	1.00E-03	mg/kg-day	3.E-01
				Zinc	1,267	mg/kg	5.95E-04	mg/kg-day	--	--	--	1.74E-03	mg/kg-day	3.00E-01	mg/kg-day	6.E-03
				Aroclor 1254	0.432	mg/kg	2.03E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	4.E-07	5.92E-07	mg/kg-day	2.00E-05	mg/kg-day	3.E-02
				Aroclor 1260	0.365	mg/kg	1.71E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	3.E-07	5.00E-07	mg/kg-day	--	--	--
				Benzo(a)pyrene*	0.00796	mg/kg	3.74E-09	mg/kg-day	7.30E+00	mg/kg-day $^{-1}$	5.E-08	1.09E-08	mg/kg-day	--	--	--
			Exp. Route Total								3.E-06					1.E+00
			Dermal Absorption	Aluminum	26,325	mg/kg	4.93E-04	mg/kg-day	--	--	--	1.44E-03	mg/kg-day	1.00E+00	mg/kg-day	1.E-03
				Antimony	131	mg/kg	2.45E-06	mg/kg-day	--	--	--	7.16E-06	mg/kg-day	6.00E-05	mg/kg-day	1.E-01
				Arsenic	3.506	mg/kg	1.97E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	3.E-07	5.75E-07	mg/kg-day	3.00E-04	mg/kg-day	2.E-03
				Cadmium	26.86	mg/kg	5.03E-08	mg/kg-day	--	--	--	1.47E-07	mg/kg-day	2.50E-05	mg/kg-day	6.E-03
				Chromium	252.8	mg/kg	4.74E-06	mg/kg-day	--	--	--	1.38E-05	mg/kg-day	7.50E-05	mg/kg-day	2.E-01
				Cobalt	18.02	mg/kg	3.38E-07	mg/kg-day	--	--	--	9.85E-07	mg/kg-day	2.00E-02	mg/kg-day	5.E-05
				Iron	45,129	mg/kg	8.46E-04	mg/kg-day	--	--	--	2.47E-03	mg/kg-day	7.00E-01	mg/kg-day	4.E-03
				Manganese	2,220	mg/kg	4.16E-05	mg/kg-day	--	--	--	1.21E-04	mg/kg-day	8.00E-04	mg/kg-day	2.E-01
				Thallium	0.271	mg/kg	5.08E-09	mg/kg-day	--	--	--	1.48E-08	mg/kg-day	7.00E-05	mg/kg-day	2.E-04
				Vanadium	201.3	mg/kg	3.77E-06	mg/kg-day	--	--	--	1.10E-05	mg/kg-day	2.60E-05	mg/kg-day	4.E-01
				Zinc	1,267	mg/kg	2.37E-05	mg/kg-day	--	--	--	6.93E-05	mg/kg-day	3.00E-01	mg/kg-day	2.E-04
				Aroclor 1254	0.432	mg/kg	1.13E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-07	3.31E-07	mg/kg-day	2.00E-05	mg/kg-day	2.E-02
				Aroclor 1260	0.365	mg/kg	9.58E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-07	2.79E-07	mg/kg-day	--	--	--
				Benzo(a)pyrene*	0.00796	mg/kg	1.94E-09	mg/kg-day	7.30E+00	mg/kg-day $^{-1}$	3.E-08	5.66E-09	mg/kg-day	--	--	--
			Exp. Route Total								7.E-07					9.E-01
		Exposure Point Total									4.E-06					2.E+00
	Exposure Medium Total										4.E-06					2.E+00
	Air	Fugitive Dust	Inhalation	Aluminum	26,325	mg/kg	1.96E-07	mg/kg-day	--	--	--	5.73E-07	mg/kg-day	1.00E-03	mg/kg-day	6.E-04
				Antimony	131	mg/kg	9.78E-10	mg/kg-day	--	--	--	2.85E-09	mg/kg-day	--	--	--
				Arsenic	3.506	mg/kg	2.62E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	4.E-10	7.63E-11	mg/kg-day	--	--	--
				Cadmium	26.86	mg/kg	2.00E-10	mg/kg-day	6.30E+00	mg/kg-day $^{-1}$	1.E-09	5.85E-10	mg/kg-day	5.70E-05	mg/kg-day	1.E-05
				Chromium	252.8	mg/kg	1.89E-09	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	8.E-08	5.50E-09	mg/kg-day	2.90E-05	mg/kg-day	2.E-04
				Cobalt	18.02	mg/kg	1.34E-10	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	1.E-09	3.92E-10	mg/kg-day	5.70E-06	mg/kg-day	7.E-05
				Iron	45,129	mg/kg	3.37E-07	mg/kg-day	--	--	--	9.82E-07	mg/kg-day	--	--	--
				Manganese	2,220	mg/kg	1.66E-08	mg/kg-day	--	--	--	4.83E-08	mg/kg-day	1.43E-05	mg/kg-day	3.E-03
				Thallium	0.271	mg/kg	2.02E-12	mg/kg-day	--	--	--	5.90E-12	mg/kg-day	--	--	--
				Vanadium	201.3	mg/kg	1.50E-09	mg/kg-day	--	--	--	4.38E-09	mg/kg-day	--	--	--
				Zinc	1,267	mg/kg	9.45E-09	mg/kg-day	--	--	--	2.76E-08	mg/kg-day	--	--	--

TABLE E.1-7.4.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure - Adult Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
				Aroclor 1254	0.432	mg/kg	3.22E-12	mg/kg-day	2.00E+00	mg/kg-day^{-1}	6.E-12	9.40E-12	mg/kg-day	--	--	--
				Aroclor 1260	0.365	mg/kg	2.72E-12	mg/kg-day	2.00E+00	mg/kg-day^{-1}	5.E-12	7.94E-12	mg/kg-day	--	--	--
				Benzo(a)pyrene*	0.00796	mg/kg	5.94E-14	mg/kg-day	3.10E+00	mg/kg-day^{-1}	3.E-13	1.73E-13	mg/kg-day	--	--	--
			Exp. Route Total								8.E-08					4.E-03
		Exposure Point Total									8.E-08					4.E-03
	Exposure Medium Total										8.E-08					4.E-03
Soil Total											4.E-06					2.E+00
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Antimony	5.3	ug/L	4.98E-05	mg/kg-day	--	--	--	1.45E-04	mg/kg-day	4.00E-04	mg/kg-day	4.E-01
				Arsenic	2.15	ug/L	2.02E-05	mg/kg-day	1.50E+00	mg/kg-day^{-1}	3.E-05	5.89E-05	mg/kg-day	3.00E-04	mg/kg-day	2.E-01
				Manganese	175	ug/L	1.64E-03	mg/kg-day	--	--	--	4.79E-03	mg/kg-day	2.00E-02	mg/kg-day	2.E-01
				Chloroform	57	ug/L	5.35E-04	mg/kg-day	--	--	--	1.56E-03	mg/kg-day	1.00E-02	mg/kg-day	2.E-01
			Exp. Route Total								3.0.E-05					9.6.E-01
			Dermal Absorption	Antimony	5.3	ug/L	2.60E-07	mg/kg-day	--	--	--	7.58E-07	mg/kg-day	6.00E-05	mg/kg-day	1.E-02
				Arsenic	2.15	ug/L	1.05E-07	mg/kg-day	1.50E+00	mg/kg-day^{-1}	2.E-07	3.07E-07	mg/kg-day	3.00E-04	mg/kg-day	1.E-03
				Manganese	175	ug/L	8.58E-06	mg/kg-day	--	--	--	2.50E-05	mg/kg-day	8.00E-04	mg/kg-day	3.E-02
				Chloroform	57	ug/L	6.05E-06	mg/kg-day	--	--	--	1.77E-05	mg/kg-day	1.00E-02	mg/kg-day	2.E-03
			Exp. Route Total								2.E-07					5.E-02
		Exposure Point Total									3.E-05					1.0.E+00
	Exposure Medium Total										3.E-05					1.0.E+00
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	3.71E-04	mg/m^3	2.37E-05	mg/kg-day	8.10E-02	mg/kg-day^{-1}	2.E-06	6.92E-05	mg/kg-day	1.40E-02	mg/kg-day	5.E-03
			Exp. Route Total								2.E-06					5.E-03
		Exposure Point Total									2.E-06					5.E-03
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	4.53E+00	mg/m^3	4.61E-03	mg/kg-day	8.10E-02	mg/kg-day^{-1}	4.E-04	1.08E-02	mg/kg-day	1.40E-02	mg/kg-day	8.E-01
			Exp. Route Total								4.E-04					8.E-01
		Exposure Point Total									4.E-04					8.E-01
	Exposure Medium Total										4.E-04					8.E-01
Groundwater Total											4.E-04					1.8.E+00
										Total of Receptor Risks Across All Media	4.E-04			Total of Receptor Hazards Across All Media		4.E+00

* Compounds are carcinogens that act via a mutagenic mode of action; therefore, carcinogenic risk for these compounds were calculated in accordance with USEPA Region III ADAF Guidance (11/08/2006).
(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.1-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.1-4.7)

TABLE E.1-7.5.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure - Child Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	26325	mg/kg	2.88E-02	mg/kg-day	--	--	--	3.37E-01	mg/kg-day	1.00E+00	mg/kg-day	3.E-01
				Antimony	131	mg/kg	1.44E-04	mg/kg-day	--	--	--	1.67E-03	mg/kg-day	4.00E-04	mg/kg-day	4.E+00
				Arsenic	3.506	mg/kg	3.84E-06	mg/kg-day	1.50E+00	mg/kg-day^{-1}	6.E-06	4.48E-05	mg/kg-day	3.00E-04	mg/kg-day	1.E-01
				Cadmium	26.86	mg/kg	2.94E-05	mg/kg-day	--	--	--	3.43E-04	mg/kg-day	1.00E-03	mg/kg-day	3.E-01
				Chromium	252.8	mg/kg	2.77E-04	mg/kg-day	--	--	--	3.23E-03	mg/kg-day	3.00E-03	mg/kg-day	1.E+00
				Cobalt	18.02	mg/kg	1.97E-05	mg/kg-day	--	--	--	2.30E-04	mg/kg-day	2.00E-02	mg/kg-day	1.E-02
				Iron	45129	mg/kg	4.95E-02	mg/kg-day	--	--	--	5.77E-01	mg/kg-day	7.00E-01	mg/kg-day	8.E-01
				Manganese	2220	mg/kg	2.43E-03	mg/kg-day	--	--	--	2.84E-02	mg/kg-day	2.00E-02	mg/kg-day	1.E+00
				Thallium	0.271	mg/kg	2.97E-07	mg/kg-day	--	--	--	3.46E-06	mg/kg-day	7.00E-05	mg/kg-day	5.E-02
				Vanadium	201.3	mg/kg	2.21E-04	mg/kg-day	--	--	--	2.57E-03	mg/kg-day	1.00E-03	mg/kg-day	3.E+00
				Zinc	1267	mg/kg	1.39E-03	mg/kg-day	--	--	--	1.62E-02	mg/kg-day	3.00E-01	mg/kg-day	5.E-02
				Aroclor 1254	0.432	mg/kg	4.73E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	9.E-07	5.52E-06	mg/kg-day	2.00E-05	mg/kg-day	3.E-01
				Aroclor 1260	0.365	mg/kg	4.00E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	8.E-07	4.67E-06	mg/kg-day	--	--	--
				Benzo(a)pyrene*	0.00796	mg/kg	8.72E-09	mg/kg-day	7.30E+00	mg/kg-day^{-1}	3.E-07	1.02E-07	mg/kg-day	--	--	--
			Exp. Route Total								8.E-06					1.1.E+01
			Dermal Absorption	Aluminum	26325	mg/kg	8.08E-04	mg/kg-day	--	--	--	9.42E-03	mg/kg-day	1.00E+00	mg/kg-day	9.E-03
				Antimony	131	mg/kg	4.02E-06	mg/kg-day	--	--	--	4.69E-05	mg/kg-day	6.00E-05	mg/kg-day	8.E-01
				Arsenic	3.506	mg/kg	3.23E-07	mg/kg-day	1.50E+00	mg/kg-day^{-1}	5.E-07	3.77E-06	mg/kg-day	3.00E-04	mg/kg-day	1.E-02
				Cadmium	26.86	mg/kg	8.24E-08	mg/kg-day	--	--	--	9.62E-07	mg/kg-day	2.50E-05	mg/kg-day	4.E-02
				Chromium	252.8	mg/kg	7.76E-06	mg/kg-day	--	--	--	9.05E-05	mg/kg-day	7.50E-05	mg/kg-day	1.E+00
				Cobalt	18.02	mg/kg	5.53E-07	mg/kg-day	--	--	--	6.45E-06	mg/kg-day	2.00E-02	mg/kg-day	3.E-04
				Iron	45129	mg/kg	1.38E-03	mg/kg-day	--	--	--	1.62E-02	mg/kg-day	7.00E-01	mg/kg-day	2.E-02
				Manganese	2220	mg/kg	6.81E-05	mg/kg-day	--	--	--	7.95E-04	mg/kg-day	8.00E-04	mg/kg-day	1.E+00
				Thallium	0.271	mg/kg	8.32E-09	mg/kg-day	--	--	--	9.70E-08	mg/kg-day	7.00E-05	mg/kg-day	1.E-03
				Vanadium	201.3	mg/kg	6.18E-06	mg/kg-day	--	--	--	7.21E-05	mg/kg-day	2.60E-05	mg/kg-day	3.E+00
				Zinc	1267	mg/kg	3.89E-05	mg/kg-day	--	--	--	4.54E-04	mg/kg-day	3.00E-01	mg/kg-day	2.E-03
				Aroclor 1254	0.432	mg/kg	1.86E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	4.E-07	2.17E-06	mg/kg-day	2.00E-05	mg/kg-day	1.E-01
				Aroclor 1260	0.365	mg/kg	1.57E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	3.E-07	1.83E-06	mg/kg-day	--	--	--
				Benzo(a)pyrene*	0.00796	mg/kg	3.18E-09	mg/kg-day	7.30E+00	mg/kg-day^{-1}	1.E-07	3.70E-08	mg/kg-day	--	--	--
			Exp. Route Total								1.E-06					6.E+00
		Exposure Point Total									9.E-06					1.7.E+01
	Exposure Medium Total										9.E-06					1.7.E+01
	Air	Fugitive Dust	Inhalation	Aluminum	26325	mg/kg	4.14E-07	mg/kg-day	--	--	--	4.83E-06	mg/kg-day	1.00E-03	mg/kg-day	5.E-03
				Antimony	131	mg/kg	2.06E-09	mg/kg-day	--	--	--	2.40E-08	mg/kg-day	--	--	--
				Arsenic	3.506	mg/kg	5.52E-11	mg/kg-day	1.50E+01	mg/kg-day^{-1}	8.E-10	6.44E-10	mg/kg-day	--	--	--
				Cadmium	26.86	mg/kg	4.23E-10	mg/kg-day	6.30E+00	mg/kg-day^{-1}	3.E-09	4.93E-09	mg/kg-day	5.70E-05	mg/kg-day	9.E-05
				Chromium	252.8	mg/kg	3.98E-09	mg/kg-day	4.10E+01	mg/kg-day^{-1}	2.E-07	4.64E-08	mg/kg-day	2.90E-05	mg/kg-day	2.E-03
				Cobalt	18.02	mg/kg	2.84E-10	mg/kg-day	9.80E+00	mg/kg-day^{-1}	3.E-09	3.31E-09	mg/kg-day	5.70E-06	mg/kg-day	6.E-04
				Iron	45129	mg/kg	7.10E-07	mg/kg-day	--	--	--	8.28E-06	mg/kg-day	--	--	--
				Manganese	2220	mg/kg	3.49E-08	mg/kg-day	--	--	--	4.07E-07	mg/kg-day	1.43E-05	mg/kg-day	3.E-02
				Thallium	0.271	mg/kg	4.26E-12	mg/kg-day	--	--	--	4.97E-11	mg/kg-day	--	--	--
				Vanadium	201.3	mg/kg	3.17E-09	mg/kg-day	--	--	--	3.69E-08	mg/kg-day	--	--	--
				Zinc	1267	mg/kg	1.99E-08	mg/kg-day	--	--	--	2.33E-07	mg/kg-day	--	--	--

TABLE E.1-7.5.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure - Child Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
				Aroclor 1254	0.432	mg/kg	6.80E-12	mg/kg-day	2.00E+00	mg/kg-day^{-1}	1.E-11	7.93E-11	mg/kg-day	--	--	--
				Aroclor 1260	0.365	mg/kg	5.74E-12	mg/kg-day	2.00E+00	mg/kg-day^{-1}	1.E-11	6.70E-11	mg/kg-day	--	--	--
				Benzo(a)pyrene*	0.00796	mg/kg	1.25E-13	mg/kg-day	3.10E+00	mg/kg-day^{-1}	2.E-12	1.46E-12	mg/kg-day	--	--	--
			Exp. Route Total								2.E-07					4.E-02
		Exposure Point Total									2.E-07					4.E-02
	Exposure Medium Total										2.E-07					4.E-02
Soil Total											9.E-06					1.7.E+01
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Antimony	5.3	ug/L	2.90E-05	mg/kg-day	--	--	--	3.39E-04	mg/kg-day	4.00E-04	mg/kg-day	8.E-01
				Arsenic	2.15	ug/L	1.18E-05	mg/kg-day	1.50E+00	mg/kg-day^{-1}	2.E-05	1.37E-04	mg/kg-day	3.00E-04	mg/kg-day	5.E-01
				Manganese	175	ug/L	9.59E-04	mg/kg-day	--	--	--	1.12E-02	mg/kg-day	2.00E-02	mg/kg-day	6.E-01
				Chloroform	57	ug/L	3.12E-04	mg/kg-day	--	--	--	3.64E-03	mg/kg-day	1.00E-02	mg/kg-day	4.E-01
			Exp. Route Total								2.E-05					2.E+00
			Dermal Absorption	Antimony	5.3	ug/L	1.92E-07	mg/kg-day	--	--	--	2.24E-06	mg/kg-day	6.00E-05	mg/kg-day	4.E-02
				Arsenic	2.15	ug/L	7.78E-08	mg/kg-day	1.50E+00	mg/kg-day^{-1}	1.E-07	9.07E-07	mg/kg-day	3.00E-04	mg/kg-day	3.E-03
				Manganese	175	ug/L	6.33E-06	mg/kg-day	--	--	--	7.38E-05	mg/kg-day	8.00E-04	mg/kg-day	9.E-02
				Chloroform	57	ug/L	3.93E-06	mg/kg-day	--	--	--	4.59E-05	mg/kg-day	1.00E-02	mg/kg-day	5.E-03
			Exp. Route Total								1.E-07					1.E-01
		Exposure Point Total									2.E-05					2.E+00
	Exposure Medium Total										2.E-05					2.E+00
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	3.71E-04	mg/m^3	1.83E-05	mg/kg-day	8.10E-02	mg/kg-day^{-1}	1.E-06	2.13E-04	mg/kg-day	1.40E-02	mg/kg-day	2.E-02
			Exp. Route Total								1.E-06					2.E-02
		Exposure Point Total									1.E-06					2.E-02
	Exposure Medium Total										1.E-06					2.E-02
Groundwater Total											2.E-05					2.E+00
											Total of Receptor Risks Across All Media					3.E-05
												Total of Receptor Hazards Across All Media				2.0.E+01

* Compounds are carcinogens that act via a mutagenic mode of action; therefore, carcinogenic risk for these compounds were calculated in accordance with USEPA Region III ADAF Guidance (11/08/2006).
(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.1-4.6)

TABLE E.1-7.6.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure - Lifetime Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Total Soil	Soil	Soil	Ingestion	Aluminum	26325	mg/kg	--
				Antimony	131	mg/kg	--
				Arsenic	3.506	mg/kg	8.E-06
				Cadmium	26.86	mg/kg	--
				Chromium	252.8	mg/kg	--
				Cobalt	18.02	mg/kg	--
				Iron	45129	mg/kg	--
				Manganese	2220	mg/kg	--
				Thallium	0.271	mg/kg	--
				Vanadium	201.3	mg/kg	--
				Zinc	1267	mg/kg	--
				Aroclor 1254	0.432	mg/kg	1.E-06
				Aroclor 1260	0.365	mg/kg	1.E-06
				Benzo(a)pyrene*	0.00796	mg/kg	4.E-07
			Exp. Route Total				1.E-05
			Dermal Absorption	Aluminum	26325	mg/kg	--
				Antimony	131	mg/kg	--
				Arsenic	3.506	mg/kg	8.E-07
				Cadmium	26.86	mg/kg	--
				Chromium	252.8	mg/kg	--
				Cobalt	18.02	mg/kg	--
				Iron	45129	mg/kg	--
				Manganese	2220	mg/kg	--
				Thallium	0.271	mg/kg	--
				Vanadium	201.3	mg/kg	--
				Zinc	1267	mg/kg	--
				Aroclor 1254	0.432	mg/kg	6.E-07
				Aroclor 1260	0.365	mg/kg	5.E-07
				Benzo(a)pyrene*	0.00796	mg/kg	1.E-07
			Exp. Route Total				2.E-06
		Exposure Point Total					1.E-05
	Exposure Medium Total						1.E-05
Total Soil Cont.	Air	Fugitive Dust	Inhalation	Aluminum	26325	mg/kg	--
				Antimony	131	mg/kg	--
				Arsenic	3.506	mg/kg	1.E-09
				Cadmium	26.86	mg/kg	4.E-09
				Chromium	252.8	mg/kg	2.E-07
				Cobalt	18.02	mg/kg	4.E-09
				Iron	45129	mg/kg	--
				Manganese	2220	mg/kg	--
				Thallium	0.271	mg/kg	--
				Vanadium	201.3	mg/kg	--
				Zinc	1267	mg/kg	--
				Aroclor 1254	0.432	mg/kg	2.E-11
				Aroclor 1260	0.365	mg/kg	2.E-11
				Benzo(a)pyrene*	0.00796	mg/kg	2.E-12
			Exp. Route Total				2.E-07
		Exposure Point Total					2.E-07
	Exposure Medium Total						2.E-07
Soil Total							1.E-05

TABLE E.1-7.6.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure - Lifetime Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Antimony	5.3	ug/L	--
				Arsenic	2.15	ug/L	5.E-05
				Manganese	175	ug/L	--
				Chloroform	57	ug/L	--
			Exp. Route Total				5.E-05
			Dermal Absorption	Antimony	5.3	ug/L	--
				Arsenic	2.15	ug/L	3.E-07
				Manganese	175	ug/L	--
				Chloroform	57	ug/L	--
			Exp. Route Total				3.E-07
		Exposure Point Total					5.E-05
	Exposure Medium Total						5.E-05
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	0.000371	mg/m^3	3.E-06
			Exp. Route Total				3.E-06
		Exposure Point Total					3.E-06
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	4.53	mg/m^3	4.E-04
			Exp. Route Total				4.E-04
		Exposure Point Total					4.E-04
	Exposure Medium Total						4.E-04
Groundwater Total							4.E-04
							4.E-04

* Compounds are carcinogens that act via a mutagenic mode of action; therefore, carcinogenic risk for these compounds were calculated in accordance with USEPA Region III ADAF Guidance (11/08/2006).
(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.1-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.1-4.7)

TABLE E.1-9.1.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Maintenance Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Receptor Population:	Maintenance Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	6.E-03	--	2.E-04	6.E-03
			Antimony	--	--	--	--	Antimony	blood	9.E-02	--	2.E-02	1.E-01
			Arsenic	4.0.E-07	--	4.E-08	4.E-07	Arsenic	skin/ vascular	3.E-03	--	2.E-04	3.E-03
			Cadmium	--	--	--	--	Cadmium	kidney	1.E-02	--	1.E-03	1.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	8.E-02	--	1.E-01	2.E-01
			Cobalt	--	--	--	--	Cobalt	blood	2.E-04	--	7.E-06	2.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	1.E-02	--	4.E-04	1.E-02
			Manganese	--	--	--	--	Manganese	CNS	2.E-02	--	1.E-02	3.E-02
			Vanadium	--	--	--	--	Vanadium	kidney	2.E-01	--	2.E-01	4.E-01
			Zinc	--	--	--	--	Zinc	blood	8.E-04	--	3.E-05	9.E-04
			Aroclor 1254	2.8.E-07	--	1.E-07	4.E-07	Aroclor 1254	eyes	2.E-02	--	9.E-03	3.E-02
			Aroclor 1260	2.8.E-07	--	1.E-07	4.E-07	Aroclor 1260	NA	--	--	--	--
			Benzo(a)pyrene	1.1.E-08	--	5.E-09	2.E-08	Benzo(a)pyrene	NA	--	--	--	--
				1.E-06	--	3.E-07	1.3.E-06			4.E-01	--	4.E-01	8.E-01
		Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	5.E-04	--	5.E-04
			Antimony	--	--	--	--	Antimony	NA	--	--	--	--
			Arsenic	--	4.E-10	--	4.E-10	Arsenic	NA	--	--	--	--
			Cadmium	--	2.E-09	--	2.E-09	Cadmium	respiratory/ kidney/ liver	--	2.E-05	--	2.E-05
			Chromium	--	3.E-07	--	3.E-07	Chromium	respiratory	--	7.E-04	--	7.E-04
			Cobalt	--	1.E-09	--	1.E-09	Cobalt	respiratory	--	7.E-05	--	7.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	2.E-03	--	2.E-03
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Zinc	--	--	--	--	Zinc	NA	--	--	--	--
			Aroclor 1254	--	3.E-11	--	3.E-11	Aroclor 1254	NA	--	--	--	--
			Aroclor 1260	--	3.E-11	--	3.E-11	Aroclor 1260	NA	--	--	--	--
			Benzo(a)pyrene	--	4.E-13	--	4.E-13	Benzo(a)pyrene	NA	--	--	--	--
				--	3.E-07	--	3.E-07			--	3.E-03	--	3.E-03
						Total Risk Across Soil	2.E-06					Total Hazard Index Across Soil	8.E-01

Total Risk Across All Media and All Exposure Routes	2.E-06

Total Hazard Index Across All Media and All Exposure Routes	8.E-01

Total blood HI across all media =	1.E-01
Total CNS HI across all media =	4.E-02
Total skin HI across all media =	3.E-03
Total respiratory HI across all media =	8.E-04
Total GI tract HI across all media =	2.E-01
Total kidney HI across all media =	4.E-01
Total liver HI across all media =	2.E-01
Total vascular HI across all media =	3.E-03
Total eyes HI across all media =	3.E-02
Total bone marrow HI across all media =	2.E-01
Total fetus HI across all media =	2.E-01

TABLE E.1-9.2.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Commercial Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Commercial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	1.E-02	--	9.E-04	1.E-02
			Antimony	--	--	--	--	Antimony	blood	2.E-01	--	7.E-02	2.E-01
			Arsenic	9.E-07	--	2.E-07	1.E-06	Arsenic	skin/ vascular	6.E-03	--	1.E-03	7.E-03
			Cadmium	--	--	--	--	Cadmium	kidney	1.E-02	--	3.E-03	2.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	4.E-02	--	1.E-01	2.E-01
			Cobalt	--	--	--	--	Cobalt	blood	4.E-04	--	3.E-05	5.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	3.E-02	--	2.E-03	3.E-02
			Manganese	--	--	--	--	Manganese	CNS	5.E-02	--	9.E-02	1.E-01
			Thallium	--	--	--	--	Thallium	liver/ blood/ hair	2.E-03	--	1.E-04	2.E-03
			Vanadium	--	--	--	--	Vanadium	kidney	1.E-01	--	2.E-01	3.E-01
			Zinc	--	--	--	--	Zinc	blood	2.E-03	--	1.E-04	2.E-03
			Aroclor 1254	2.E-07	--	1.E-07	3.E-07	Aroclor 1254	eyes	1.E-02	--	1.E-02	2.E-02
			Aroclor 1260	1.E-07	--	1.E-07	2.E-07	Aroclor 1260	NA	--	--	--	--
			Benzo(a)pyrene	1.E-08	--	9.E-09	2.E-08	Benzo(a)pyrene	NA	--	--	--	--
			Total	1.2.E-06	--	4.E-07	2.E-06	Total		4.E-01	--	5.E-01	1.E+00
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	2.E-03	--	2.E-03
			Antimony	--	--	--	--	Antimony	NA	--	--	--	--
			Arsenic	--	1.E-09	--	1.E-09	Arsenic	NA	--	--	--	--
			Cadmium	--	5.E-09	--	5.E-09	Cadmium	respiratory/ kidney/ liver	--	4.E-05	--	4.E-05
			Chromium	--	3.E-07	--	3.E-07	Chromium	respiratory	--	7.E-04	--	7.E-04
			Cobalt	--	5.E-09	--	5.E-09	Cobalt	respiratory	--	2.E-04	--	2.E-04
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	1.E-02	--	1.E-02
			Thallium	--	--	--	--	Thallium	NA	--	--	--	--
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Zinc	--	--	--	--	Zinc	NA	--	--	--	--
			Aroclor 1254	--	2.E-11	--	2.E-11	Aroclor 1254	NA	--	--	--	--
			Aroclor 1260	--	2.E-11	--	2.E-11	Aroclor 1260	NA	--	--	--	--
			Benzo(a)pyrene	--	7.E-13	--	7.E-13	Benzo(a)pyrene	NA	--	--	--	--
			Total	--	3.E-07	--	3.E-07	Total		--	1.E-02	--	1.E-02
Groundwater	Groundwater	Groundwater used as tapwater	Antimony	--	--	--	--	Antimony	blood	1.E-01	--	7.E-04	1.E-01
			Arsenic	1.E-05	--	9.E-09	1.E-05	Arsenic	skin/ vascular	7.E-02	--	6.E-05	7.E-02
			Manganese	--	--	--	--	Manganese	CNS	9.E-02	--	2.E-03	9.E-02
			Chloroform	--	--	--	--	Chloroform	liver	6.E-02	--	9.E-05	6.E-02
			Total	1.E-05	--	9.E-09	1.E-05	Total		3.E-01	--	3.E-03	3.E-01
	Air	Air (Indoor Air)	Chloroform	--	8.E-07	--	8.E-07	Chloroform	respiratory	--	2.E-03	--	2.E-03
				--	8.E-07	--	8.E-07			--	2.E-03	--	2.E-03
						Total Risk Across Soil	2.E-06					Total Hazard Index Across Soil	1.E+00
						Total Risk Across Groundwater	1.E-05					Total Hazard Index Across Groundwater	3.E-01

Total Risk Across All Media and All Exposure Routes	1.E-05

Total Hazard Index Across All Media and All Exposure Routes	1.E+00

Total blood HI across all media =	4.E-01
Total CNS HI across all media =	3.E-01
Total skin HI across all media =	8.E-02
Total respiratory HI across all media =	3.E-03
Total GI tract HI across all media =	2.E-01
Total kidney HI across all media =	4.E-01
Total liver HI across all media =	2.E-01
Total vascular HI across all media =	8.E-02
Total eyes HI across all media =	2.E-02
Total bone marrow HI across all media =	2.E-01
Total hair HI across all media =	2.E-03
Total fetus HI across all media =	2.E-01

TABLE E.1-9.3.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Construction Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	9.E-02	--	3.E-03	9.E-02
			Antimony	--	--	--	--	Antimony	blood	2.E+00	--	4.E-01	3.E+00
			Arsenic	2.E-07	--	2.E-08	3.E-07	Arsenic	skin/ vascular	4.E-02	--	3.E-03	4.E-02
			Cadmium	--	--	--	--	Cadmium	kidney	9.E-02	--	1.E-02	1.E-01
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	4.E-02	--	5.E-02	9.E-02
			Cobalt	--	--	--	--	Cobalt	blood	3.E-03	--	9.E-05	3.E-03
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	5.E-01	--	1.E-02	5.E-01
			Manganese	--	--	--	--	Manganese	CNS	4.E-01	--	3.E-01	6.E-01
			Thallium	--	--	--	--	Thallium	liver/ blood/ hair	1.E-02	--	4.E-04	1.E-02
			Vanadium	--	--	--	--	Vanadium	kidney	2.E+00	--	1.E-01	2.E+00
			Zinc	--	--	--	--	Zinc	blood	1.E-02	--	4.E-04	1.E-02
			Aroclor 1254	4.E-08	--	2.E-08	6.E-08	Aroclor 1254	eyes	3.E-02	--	1.E-02	4.E-02
			Aroclor 1260	3.E-08	--	1.E-08	5.E-08	Aroclor 1260	NA	--	--	--	--
			Benzo(a)pyrene	3.E-09	--	1.E-09	4.E-09	Benzo(a)pyrene	NA	--	--	--	--
			Total	3.E-07	--	5.E-08	4.E-07	Total		5.E+00	--	9.E-01	6.E+00
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	2.8.E+00	--	2.8.E+00
			Antimony	--	--	--	--	Antimony	NA	--	1.E-01	--	1.E-01
			Arsenic	--	8.E-08	--	8.E-08	Arsenic	NA	--	--	--	--
			Cadmium	--	3.E-07	--	3.E-07	Cadmium	respiratory/ kidney/ liver	--	5.E-02	--	5.E-02
			Chromium	--	2.E-05	--	2.E-05	Chromium	respiratory	--	9.E-01	--	9.E-01
			Cobalt	--	3.E-07	--	3.E-07	Cobalt	respiratory	--	3.E-01	--	3.E-01
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	1.7.E+01	--	1.7.E+01
			Thallium	--	--	--	--	Thallium	NA	--	--	--	--
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Zinc	--	--	--	--	Zinc	NA	--	--	--	--
			Aroclor 1254	--	1.E-09	--	1.E-09	Aroclor 1254	NA	--	--	--	--
			Aroclor 1260	--	1.E-09	--	1.E-09	Aroclor 1260	NA	--	--	--	--
			Benzo(a)pyrene	--	4.E-11	--	4.E-11	Benzo(a)pyrene	NA	--	--	--	--
			Total	--	2.E-05	--	2.E-05	Total		--	2.1.E+01	--	2.1.E+01
	Air	Air (Trench Air)	Chloroform	--	2.E-08	--	2.E-08	Chloroform	respiratory	--	2.E-01	--	2.E-01
				--	2.E-08	--	2.E-08			--	2.E-01	--	2.E-01

Total Risk Across Soil	2.E-05	Total Hazard Index Across Soil	2.7.E+01
Total Risk Across Groundwater	2.E-08	Total Hazard Index Across Groundwater	2.E-01
Total Risk Across All Media and All Exposure Routes	2.E-05	Total Hazard Index Across All Media and All Exposure Routes	2.7.E+01

Total blood HI across all media =	3.E+00
Total CNS HI across all media =	2.0.E+01
Total skin HI across all media =	4.E-02
Total respiratory HI across all media =	1.E+00
Total GI tract HI across all media =	6.E-01
Total kidney HI across all media =	2.E+00
Total liver HI across all media =	7.E-01
Total vascular HI across all media =	4.E-02
Total eyes HI across all media =	4.E-02
Total bone marrow HI across all media =	9.E-02
Total hair HI across all media =	1.E-02
Total fetus HI across all media =	9.E-02

TABLE E.1-9.4.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Adult Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	4.E-02	--	1.E-03	4.E-02
			Antimony	--	--	--	--	Antimony	blood	4.E-01	--	1.E-01	6.E-01
			Arsenic	2.E-06	--	3.E-07	3.E-06	Arsenic	skin/ vascular	2.E-02	--	2.E-03	2.E-02
			Cadmium	--	--	--	--	Cadmium	kidney	4.E-02	--	6.E-03	4.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	1.E-01	--	2.E-01	3.E-01
			Cobalt	--	--	--	--	Cobalt	blood	1.E-03	--	5.E-05	1.E-03
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	9.E-02	--	4.E-03	9.E-02
			Manganese	--	--	--	--	Manganese	CNS	2.E-01	--	2.E-01	3.E-01
			Thallium	--	--	--	--	Thallium	liver/ blood/ hair	5.E-03	--	2.E-04	6.E-03
			Vanadium	--	--	--	--	Vanadium	kidney	3.E-01	--	4.E-01	7.E-01
			Zinc	--	--	--	--	Zinc	blood	6.E-03	--	2.E-04	6.E-03
			Aroclor 1254	4.E-07	--	2.E-07	6.E-07	Aroclor 1254	eyes	3.E-02	--	2.E-02	5.E-02
			Aroclor 1260	3.E-07	--	2.E-07	5.E-07	Aroclor 1260	NA	--	--	--	--
			Benzo(a)pyrene*	5.E-08	--	3.E-08	8.E-08	Benzo(a)pyrene*	NA	--	--	--	--
			Total	3.E-06	--	7.E-07	4.E-06	Total		1.E+00	--	9.E-01	2.E+00
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	6.E-04	--	6.E-04
			Antimony	--	--	--	--	Antimony	NA	--	--	--	--
			Arsenic	--	4.E-10	--	4.E-10	Arsenic	NA	--	--	--	--
			Cadmium	--	1.E-09	--	1.E-09	Cadmium	respiratory/ kidney/ liver	--	1.E-05	--	1.E-05
			Chromium	--	8.E-08	--	8.E-08	Chromium	respiratory	--	2.E-04	--	2.E-04
			Cobalt	--	1.E-09	--	1.E-09	Cobalt	respiratory	--	7.E-05	--	7.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	3.E-03	--	3.E-03
			Thallium	--	--	--	--	Thallium	NA	--	--	--	--
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Zinc	--	--	--	--	Zinc	NA	--	--	--	--
			Aroclor 1254	--	6.E-12	--	6.E-12	Aroclor 1254	NA	--	--	--	--
			Aroclor 1260	--	5.E-12	--	5.E-12	Aroclor 1260	NA	--	--	--	--
			Benzo(a)pyrene*	--	3.E-13	--	3.E-13	Benzo(a)pyrene*	NA	--	--	--	--
			Total	--	8.E-08	--	8.E-08	Total		--	4.E-03	--	4.E-03
Groundwater	Groundwater	Groundwater used as tapwater	Antimony	--	--	--	--	Antimony	blood	4.E-01	--	1.E-02	4.E-01
			Arsenic	3.E-05	--	2.E-07	3.E-05	Arsenic	skin/ vascular	2.E-01	--	1.E-03	2.E-01
			Manganese	--	--	--	--	Manganese	CNS	2.E-01	--	3.E-02	3.E-01
			Chloroform	--	--	--	--	Chloroform	liver	2.E-01	--	2.E-03	2.E-01
			Total	3.0.E-05	--	2.E-07	3.E-05	Total		9.6.E-01	--	5.E-02	1.E+00
	Air	Air (Indoor Air)	Chloroform	--	2.E-06	--	2.E-06	Chloroform	respiratory	--	5.E-03	--	5.E-03
				--	2.E-06	--	2.E-06			--	5.E-03	--	5.E-03
		Air (Shower Air)	Chloroform	--	4.E-04	--	4.E-04	Chloroform	respiratory	--	8.E-01	--	8.E-01
				--	4.E-04	--	4.E-04			--	8.E-01	--	8.E-01

Total Risk Across Soil	4.E-06
Total Risk Across Groundwater	4.E-04
Total Risk Across All Media and All Exposure Routes	4.E-04

Total Hazard Index Across Soil	2.E+00
Total Hazard Index Across Groundwater	2.E+00
Total Hazard Index Across All Media and All Exposure Routes	4.E+00

Total blood HI across all media =	1.E+00
Total CNS HI across all media =	6.E-01
Total skin HI across all media =	2.E-01
Total respiratory HI across all media =	8.E-01
Total GI tract HI across all media =	4.E-01
Total kidney HI across all media =	7.E-01
Total liver HI across all media =	6.E-01
Total vascular HI across all media =	2.E-01
Total eyes HI across all media =	5.E-02
Total bone marrow HI across all media =	3.E-01
Total hair HI across all media =	6.E-03
Total fetus HI across all media =	3.E-01

* Compounds are carcinogens that act via a mutagenic mode of action; therefore, carcinogenic risk for these compounds were calculated in accordance with USEPA Region III ADAF Guidance (11/08/2006).

TABLE E.1-9.5.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Child Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	3.E-01	--	9.E-03	3.E-01
			Antimony	--	--	--	--	Antimony	blood	4.E+00	--	8.E-01	5.E+00
			Arsenic	6.E-06	--	5.E-07	6.E-06	Arsenic	skin/ vascular	1.E-01	--	1.E-02	2.E-01
			Cadmium	--	--	--	--	Cadmium	kidney	3.E-01	--	4.E-02	4.E-01
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	1.E+00	--	1.E+00	2.3.E+00
			Cobalt	--	--	--	--	Cobalt	blood	1.E-02	--	3.E-04	1.E-02
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	8.E-01	--	2.E-02	8.E-01
			Manganese	--	--	--	--	Manganese	CNS	1.E+00	--	1.E+00	2.4.E+00
			Thallium	--	--	--	--	Thallium	liver/ blood/ hair	5.E-02	--	1.E-03	5.E-02
			Vanadium	--	--	--	--	Vanadium	kidney	3.E+00	--	3.E+00	5.3.E+00
			Zinc	--	--	--	--	Zinc	blood	5.E-02	--	2.E-03	6.E-02
			Aroclor 1254	9.E-07	--	4.E-07	1.E-06	Aroclor 1254	eyes	3.E-01	--	1.E-01	4.E-01
			Aroclor 1260	8.E-07	--	3.E-07	1.E-06	Aroclor 1260	NA	--	--	--	--
			Benzo(a)pyrene*	3.E-07	--	1.E-07	5.E-07	Benzo(a)pyrene*	NA	--	--	--	--
			Total	8.E-06	--	1.E-06	9.E-06	Total		1.E+01	--	6.E+00	1.7.E+01
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	5.E-03	--	5.E-03
			Antimony	--	--	--	--	Antimony	NA	--	--	--	--
			Arsenic	--	8.E-10	--	8.E-10	Arsenic	NA	--	--	--	--
			Cadmium	--	3.E-09	--	3.E-09	Cadmium	respiratory/ kidney/ liver	--	9.E-05	--	9.E-05
			Chromium	--	2.E-07	--	2.E-07	Chromium	respiratory	--	2.E-03	--	2.E-03
			Cobalt	--	3.E-09	--	3.E-09	Cobalt	respiratory	--	6.E-04	--	6.E-04
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	3.E-02	--	3.E-02
			Thallium	--	--	--	--	Thallium	NA	--	--	--	--
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Zinc	--	--	--	--	Zinc	NA	--	--	--	--
			Aroclor 1254	--	1.E-11	--	1.E-11	Aroclor 1254	NA	--	--	--	--
			Aroclor 1260	--	1.E-11	--	1.E-11	Aroclor 1260	NA	--	--	--	--
			Benzo(a)pyrene*	--	2.E-12	--	2.E-12	Benzo(a)pyrene*	NA	--	--	--	--
			Total	--	2.E-07	--	2.E-07	Total		--	4.E-02	--	4.E-02
Groundwater	Groundwater	Groundwater used as tapwater	Antimony	--	--	--	--	Antimony	blood	8.E-01	--	4.E-02	9.E-01
			Arsenic	2.E-05	--	1.E-07	2.E-05	Arsenic	skin/ vascular	5.E-01	--	3.E-03	5.E-01
			Manganese	--	--	--	--	Manganese	CNS	6.E-01	--	9.E-02	7.E-01
			Chloroform	--	--	--	--	Chloroform	liver	4.E-01	--	5.E-03	4.E-01
			Total	2.E-05	--	1.E-07	2.E-05	Total		2.E+00	--	1.E-01	2.E+00
	Air	Air (Indoor Air)	Chloroform	--	1.E-06	--	1.E-06	Chloroform	respiratory	--	2.E-02	--	2.E-02
				--	1.E-06	--	1.E-06			--	2.E-02	--	2.E-02

Total Risk Across Soil	9.E-06
Total Risk Across Groundwater	2.E-05
Total Risk Across All Media and All Exposure Routes	3.E-05

Total Hazard Index Across Soil	1.7.E+01
Total Hazard Index Across Groundwater	2.E+00
Total Hazard Index Across All Media and All Exposure Routes	2.0.E+01

Total blood HI across all media =	7.E+00
Total CNS HI across all media =	3.E+00
Total skin HI across all media =	6.E-01
Total respiratory HI across all media =	2.E-02
Total GI tract HI across all media =	3.E+00
Total kidney HI across all media =	6.E+00
Total liver HI across all media =	4.E+00
Total vascular HI across all media =	6.E-01
Total eyes HI across all media =	4.E-01
Total bone marrow HI across all media =	2.E+00
Total hair HI across all media =	5.E-02
Total fetus HI across all media =	2.E+00

* Compounds are carcinogens that act via a mutagenic mode of action; therefore, carcinogenic risk for these compounds were calculated accordance with USEPA Region III ADAF Guidance (11/08/2006).

TABLE E.1-9.6.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Lifetime Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--
			Antimony	--	--	--	--
			Arsenic	8.E-06	--	8.E-07	9.0.E-06
			Cadmium	--	--	--	--
			Chromium	--	--	--	--
			Cobalt	--	--	--	--
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Thallium	--	--	--	--
			Vanadium	--	--	--	--
			Zinc	--	--	--	--
			Aroclor 1254	1.E-06	--	6.E-07	2.E-06
			Aroclor 1260	1.E-06	--	5.E-07	2.E-06
			Benzo(a)pyrene*	4.E-07	--	1.E-07	5.4.E-07
			Total	1.E-05	--	2.0.E-06	1.E-05
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--
			Antimony	--	--	--	--
			Arsenic	--	1.E-09	--	1.E-09
			Cadmium	--	4.E-09	--	4.E-09
			Chromium	--	2.E-07	--	2.E-07
			Cobalt	--	4.E-09	--	4.E-09
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Thallium	--	--	--	--
			Vanadium	--	--	--	--
			Zinc	--	--	--	--
			Aroclor 1254	--	2.E-11	--	2.E-11
			Aroclor 1260	--	2.E-11	--	2.E-11
			Benzo(a)pyrene*	--	2.E-12	--	2.E-12
			Total	--	2.E-07	--	2.E-07
Groundwater	Groundwater	Groundwater used as tapwater	Antimony	--	--	--	--
			Arsenic	5.E-05	--	3.E-07	5.E-05
			Manganese	--	--	--	--
			Chloroform	--	--	--	--
			Total	5.E-05	--	3.E-07	4.8.E-05
	Air	Air (Indoor Air)	Chloroform	--	3.E-06	--	3.E-06
				--	3.E-06	--	3.E-06
		Air (Shower Air)	Chloroform	--	4.E-04	--	4.E-04
				--	4.E-04	--	4.E-04
						Total Risk Across Soil	1.E-05
						Total Risk Across Groundwater	4.E-04

Total Risk Across All Media and All Exposure Routes	4.E-04

* Compounds are carcinogens that act via a mutagenic mode of action; therefore, carcinogenic risk for these compounds were calculated accordance with USEPA Region III ADAF Guidance (11/08/2006).

TABLE E.1-10.1.RME
RME Risk Assessment Summary: Construction Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	None Identified					Antimony	blood	2.1.E+00	--	4.E-01	3.E+00
								Manganese	CNS	4.E-01	--	3.E-01	6.E-01
								Vanadium	kidney	2.E+00	--	1.E-01	2.E+00
			Total	--	--	--	--	Total		4.6.E+00	--	8.E-01	5.E+00
	Air	Air	None Identified					Aluminum	CNS	--	3.E+00	--	2.8.E+00
								Manganese	CNS	--	1.7E+01	--	1.7.E+01
			Total	--	--	--	--	Total		--	2.E+01	--	1.9.E+01
Groundwater	Groundwater	Groundwater	None Identified					None Identified					
			Total	--	--	--	--	Total		--	--	--	--
							Total Risk Across Soil						Total Hazard Index Across Soil
							Total Risk Across Groundwater						Total Hazard Index Across Groundwater

Total Risk Across All Media and All Exposure Routes	--	Total Hazard Index Across All Media and All Exposure Routes	2.5.E+01

Total blood HI across all media =	3.E+00
Total CNS HI across all media =	2.E+01
Total kidney HI across all media =	2.E+00

TABLE E.1-10.2.RME
RME Risk Assessment Summary: Child Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	developmental CNS	3.E-01	--	9.E-03	3.E-01
			Antimony	blood	4.E+00	--	8.E-01	5.E+00
			Cadmium	kidney	3.E-01	--	4.E-02	4.E-01
			Chromium	GI tract/fetus/bone marrow/liver	1.1.E+00	--	1.2.E+00	2.3.E+00
			Iron	blood/ liver/ GI tract	8.E-01	--	2.E-02	8.E-01
			Manganese	CNS	1.E+00	--	1.E+00	2.E+00
			Vanadium	kidney	3.E+00	--	3.E+00	5.E+00
			Total		1.1.E+01	--	6.E+00	1.7.E+01
	Air	Air	None Identified		--	--	--	--
			Total		--	--	--	--
Groundwater	Groundwater	Groundwater Used as Tapwater	Antimony	blood	8.E-01	--	4.E-02	9.E-01
			Manganese	CNS	6.E-01	--	9.E-02	7.E-01
			Chloroform	liver	4.E-01	--	5.E-03	4.E-01
			Total		2.E+00	--	1.E-01	1.9.E+00

Total Hazard Index Across Soil	1.7.E+01
Total Hazard Index Across Groundwater	1.9.E+00

Total Hazard Index Across All Media and All Exposure Routes	1.8.E+01

Total blood HI across all media =	7.E+00
Total CNS HI across all media =	3.E+00
Total GI tract HI across all media =	3.E+00
Total kidney HI across all media =	6.E+00
Total liver HI across all media =	4.E+00
Total bone marrow HI across all media =	2.E+00
Total fetus HI across all media =	2.E+00

TABLE E.1-10.3.RME
RME Risk Assessment Summary: Lifetime Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	None Identified	--	--	--	--
			Total	--	--	--	--
	Air	Air	None Identified				
			Total	--	--	--	--
Groundwater	Groundwater	Groundwater	Arsenic	5.E-05	--	3.E-07	5.E-05
			Total	5.E-05	--	3.E-07	5.E-05
	Air	Shower Air	Chloroform	--	4.E-04	--	4.E-04
			Total	--	4.E-04	--	4.E-04
						Total Risk Across Soil	--
						Total Risk Across Groundwater	4.E-04

Total Risk Across All Media and All Exposure Routes	4.E-04

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APPENDIX E.2

IRON "MARGIN OF EXPOSURE" EVALUATION
and
LEAD IEUBK MODEL RESULTS

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Table 1
Iron "Margin of Exposure" Evaluation
SMWU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Total Soil - Child Resident				
Iron EPC (mg/kg)	Child Daily Intake Estimate* (mg/day)	RDA for Child 6 mths to 4 years Old	Child Daily Intake** (mg/kg-day)	Provisional RfD (mg/kg-day)
45,129	8.7	10 mg/day	0.58	0.7
Surface Soil - Child Resident				
Iron EPC (mg/kg)	Child Daily Intake Estimate* (mg/day)	RDA for Child 6 mths to 4 years Old	Child Daily Intake** (mg/kg-day)	Provisional RfD (mg/kg-day)
44,944	8.6	10 mg/day	0.58	0.7

* See Table 2 for equations used to calculated daily intake estimates.
** Default weight of 15 kg used for child

Table 2
Iron "Margin of Exposure" Evaluation
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion-Total Soil	Resident	Child	SWMU 57	AT-NC	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	Chronic
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	MDC or EPC	Daily = CS*IRS*EF*ED*FI*CF1 / BW*AT
				ED	Exposure Duration	6	years	USEPA, 1991	Intake
				EF	Exposure Frequency	350	days/year	USEPA, 1991	(mg/day)
				FI	Fraction Ingested	1	(unitless)	default	
				IRS	Ingestion Rate of Soil	200	mg/day	USEPA, 1991	

Notes:

MDC = Maximum Detected Concentration

EPC = Exposure Point Concentration

kg = kilogram

mg/kg = milligram per kilogram

mg/day = milligram per day

kg/mg = kilogram per milligram

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

LEAD MODEL FOR WINDOWS Version 1.0

Model Version: 1.0 Build 264
User Name: Tina Devine
Date: 3/21/2009
Site Name: RFAAP
Operable Unit: SWMU 57
Run Mode: Site Risk Assessment

#All default values

The time step used in this model run: 1 - Every 4 Hours (6 times a day).

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (ug Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 0.710 ug Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 41.941 ug/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	45.630	41.941
1-2	45.630	41.941
2-3	45.630	41.941
3-4	45.630	41.941
4-5	45.630	41.941
5-6	45.630	41.941
6-7	45.630	41.941

****** Alternate Intake ******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

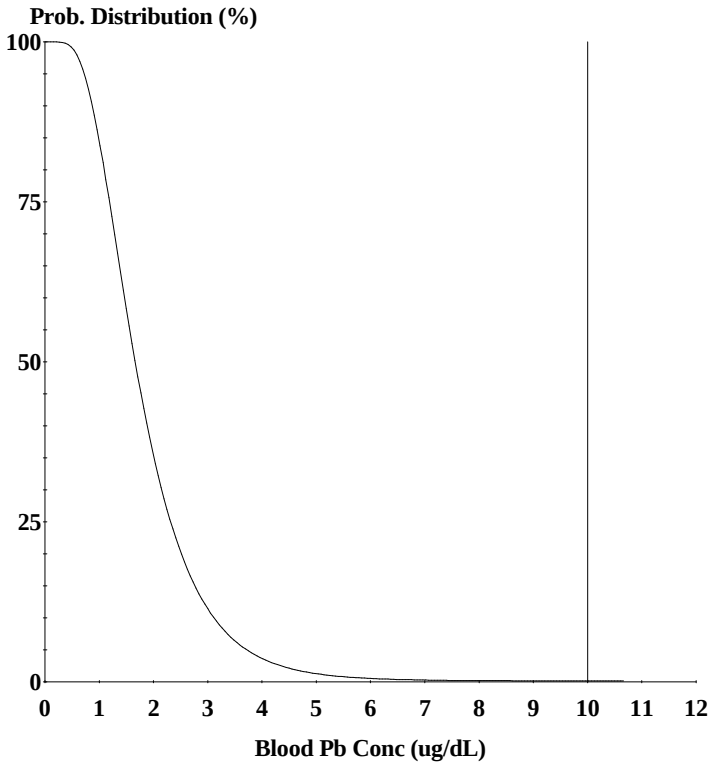
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 2.500 ug Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (ug/day)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
.5-1	0.021	2.649	0.000	0.068
1-2	0.034	2.775	0.000	0.170
2-3	0.062	3.127	0.000	0.178
3-4	0.067	3.024	0.000	0.182
4-5	0.067	2.934	0.000	0.191
5-6	0.093	3.102	0.000	0.202
6-7	0.093	3.427	0.000	0.205

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	1.065	3.803	2.1
1-2	1.696	4.676	2.0
2-3	1.702	5.068	1.9
3-4	1.712	4.985	1.8
4-5	1.277	4.468	1.5
5-6	1.152	4.549	1.4
6-7	1.089	4.815	1.3



Cutoff = 10.000 ug/dl
Geo Mean = 1.744
GSD = 1.600
% Above = 0.010

Age Range = 0 to 84 months
Time Step = Every 4 Hours
Run Mode = Site Risk Assessment

Table 1
Calculation of Blood Lead Concentrations using ALM - Commercial Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1, GSDi = Hom	Using Equation 1, GSDi = Het	Using Equation 2, GSDi = Hom	Using Equation 2, GSDi = Het
PbS	X	X	Soil lead concentration	ug/g or ppm	45.63	45.63	45.63	45.63
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4	0.4	0.4
GSD_i	X	X	Geometric standard deviation PbB	--	2.1	2.3	2.1	2.3
PbB_0	X	X	Baseline PbB	ug/dL	1.5	1.7	1.5	1.7
IR_S	X		Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050	--	--
IR_{S+D}		X	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	0.050	0.050
W_S		X	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--	1.0	1.0
K_{SD}		X	Mass fraction of soil in dust	--	--	--	0.7	0.7
$AF_{S,D}$	X	X	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12
$EF_{S,D}$	X	X	Exposure frequency (same for soil and dust)	days/yr	250	250	250	250
$AT_{S,D}$	X	X	Averaging time (same for soil and dust)	days/yr	365	365	365	365
PbB_{adult}	**PbB of adult worker, geometric mean**			**ug/dL**	**1.6**	**1.8**	**1.6**	**1.8**
$PbB_{fetal,0.95}$	**95th percentile PbB among fetuses of adult workers**			**ug/dL**	**4.8**	**6.3**	**4.8**	**6.3**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10.0**	**10.0**	**10.0**	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**0.4%**	**1.4%**	**0.4%**	**1.4%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

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Table 2
Calculation of Blood Lead Concentrations using ALM - Construction Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario: Using Equation 1 GSDi = Hom	Using Equation 1 GSDi = Het	Using Equation 2 GSDi = Hom	Using Equation 2 GSDi = Het
PbS	X	X	Soil lead concentration	ug/g or ppm	45.63	45.63	45.63	45.63
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4	0.4	0.4
GSD_i	X	X	Geometric standard deviation PbB	--	2.1	2.3	2.1	2.3
PbB_0	X	X	Baseline PbB	ug/dL	1.5	1.7	1.5	1.7
IR_S	X		Soil ingestion rate (including soil-derived indoor dust)	g/day	0.330	0.330	--	--
IR_{S+D}		X	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	0.330	0.330
W_S		X	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--	1.0	1.0
K_{SD}		X	Mass fraction of soil in dust	--	--	--	0.7	0.7
$AF_{S,D}$	X	X	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12
$EF_{S,D}$	X	X	Exposure frequency (same for soil and dust)	days/yr	250	250	250	250
$AT_{S,D}$	X	X	Averaging time (same for soil and dust)	days/yr	365	365	365	365
PbB_{adult}	**PbB of adult worker, geometric mean**			**ug/dL**	**2.0**	**2.2**	**2.0**	**2.2**
$PbB_{fetal,\ 0.95}$	**95th percentile PbB among fetuses of adult workers**			**ug/dL**	**6.1**	**7.8**	**6.1**	**7.8**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10.0**	**10.0**	**10.0**	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**1.0%**	**2.6%**	**1.0%**	**2.6%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal,\ 0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal,\ 0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Table 3
Calculation of Blood Lead Concentrations using ALM - Maintenance Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 05/19/03

Exposure Variable	PbB Equation[1] 1*	PbB Equation[1] 2**	Description of Exposure Variable	Units	Values for Non-Residential Exposure Scenario			
					Using Equation 1		Using Equation 2	
					GSDi = Hom	GSDi = Het	GSDi = Hom	GSDi = Het
PbS	X	X	Soil lead concentration	ug/g or ppm	97.97	97.97	97.97	97.97
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4	0.4	0.4
GSD_i	X	X	Geometric standard deviation PbB	--	2.1	2.3	2.1	2.3
PbB_0	X	X	Baseline PbB	ug/dL	1.5	1.7	1.5	1.7
IR_S	X		Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100	0.100	--	--
IR_{S+D}		X	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	0.100	0.100
W_S		X	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--	1.0	1.0
K_{SD}		X	Mass fraction of soil in dust	--	--	--	0.7	0.7
$AF_{S, D}$	X	X	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12
$EF_{S, D}$	X	X	Exposure frequency (same for soil and dust)	days/yr	219	219	219	219
$AT_{S, D}$	X	X	Averaging time (same for soil and dust)	days/yr	365	365	365	365
PbB_{adult}	**PbB of adult worker, geometric mean**			**ug/dL**	**1.8**	**2.0**	**1.8**	**2.0**
$PbB_{fetal, 0.95}$	**95th percentile PbB among fetuses of adult workers**			**ug/dL**	**5.4**	**7.0**	**5.4**	**7.0**
PbB_t	**Target PbB level of concern (e.g., 10 ug/dL)**			**ug/dL**	**10.0**	**10.0**	**10.0**	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**			**%**	**0.7%**	**1.9%**	**0.7%**	**1.9%**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same $PbB_{fetal,0.95}$.

***Equation 1, based on Eq. 1, 2 in USEPA (1996).**

PbB_{adult} =	$(PbS*BKSF*IR_{S+D}*AF_{S,D}*EF_S/AT_{S,D}) + PbB_0$
$PbB_{fetal, 0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

****Equation 2, alternate approach based on Eq. 1, 2, and A-19 in USEPA (1996).**

PbB_{adult} =	$PbS*BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])/365+PbB_0$
$PbB_{fetal, 0.95}$ =	$PbB_{adult} * (GSD_i^{1.645} * R)$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

APPENDIX F

ECOLOGICAL RISK ASSESSMENT

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APPENDIX F.1

SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT PROCESS

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APPENDIX F.1
SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT PROCESS
SWMU 57 RFI/CMS REPORT

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LIST OF ABBREVIATIONS AND ACRONYMS

% ..... Percent
ADD..... Average Daily Dose
AF ..... Area Use Factor
BAF..... Bioaccumulation Factor
BTAG..... Biological Technical Assistance Group
BW ..... Body Weight
C_{TRV}..... NOAEL- or LOAEL-based TRV concentration
COPC ..... Chemical of Potential Concern
COPEC..... Chemical of Potential Ecological Concern
DF ..... Dietary Fraction
DW:WW ..... Dry weight to wet weight
ECO-SSL ..... Ecological Soil Screening Level
EF..... Extrapolation Factor
EPC ..... Exposure Point Concentration
HQ..... Hazard Quotient
IR ..... Ingestion Rate
kg ..... Kilogram
LD_{50}..... Lethal Dose to 50% of the test population
LOAEL ..... Lowest Observable Adverse Effects Level
MDC ..... Maximum Detected Concentration
mg ..... Milligram
mg/kg ..... Milligrams Per Kilogram
NOAEL..... No Observable Adverse Effects Level
ORNL..... Oak Ridge National Laboratory
PAH ..... Polynuclear Aromatic Hydrocarbon
SLERA..... Screening Level Ecological Risk Assessment
TOC ..... Total Organic Carbon
TRV ..... Toxicity Reference Value
UF ..... Uncertainty Factor
UF_{plant} ..... Plant Uptake Factor
USACHPPM..... U.S. Army Center for Health Promotion and Preventive Medicine
USEPA..... U.S. Environmental Protection Agency

1.0 INTRODUCTION

The purpose of this appendix is to present and describe development of exposure assessment models for the receptors presented in Section 7.0, the Screening Level Ecological Risk Assessment (SLERA) at SWMU 57. The following sections provide a summary of parameters used in the models and a detailed description of the direct contact and dose rate modeling approachs used in the SLERA. The complete SLERA for SWMU 57 is presented in Appendix F.2.

2.0 MODEL PARAMETERS

The direct contact and dose rate models include parameters relating to receptor-specific exposure, chemical of potential concern (COPC) toxicity, and bioaccumulation rates. The following sections describe the estimation of these parameters and major assumptions of parameterization.

2.1 TOXICITY REFERENCE VALUES

MDCs for detected chemicals in soil are used as the preliminary exposure estimate to evaluate a conservative risk scenario for the direct contact pathway to soil invertebrates. Other potentially complete exposure pathways to soil invertebrate and microbial communities include direct ingestion of soil and biota. Due to insufficient information to quantify these pathways, likely secondary to the direct contact/absorption pathway, their omission should not substantially alter the risk characterization.

To evaluate the preliminary exposure estimates, the Toxicity Reference Values (TRVs) that were protective of terrestrial plants and soil invertebrate/microbial communities, were selected from a review of toxicological benchmarks for soil. TRVs for direct contact of soil to invertebrates/microbes and soil to plants were determined from the following guidance:

- USEPA Ecological Soil Screening Level (ECO-SSL): soil invertebrate and plant;
- Oak Ridge National Laboratory (ORNL): plant, microbial community, earthworm values (Efroymson *et al*. 1997a, Efroymson *et al*. 1997b, Efroymson *et al*. 1997c); and
- USEPA Region III Biological Technical Assistance Group (BTAG) soil screening values (USEPA 1995), BTAG freshwater screening benchmarks (USEPA 2006a), and BTAG freshwater sediment screening levels (USEPA 2006b)

Selected screening levels and sources are reported on Table F.2-5 for terrestrial plants and Table F.2-7 for soil invertebrates and microbial communities.

2.2 RECEPTOR-SPECIFIC EXPOSURE PARAMETERS

Wildlife receptors selected to characterize exposure at SWMU 57 include:

- Herbivorous mammals: Meadow Vole (*Microtus pennsylvanicus*);
- Invertivorous mammals: Short-tailed Shrew (*Blarina brevicauda*);
- Invertivorous birds: American Robin (*Turdus migratorius*);
- Carnivorous birds: Red-tailed Hawk (*Buteo jamaicensis*); and
- Carnivorous mammals: Red Fox (*Vulpes vulpes*).

Exposure parameters used to derive TRV-based substrate concentrations for each receptor include body weight (kg), food ingestion rate (kg dry weight/day), dietary fraction, incidental substrate ingestion rate (kg dry weight/day), and area use factor. Both preliminary and refinement level exposure parameters are presented in Table F.2-9.

2.3 LITERATURE-BASED NOAEL AND LOAEL VALUES

The dose-response relationships for chemicals of potential concern are expressed as NOAELs and LOAELs for wildlife receptors, which are defined as a daily ingested amount (mg/kg body weight-day) that is associated with a specified effect. This process involves the determination of a "test species dose" for a critical endpoint from a particular experimental combination of exposure concentration, exposure duration, test species, and chemical. Endpoints may be based on growth, reproductive, developmental, and survival effects. Such effects are important because they may affect the abundance or reproductive success of receptor populations. The test-species dose from the selected study is then modified using extrapolation and uncertainty factors (EFs and UFs).

For this evaluation, EFs and UFs are used to modify laboratory study results, based on the methodology of Sample et al. (1996). This process involves the determination of a "test species dose" for a critical endpoint from a particular experimental combination of exposure concentration, exposure duration, test species, and chemical. The test-species dose from the selected study is then modified to account for the various extrapolations and uncertainties inherent in applying results from a controlled setting to an ecologically relevant setting, as in:

$$\text{NOAEL or LOAEL} = \frac{\text{Test-Species Dose}}{\text{Duration UF} \times \text{Endpoint UF}} \times \text{Body-Weight EF}$$

EFs and UFs are based on: (1) the duration of exposure, (2) the endpoint measured, and (3) differences in body weights among test and receptor species (Calabrese and Baldwin 1993, Ford et al. 1992, Opresko et al. 1994, Sample et al. 1996, USEPA 1996, Wentsel et al. 1994). EFs and UFs derivation and use is described in the following subsections. The use of surrogate chemical data is also discussed. NOAEL and LOAELs for COPCs are summarized in Table F.2-10.

2.3.1 The Test-Species Dose

Critical toxicological values are identified from carefully qualified primary and secondary literature references. The selection of particular studies and endpoints used for the derivation of NOAELs and LOAELs is based on the evaluation of the applicable studies and the dose-response data contained therein. In cases where preferred toxicological endpoints are not available, other toxicity values are used, but additional uncertainty factors may be incorporated. All toxicological values chosen for NOAEL and LOAEL derivation are presented on a mg chemical per kg body weight per day (mg/kg BW-day) basis. These units allow comparisons among organisms of different body sizes (Sample et al. 1996).

2.3.2 Duration Uncertainty Factors

Exposure durations of interest include (1) chronic, (2) subchronic, and (3) acute. Chronic studies occur over the lifetime or a majority of the lifespan of the test organism, generally longer than one year for mammals and 10 weeks for birds. Additionally, studies in which the test organism is dosed during a critical life stage (e.g., gestation) are included with chronic duration studies. Subchronic studies include exposures of two weeks to one year in duration that do not occur during a critical life stage. Acute studies typically have exposures of less than two weeks. NOAELs and LOAELs are usually reported from chronic and subchronic studies, with acute studies often reporting LD_{50} levels (LD_{50}; doses corresponding to the overt expression of a serious adverse effect such as mortality in 50% of test animals). Test-species doses from chronic studies are used preferentially over data from acute and subchronic studies. In cases where chronic data are not available as test-species doses, studies involving less-than-chronic exposures are used to in NOAEL and LOAEL derivation with the addition of a duration uncertainty factor.

For this study, duration uncertainty factors are applied according to USACHPPM 2000:

- Subchronic NOAEL to Chronic NOAEL: 10
- Subchronic LOAEL to Chronic NOAEL: 20

- Subchronic LOAEL to Chronic LOAEL: 4
- Acute NOAEL to Chronic NOAEL: 30
- Acute LOAEL to Chronic NOAEL: 50
- Acute LOAEL to Chronic LOAEL: 10

2.3.3 Endpoint Uncertainty Factors

Additional UFs are used to account for uncertainties in extrapolation between effect- and no-effect levels. Specifically, a NOAEL test-species dose may be estimated from a LOAEL (or LD_{50}) value, or a LOAEL may be estimated from a LD_{50}.

Extrapolation from a LOAEL or LD_{50t} to a NOAEL: Consistent with USACHPPM 2000, a UF of 10 is used with chronic LOAEL values to estimate the chronic NOAEL, which is considered conservative (Sample et al. 1996, USEPA 1996). When a LOAEL value is not available, a LD_{50} is used, although chronic NOAELs may range from 1/10 to 1/10,000 of the corresponding acute LD_{50} value (Opresko et al. 1994). For this report, an uncertainty factor of 100 is used to estimate a NOAEL value from a LD_{50} value (USACHPPM 2000).

Extrapolation from an LD_{50} to a LOAEL: Consistent with USACHPPM 2000, an UF of 20 is used conservatively to estimate a LOAEL value from a LD_{50} value (USACHPPM 2000).

2.3.4 Body-Weight Extrapolation Factor

This extrapolation is accomplished using a body weight-scaling factor to account for differences in body size (Sample et al. 1996). Numerous studies have shown that many physiological functions such as metabolic rates and responses to chemicals are a function of body size for mammals. Smaller mammals have higher metabolic rates and are usually more resistant to chemicals because of more rapid rates of detoxification. It has been shown that the best measure of body size is one based on body surface-area, which can be expressed in terms of body weight raised to a fractional power (Opresko et al. 1994, Sample et al. 1996, USEPA 1980). Dosimetric differences between the mammalian test species and wildlife receptors are accounted for using:

$$\mathrm{NOAEL}_w = \mathrm{NOAEL}_t \times \left(\frac{\mathrm{BW}_t}{\mathrm{BW}_w} \right)^{0.25}$$

where:

$NOAEL_w$	= NOAEL for the mammalian wildlife receptor (mg/kg BW-day)
$NOAEL_t$	= NOAEL for the mammalian test species (mg/kg BW-day)
BW_t	= Test species body weight (kg)
BW_w	= Wildlife receptor body weight (kg)

Scaling factors may not be appropriate for avian interspecies extrapolations. Information has shown that adjustment factors based on body size for interspecies extrapolation among avian species range from 0.63 to 1.55 (Sample et al. 1996). Therefore, a body-weight extrapolation factor is not used to derive avian NOAELs and LOAELs.

Mammalian wildlife receptor body weights are presented on Table F.2-9 and laboratory test species body weights are presented on Table F.2-10.

2.4 BIOACCUMULATION FACTORS

Bioaccumulation factors (BAFs) provide quantitative indicators of the tendency for a chemical to partition into terrestrial organisms, relative to the concentrations present in terrestrial exposure media. Exposure-point concentrations of chemicals in terrestrial prey (soil invertebrates and small mammals) and terrestrial plants are estimated using BAFs derived from the literature. The derivation of BAFs is described for organic and inorganic chemicals in the following subsections.

2.4.1 Terrestrial Plants

Exposure-point concentrations of chemicals in terrestrial plants are estimated using soil-to-plant bioaccumulation factors (uptake factors for plants, UF_{plant}) derived from the literature. UF_{plant} values are used to estimate wet-weight chemical concentrations in terrestrial plants using the same equation for invertebrates and a dry weight to wet weight conversion factor assuming plants are 80% water (Salisbury and Ross 1992). Table F.2-11 presents the uptake factors for plants.

Organic Chemicals: Organic chemicals may enter the plant by partitioning from contaminated soil to the roots and then translocating throughout the plant via the xylem tissue. Most bioaccumulative, lipophilic organic chemicals partition to the epidermis of the root or adhere to soil particles and are not drawn into the inner root or xylem (Paterson et al. 1990). Uptake factors for estimating concentrations of organic chemicals in plant tissues are derived from the following equation:

$$UF_{plant} = 10^{[1.588-(0.578\times \log K_{ow})]}$$

where:

UF_{plant} = Plant uptake factor (kg soil, dry weight / kg plant, dry weight)

$\log K_{ow}$ = Logarithm of the octanol:water partition coefficient

This relationship is based on a linear regression of bioaccumulation factors for 29 organic chemicals (Travis and Arms 1988). The correlation coefficient for the regression is 0.73, indicating that a majority of the variability in bioaccumulation is explained by the log K_{ow}. UF_{plant} values are derived for organic chemicals using this equation.

Inorganic Chemicals: Concentrations of inorganic chemicals in plant tissues are estimated based on generalized soil-to-plant transfer coefficients reported in a literature review. The soil-to-plant transfer factors for inorganic chemicals are equivalent to UF_{plant} values for organic chemicals and represent the ratio of the dry weight concentrations in plant tissue to the dry weight concentration of the element in root-zone soils. Bechtel-Jacobs 1998 C_p regression equation: $C_p = e^{(slope*\ln(Cs) - intercept)}$

2.4.2 Terrestrial Prey

Organic Chemicals: BAFs for estimating concentrations of organic chemicals in prey tissues are derived from linear regression equations presented in Travis and Arms (1998) and Beyer and Stafford (1993). The dry weight to wet weight (DW:WW) conversion factor is 0.2 for soil invertebrates (kg soil invertebrate dry weight per soil invertebrate wet weight; assumes invertebrates are 80% water), based on data reported in USEPA (1993). No DW:WW conversion factor was applied for small mammals. The BAF values used in to estimate concentrations of organic chemicals in soil invertebrates and small mammals are shown in Tables F.2-12 and F.2-13.

Inorganic Chemicals: Inorganic bioaccumulation factors for terrestrial prey (Table F.2-13) are wet-weight-based and are used to predict concentrations in invertebrates and small mammals according to:

$$BAF_{si} = C_{si} / C_{soil}$$

where:

BAF_{si} = Soil invertebrate uptake factor for inorganic chemicals

C_{si} = Chemical concentration predicted in soil invertebrates (mg chemical / kg soil invertebrate, dry weight)

C_{soil} = Concentration of inorganic chemical in soil (mg chemical / kg soil, dry weight)

3.0 DIRECT CONTACT APPROACH

3.1 PRELIMINARY DIRECT CONTACT TOXICITY EVALUATION

Risk is assessed by comparing the preliminary exposure estimate (maximum detected concetrations - MDC) of each detected chemical to the established TRV (detailed in Section 2.1). The preliminary risk is characterized in terms of a hazard quotient (HQ), which is expressed as:

HQ = MDC/TRV

where:

HQ = Hazard Quotient for the contaminant (unitless)
MDC = Maximum Detected Concentration for contaminant (mg/kg)
TRV = Screening Level for contaminant (mg/kg)

3.2 REFINED DIRECT CONTACT TOXICITY EVALUATION

For the refined evaluation, risk is assessed by comparing the exposure point concentration (EPC) of each detected chemical to the TRV (Section 7.1.6 details EPC development). The refined risk HQ is expressed as:

HQ = EPC/TRV

where:

HQ = Hazard Quotient for the contaminant (unitless)
EPC = Calculated Exposure Point Concentration for contaminant (mg/kg)
TRV = Screening Level for contaminant (mg/kg)

An HQ of less than 1 indicates no or negligible risk. The potential for risk increases as the HQ increases above unity. However, this result should be considered in the context of other characteristics of the exposure area.

Results of the direct contact toxicity evaluation for SWMU 57 are presented in Tables F.2-6 (terrestrial plants) and F.2-8 (soil and microbial communities).

4.0 DOSE RATE MODELING APPROACH

A simplified food web model is utilized to calculate TRVs for each chemical and wildlife receptor. TRVs quantify COPC concentrations in exposure media that may result in no observable adverse effects or low observable adverse effects. The NOAEL corresponds to the greatest exposure associated with no observed adverse effects on growth, reproduction, or survival. The LOAEL corresponds to the smallest exposure associated with observed adverse effects on growth, reproduction or survival. TRVs developed by dose rate models are used to evaluate ecological effects associated with COPEC concentrations in exposure media.

4.1 PRELIMINARY DOSE RATE MODEL

Preliminary risk characterization for wildlife receptors uses the conservative preliminary exposure estimate and ecological effects evaluation to characterize risk to potential terrestrial receptors.

The simplified food web model considers the ingestion of prey, the incidental ingestion of media, and the primary routes of exposure to wildlife receptors. Chemical concentrations in prey are expressed as a function of chemical concentrations in exposure media using BAFs for terrestrial prey items. Other important parameters in the model include receptor body weight and an estimate of receptor use. As shown in the equation below, literature-derived NOAEL and LOAEL values are input into the model as the ADD variable to calculate the concentration in exposure media (C_{TRV}) that would result in a dose equivalent to a NOAEL or LOAEL.

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \ (BAF_{food} \cdot DF) + IR_s)AF}$$

where:

C_{TRV} = NOAEL or LOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg COPC/kg body weight-day)

BW = Minimum Body Weight of the receptor (kg)

IR_{food} = Maximum Ingestion Rate of food (kg food ingested per day, dry weight)

BAF_{food} = BAF of most contaminated dietary component used, specific to prey type and COPC (ratio of mg of COPC/kg fauna, wet weight to mg COPC/ kg substrate, dry weight)

DF = Dietary Fraction (most contaminated dietary component assumed to be 100% of diet)

IR_s = Maximum Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)

AF = 100% Area Use Factor

Preliminary receptor parameters for SWMU 57 are presented on Table F.2-9. The resulting risk is characterized in terms of an HQ and is presented for wildlife receptors in Appendix F.2 and summarized in Table F.2-24 for SWMU 57.

4.2 REFINED EXPOSURE ESTIMATE AND RISK CHARACTERIZATION

The refined exposure and risk characterization, Step 3a of the ecological risk assessment guidance (ERAGS), reviews and refines the conservative assumptions used in the risk calculation (USEPA 1997). In Step 3a, conservative assumptions used in the preliminary exposure and risk characterization are replaced with more environmentally realistic assumptions to evaluate risk posed by COPECs identified in the preliminary risk characterization. The addition of Step 3a focuses the outcome of the ecological screening, streamlines the review process and functions as the initial basis for ecological risk management decision-making at each site.

4.3 REFINED DOSE RATE MODEL

This step replaces the conservative assumptions used in the preliminary exposure estimate and ecological effects evaluation with more environmentally realistic assumptions including the use of average body weight, average food and substrate ingestion rates, and the use of realistic area use factor, resulting in a more realistic estimate of potential risk.

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \ \sum \ (BAF_{food} \cdot DF) + IR_s)AF_{refined}}$$

where:

C_{TRV} = NOAEL or LOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg COPC/kg body weight-day)

BW = Average Body Weight of the receptor (kg)

IR_{food} = Average Ingestion Rate of food (kg food ingested per day, dry weight)

BAF_{food} = BAF of dietary component used, specific to prey type and COPC (ratio of mg of COPC/kg fauna, wet weight to mg COPC/ kg substrate, dry weight)

DF = Dietary Fraction

IR_s = Average Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)

$AF_{refined}$ = Refined Area Use Factor (detailed below)

In the refined model, a realistic area use factor ($AF_{refined}$) was used to calculate the ratio of the study area (0.16 acres) to the average home range of the receptor:

$AF_{refined}$ = Study Area/Home Range Area

Other receptor parameters in the refined model remain conservative. The conservative assumptions are summarized as follows:

- Receptors assimilate 100% of COPECs detected in the food and soil; and
- Receptors forage in the site area 100% of the time.

Refined receptor parameters for SWMU 57 are presented on Table F.2-9. The resulting risk is characterized in terms of an HQ and is presented for wildlife receptors in Appendix F.2 and summarized in Table F.2-24.

4.4 EXAMPLE C_{TRV} EQUATION CALCULATION – PRELIMINARY AND REFINED

The following example C_{TRV} equation details the arsenic NOAEL-based screening level (SL) calculated for the short-tailed shrew at SWMU 57 (Tables F.2-16 and F.2-17) and resulting HQs:

Preliminary

- ADD = 0.15 mg/kg bw-day (NOAEL)
- BW = 0.0125 kg (minimum body weight)
- IR_{food} = 0.003 kg dw/day (maximum ingestion rate)
- BAF_{food} = 1.1 (for the most contaminated dietary component in this case plant)
- DF = 1 (100% most contaminated dietary component in this case 100% plants)
- IR_{soil} = 0.00039 kg dw/day (maximum soil ingestion rate)
- AF = 1 (default used)

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}\ (BAF_{food} \cdot DF) + IR_s)AF} = \frac{0.15 \cdot 0.0125}{(0.003\,(1.1 \cdot 1) + 0.00039) \cdot 1} = \textbf{5.08E-01 mg/kg}$$

NOAEL HQ = MDC (mg/kg)/NOAEL-based SL (mg/kg) = $\frac{5.2}{5.1E-01}$ = **1.03E+01**

EPC NOAEL HQ = NOAEL HQ * (EPC (mg/kg) / MDC (mg/kg)) = 1.03E+01*($\frac{3.841}{5.2}$) = **7.6E+00**

Refined

- ADD = 0.15 mg/kg bw-day
- BW = 0.015 kg
- IR_{food} = 0.002 kg dw/day
- BAF_{plant} = 0.038

- BAF_{inv} = 0.163
- DF_{plant} = 0.14
- DF_{inv} = 0.86
- IR_{soil} = 0.00026 kg dw/day
- $AF_{refined}$ = 0.17

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF_{food}) + IR_s) AF}$$

$$= \frac{0.15 \cdot 0.015}{(0.002\,(0.038 \cdot 0.14 + 0.163 \cdot 0.86) + 0.00026) \cdot 0.17} = \textbf{2.4+01 mg/kg}$$

NOAEL HQ = EPC (mg/kg)/NOAEL-based SL (mg/kg) = $\frac{3.841}{2.4E+01}$ = **1.6E-01**

Table F.2-24 provides a summary of preliminary and refined HQs developed for terrestrial receptors at SWMU 57.

5.0 SUMMARY

Receptor-specific exposure parameters are obtained from life history studies found in the literature. Important receptor-specific exposure parameters input into the model include: body weight, food ingestion rate, diet composition, incidental substrate ingestion rate, and area use factor.

The dose-response relationships for chemicals of potential interest are expressed as NOAELs and LOAELs for wildlife receptors, which are defined as a daily ingested amount (mg COPC/kg body weight-day) that is associated with a specified growth, reproductive, developmental, or survival effect. Extrapolation and uncertainty factors are applied to literature-based toxicological endpoints to account for differences in a controlled laboratory setting and an ecologically relevant setting. Extrapolation and uncertainty factors are based on: (1) the duration of exposure, (2) the endpoint measured, and (3) differences in body weights among test and receptor species.

Bioaccumulation accumulation factors provide quantitative indicators of the tendency for a chemical to partition into organisms, relative to the concentrations present in exposure media. Exposure-point concentrations of chemicals in terrestrial prey (soil invertebrates and small mammals) are estimated using several BAFs derived from the literature.

COPC concentrations in prey and media, receptor-specific exposure parameters, literature-based NOAEL and LOAEL values, and bioaccumulation factors are used in the model to calculate the concentration in exposure media (C_{TRV}) that would result in a dose equivalent to a NOAEL or LOAEL. The dose rate modeling approach is used to evaluate the potential mobility of COPCs through varying trophic associations.

6.0 REFERENCES

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APPENDIX F.2

SWMU 57 SLERA

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Table F.2-1
SLERA Occurence/Distribution - Surface Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits
TAL Metals							
Aluminum	7429-90-5	11,900	33,300	mg/kg	57SB4A2	15/15	1.83 - 210
Antimony	7440-36-0	0.305	340	mg/kg	57SB7A	15/15	0.042 - 0.42
Arsenic	7440-38-2	1.035	5.2	mg/kg	57SB3A DUP AVG	15/15	0.0232 - 0.14
Barium	7440-39-3	51	220	mg/kg	57SB7A	15/15	0.106 - 0.17
Beryllium	7440-41-7	0.42	2.2	mg/kg	57SB8A	15/15	0.021 - 0.0391
Cadmium	7440-43-9	0.1175	120	mg/kg	57SB7A	14/15	0.11 - 0.182
Calcium	7440-70-2	372	4,440	mg/kg	57SB1A	15/15	4.2 - 16.6
Chromium	7440-47-3	20	1500	mg/kg	57SB7A	15/15	0.72 - 0.912
Cobalt	7440-48-4	1.8	41.5	mg/kg	57SB3A DUP AVG	15/15	0.208 - 0.37
Copper	7440-50-8	4.9	110	mg/kg	57SB7A	15/15	0.044 - 0.368
Iron	7439-89-6	7,100	78,700	mg/kg	57SB4A	15/15	0.48 - 480
Lead	7439-92-1	13	680	mg/kg	57SB7A	15/15	0.0218 - 0.9
Magnesium	7439-95-4	710	2,700	mg/kg	57SB1A	15/15	3.21 - 5
Manganese	7439-96-5	85	4,400	mg/kg	57SB8A	15/15	0.16 - 16
Mercury	7439-97-6	0.041	0.76	mg/kg	57SB9A	15/15	0.0075 - 0.0077
Nickel	7440-02-0	5.5	17	mg/kg	57SB5A	15/15	0.0356 - 0.071
Potassium	7440-09-7	528	1,700	mg/kg	57SB5A	15/15	5 - 5.3
Selenium	7782-49-2	0.14	0.89	mg/kg	57SB6A	10/15	0.0502 - 0.18
Silver	7440-22-4	0.023	0.2	mg/kg	57SB7A	15/15	0.0044 - 0.013
Sodium	7440-23-5	33	520	mg/kg	57SB8A	15/15	8.92 - 66
Thallium	7440-28-0	0.17	0.34	mg/kg	57SB5A	15/15	0.0049 - 0.027
Vanadium	7440-62-2	20	1200	mg/kg	57SB7A	15/15	0.034 - 1.4
Zinc	7440-66-6	34	3700	mg/kg	57SB7A	15/15	0.517 - 1
Pesticides/PCBs							
Dieldrin	60-57-1	5.4E-03	5.4E-03	mg/kg	57SB8A	1/5	0.000464 - 0.0012
Endosulfan II	33213-65-9	1.4E-01	1.4E-01	mg/kg	57SB6A	1/5	0.000321 - 0.0023
Endrin	72-20-8	2.7E-03	2.7E-03	mg/kg	57SB8A	1/5	0.000447 - 0.0014
Heptachlor epoxide	1024-57-3	9.6E-03	9.6E-03	mg/kg	57SB5A	1/5	0.00056 - 0.0011
Aroclor 1254	11097-69-1	1.2E-02	2.0E+00	mg/kg	57SB6A	5/5	0.0042 - 0.012
Aroclor 1260	11096-82-5	7.3E-02	2.0E+00	mg/kg	57SB6A	4/5	0.0098 - 0.043
TCL VOCs							
2-Butanone	78-93-3	5.3E-03	3.0E-02	mg/kg	57SB2A	9/15	0.0027 - 0.021
Acetone	67-64-1	3.4E-02	1.9E-01	mg/kg	57SB6A	15/15	0.0048 - 0.076
Benzene	71-43-2	2.4E-04	2.4E-04	mg/kg	57SB11A DUP AVG	1/15	0.00014 - 0.0075
Carbon disulfide	75-15-0	6.4E-04	5.2E-03	mg/kg	57SB5A	4/15	0.0003 - 0.018
Chloromethane	74-87-3	1.8E-02	1.9E-02	mg/kg	57SB9A	2/15	0.00028 - 0.0038
Ethylbenzene	100-41-4	4.7E-04	4.7E-04	mg/kg	57SB3A DUP AVG	1/15	0.00014 - 0.0084
Methyl acetate	79-20-9	4.1E-03	9.5E-02	mg/kg	57SB18A	9/15	0.00094 - 0.011
Methylene chloride	75-09-2	3.6E-03	2.4E-02	mg/kg	57SB9A	5/15	0.00326 - 0.011
Toluene	108-88-3	2.0E-03	2.0E-03	mg/kg	57SB3A DUP AVG	1/15	0.00045 - 0.0046
Trichloroethene	79-01-6	1.8E-03	1.8E-03	mg/kg	57SB3A DUP AVG	1/15	0.00063 - 0.011
Xylenes (total)	1330-20-7	6.2E-03	6.2E-03	mg/kg	57SB7A	1/15	0.000488 - 0.023
VOC TICs							
Hexanal	--	7.0E-03	2.8E-02	mg/kg	57SB2A	2/2	0 - 0
TCL SVOCs							
1,1'-Biphenyl	92-52-4	9.3E-04	9.3E-04	mg/kg	57SB8A	1/9	0.00062 - 0.00394
2-Methylnaphthalene	91-57-6	9.0E-04	9.0E-03	mg/kg	57SB3A DUP AVG	5/9	0.00065 - 0.00438
4-Chloro-3-Methylphenol	59-50-7	1.7E-02	4.2E-02	mg/kg	57SB3A DUP AVG	5/9	0.0024 - 0.00834
Acenaphthene	83-32-9	9.0E-04	1.2E-02	mg/kg	57SB6A	3/9	0.00054 - 0.00275
Acenaphthylene	208-96-8	2.0E-03	6.5E-03	mg/kg	57SB3A DUP AVG	2/9	0.00081 - 0.00242
Acetophenone	98-86-2	5.6E-02	5.6E-02	mg/kg	57SB3A DUP AVG	1/9	0.00228 - 0.018
Anthracene	120-12-7	6.0E-03	2.0E-02	mg/kg	57SB6A	2/9	0.00058 - 0.0088
Benzo(a)anthracene	56-55-3	9.0E-04	4.2E-02	mg/kg	57SB6A	4/9	0.00073 - 0.0213
Benzo(a)pyrene	50-32-8	8.9E-03	3.1E-02	mg/kg	57SB6A	5/9	0.0014 - 0.00914
Benzo(b)fluoranthene	205-99-2	1.9E-03	5.5E-02	mg/kg	57SB2A	6/9	0.0012 - 0.0156
Benzo(g,h,i)perylene	191-24-2	8.0E-03	1.5E-02	mg/kg	57SB6A	3/9	0.0031 - 0.014
Benzo(k)fluoranthene	207-08-9	7.1E-03	1.9E-02	mg/kg	57SB6A	2/9	0.00097 - 0.0214
Bis(2-ethylhexyl)phthalate	117-81-7	2.1E-02	5.6E-01	mg/kg	57SB6A	9/9	0.0018 - 0.0035
Butyl Benzyl Phthalate	85-68-7	4.4E-02	4.4E-02	mg/kg	57SB2A	1/9	0.0029 - 0.00717
Caprolactam	105-60-2	1.5E-02	3.4E-02	mg/kg	57SB3A DUP AVG	2/9	0.00766 - 0.061
Chrysene	218-01-9	9.0E-04	4.0E-02	mg/kg	57SB6A	5/9	0.00065 - 0.0163
Di-n-butylphthalate	84-74-2	1.5E-02	3.3E-01	mg/kg	57SB1A	9/9	0.0016 - 0.00611
Dibenz(a,h)anthracene	53-70-3	2.7E-03	3.5E-03	mg/kg	57SB6A	2/9	0.00073 - 0.00944
Dibenzofuran	132-64-9	5.8E-03	5.8E-03	mg/kg	57SB6A	1/9	0.00036 - 0.00506
Diethylphthalate	84-66-2	1.8E-03	2.0E-02	mg/kg	57SB3A DUP AVG	8/17	0.0005 - 0.00304
Fluoranthene	206-44-0	1.2E-02	9.9E-02	mg/kg	57SB6A	5/17	0.00282 - 0.01
Fluorene	86-73-7	2.0E-03	1.0E-02	mg/kg	57SB6A	3/17	0.00038 - 0.00269
Indeno(1,2,3-cd)pyrene	193-39-5	2.7E-03	4.2E-02	mg/kg	57SB2A	5/17	0.00095 - 0.00627
Naphthalene	91-20-3	4.5E-04	7.0E-03	mg/kg	57SB6A	5/17	0.00032 - 0.00442
Phenanthrene	85-01-8	1.3E-02	9.7E-02	mg/kg	57SB6A	4/17	0.00276 - 0.0097
Phenol	108-95-2	1.4E-03	1.4E-03	mg/kg	57SB8A	1/17	0.00095 - 0.00634
Pyrene	129-00-0	1.8E-03	8.1E-02	mg/kg	57SB6A	7/17	0.00043 - 0.00237
SVOC TICs							
(Z)-9-Octadecenamide	301-02-0	1.0E+00	1.0E+00	mg/kg	57SB3A DUP AVG	1/17	0 - 0
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	3.9E-01	3.9E-01	mg/kg	57SB3A DUP AVG	1/17	0 - 0
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	5.1E-02	1.6E-01	mg/kg	57SB4A2	2/17	0 - 0
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	3.3E-01	3.3E-01	mg/kg	57SB3A DUP AVG	1/17	0 - 0

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Chemical	CAS #	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	4.1E-02	5.3E-01	mg/kg	57SB3A DUP AVG	3/17	0 - 0
1-Hexadecanol	36653-82-4	4.8E-02	4.8E-02	mg/kg	57SB4A2	1/17	0 - 0
1-Octadecanol	112-92-5	3.1E-02	3.1E-02	mg/kg	57SB4A	1/17	0 - 0
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	2.6E-01	2.6E-01	mg/kg	57SB1A	1/17	0 - 0
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	5.8E-02	9.4E-02	mg/kg	57SB1A	3/17	0 - 0
4-(1,1,3,3-Tetramethyl B-utyl)-Phenol	--	2.9E-02	2.9E-02	mg/kg	57SB4A2	1/1	0 - 0
Erucylamide	112-84-5	3.2E-01	6.0E-01	mg/kg	57SB2A	2/2	0 - 0
Oxirane, hexadecyl-	7390-81-0	5.8E-02	5.8E-02	mg/kg	57SB4A	1/1	0 - 0
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	2.9E-02	2.9E-02	mg/kg	57SB4A	1/1	0 - 0
Phenol, 4-(1,1-dimethylpropyl)-	--	7.2E-04	7.2E-04	mg/kg	57SB4A2	1/1	0 - 0
Phosphoric acid, tris (3-methylphenyl) e	78-30-8	1.4E-03	1.4E-03	mg/kg	57SB3A DUP AVG	1/1	0 - 0
Phsophoric acid, tris(3-methylphenyl) es	563-04-2	5.6E-04	5.6E-04	mg/kg	57SB3A DUP AVG	1/1	0 - 0
Stearic Acid	57-11-4	4.0E-05	4.0E-05	mg/kg	57SB4A	1/1	0 - 0
PAHs							
Anthracene	120-12-7	1.5E-06	2.3E-06	mg/kg	57SB3A DUP AVG	3/5	0.00084 - 0.00112
Benzo(a)anthracene	56-55-3	7.1E-06	7.1E-06	mg/kg	57SB2A	1/5	0.00096 - 0.00128
Benzo(a)pyrene	50-32-8	1.0E-05	1.8E-05	mg/kg	57SB1A	2/5	0.0012 - 0.0016
Benzo(b)fluoranthene	205-99-2	1.4E-05	1.4E-05	mg/kg	57SB1A	1/5	0.00156 - 0.00208
Benzo(g,h,i)perylene	191-24-2	2.7E-05	2.7E-05	mg/kg	57SB1A	1/5	0.015 - 0.02
Benzo(k)fluoranthene	207-08-9	8.5E-06	8.5E-06	mg/kg	57SB1A	1/5	0.0012 - 0.0016
Chrysene	218-01-9	8.6E-06	1.1E-05	mg/kg	57SB1A	3/5	0.00144 - 0.00192
Fluoranthene	206-44-0	2.9E-05	6.5E-05	mg/kg	57SB3A DUP AVG	3/5	0.00204 - 0.00272
Indeno(1,2,3-cd)pyrene	193-39-5	7.2E-06	1.1E-05	mg/kg	57SB1A	2/5	0.00084 - 0.00112
Phenanthrene	85-01-8	1.1E-05	2.4E-05	mg/kg	57SB1A	3/5	0.00072 - 0.00096
Pyrene	129-00-0	2.0E-05	8.2E-05	mg/kg	57SB1A	3/5	0.00108 - 0.00144
Cyanide							
Cyanide	57-12-5	5.0E-08	1.7E-07	mg/kg	57SB3A DUP AVG	4/5	0.0356 - 0.0356

Notes:
CAS = Chemical Abstracts Service
COPEC = Chemical of Potential Ecological Concern
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
mg/kg = Milligram Per Kilogram

Table F.2-2
Non-detected Chemicals MDL Screening for SWMU 57 - Surface Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
TAL Metals																		
Cadmium	7440-43-9	mg/kg	1	15	0.11	0.11	32	A	N	140	A	N	0.77	A	N	0.36	A	N
Selenium	7782-49-2	mg/kg	5	15	0.089	0.089	1	A	N	4.1	A	N	1.2	A	N	0.63	A	N
Pesticides/PCBs																		
4,4'-DDD	72-54-8	ug/kg	5	5	0.357	3.9	100	G	N	100	C	N	--	--	NS	--	--	NS
4,4'-DDE	72-55-9	ug/kg	5	5	0.263	3.1	100	G	N	100	C	N	--	--	NS	--	--	NS
4,4'-DDT	50-29-3	ug/kg	5	5	0.27	3.6	100	G	N	100	C	N	93	--	N	21	A	N
Aldrin	309-00-2	ug/kg	5	5	0.456	1.9	100	G	N	100	C	N	--	--	NS	--	--	NS
alpha-BHC	319-84-6	ug/kg	5	5	0.455	1.2	100000	G	N	--	--	NS	--	--	NS	--	--	NS
alpha-Chlordane	5103-71-9	ug/kg	5	5	0.651	2.4	100	G	N	100	C	N	--	--	NS	--	--	NS
beta-BHC	319-85-7	ug/kg	5	5	0.91	2.3	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
delta-BHC	319-86-8	ug/kg	5	5	1.23	3.3	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
Dieldrin	60-57-1	ug/kg	4	5	0.464	1.6	100	G	N	100	C	N	22	--	N	4.9	A	N
Endosulfan I	959-98-8	ug/kg	5	5	1.2	3.1	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Endosulfan II	33213-65-9	ug/kg	4	5	0.321	2.3	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Endosulfan Sulfate	1031-07-8	ug/kg	5	5	0.755	3.5	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Endrin	72-20-8	ug/kg	4	5	0.447	1.9	100	G	N	100	C	N	--	--	NS	--	--	NS
Endrin Aldehyde	7421-93-4	ug/kg	5	5	1.4	3.6	100	G	N	100	C	N	--	--	NS	--	--	NS
Endrin Ketone	53494-70-5	ug/kg	5	5	0.413	3.6	100	G	N	100	C	N	--	--	NS	--	--	NS
gamma-BHC (Lindane)	58-89-9	ug/kg	5	5	0.291	2.2	100	G	N	100	C	N	--	--	NS	--	--	NS
gamma-Chlordane	5103-74-2	ug/kg	5	5	0.64	1.6	100	G	N	100	C	N	--	--	NS	--	--	NS
Heptachlor	76-44-8	ug/kg	5	5	1.06	4.2	100	G	N	100	C	N	--	--	NS	--	--	NS
Heptachlor Epoxide	1024-57-3	ug/kg	4	5	0.58	1.4	100	G	N	100	C	N	--	--	NS	--	--	NS
Methoxychlor	72-43-5	ug/kg	5	5	0.42	4.5	100	G	N	100	C	N	--	--	NS	--	--	NS
Toxaphene	8001-35-2	ug/kg	5	5	30	78	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Aroclor 1016	12674-11-2	ug/kg	5	5	5.7	29	40,000	--	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1221	11104-28-2	ug/kg	5	5	2.8	52	40,000	--	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1232	11141-16-5	ug/kg	5	5	7	59	40,000	--	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1242	53469-21-9	ug/kg	5	5	4.2	110	40,000	--	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1248	12672-29-6	ug/kg	5	5	7	37	40,000	--	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1260	11096-82-5	ug/kg	1	5	9.8	9.8	40,000	--	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1262	37324-23-5	ug/kg	4	4	7.1	36	40,000	--	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1268	11100-14-4	ug/kg	4	4	6	31	40,000	--	N	--	--	NS	--	--	NS	--	--	NS
Herbicides																		
2,4,5-T	93-76-5	ug/kg	1	1	2.8	2.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4,5-TP (Silvex)	93-72-1	ug/kg	1	1	5.6	5.6	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4-D	94-75-7	ug/kg	1	1	22.4	22.4	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4-DB	94-82-6	ug/kg	1	1	86.8	86.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dalapon	75-99-0	ug/kg	1	1	79.8	79.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dicamba	1918-00-9	ug/kg	1	1	2.8	2.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dichlorprop	120-36-5	ug/kg	1	1	23.8	23.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dinoseb	88-85-7	ug/kg	1	1	29.4	29.4	--	--	NS	--	--	NS	--	--	NS	--	--	NS
MCPA	94-74-6	ug/kg	1	1	1,950	1,950	--	--	NS	--	--	NS	--	--	NS	--	--	NS
MCPP	93-65-2	ug/kg	1	1	7,080	7,080	--	--	NS	--	--	NS	--	--	NS	--	--	NS
TCL VOCs																		
1,1,1-Trichloroethane	71-55-6	ug/kg	15	15	0.23	7	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	15	15	0.23	6.4	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/kg	15	15	0.37	9.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,1,2-Trichloroethane	79-00-5	ug/kg	15	15	0.688	13	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1-Dichloroethane	75-34-3	ug/kg	15	15	0.22	4.8	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1-Dichloroethene	75-35-4	ug/kg	15	15	0.42	8.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2,3-Trichlorobenzene	87-61-6	ug/kg	15	15	0.23	8.5	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2,4-Trichlorobenzene	120-82-1	ug/kg	15	15	0.27	10	100	G	N	100	C	N	--	--	NS	--	--	NS
1,2-Dibromo-3-chloropropane	96-12-8	ug/kg	15	15	0.92	18	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2-Dibromoethane	106-93-4	ug/kg	15	15	0.795	14	--	--	NS	5,000	C	N	--	--	NS	--	--	NS
1,2-Dichlorobenzene	95-50-1	ug/kg	15	15	0.28	4.2	100	G	N	100	C	N	--	--	NS	--	--	NS
1,2-Dichloroethane	107-06-2	ug/kg	15	15	0.33	9.8	870,000	G	N	--	--	NS	--	--	NS	--	--	NS
1,2-Dichloropropane	78-87-5	ug/kg	15	15	0.68	6.6	300	G	N	300	C	N	--	--	NS	--	--	NS
1,3-Dichlorobenzene	541-73-1	ug/kg	15	15	0.27	7.6	--	--	NS	--	--	NS	--	--	NS	--	--	NS

Table F.2-2
Non-detected Chemicals MDL Screening for SWMU 57 - Surface Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
1,4-Dichlorobenzene	106-46-7	ug/kg	15	15	0.25	8.5	100	G	N	20,000	B	N	--	--	NS	--	--	NS
2-Butanone	78-93-3	ug/kg	6	15	2.9	21	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Hexanone	591-78-6	ug/kg	15	15	2.62	27	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Methyl-2-pentanone	108-10-1	ug/kg	15	15	1.69	24	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
Benzene	71-43-2	ug/kg	14	15	0.14	7.5	100	G	N	100	C	N	--	--	NS	--	--	NS
Bromochloromethane	74-97-5	ug/kg	15	15	0.14	12	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bromodichloromethane	75-27-4	ug/kg	15	15	0.28	12	450,000	G	N	--	--	NS	--	--	NS	--	--	NS
Bromoform	75-25-2	ug/kg	15	15	0.55	15	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bromomethane	74-83-9	ug/kg	15	15	1.4	12	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Carbon Disulfide	75-15-0	ug/kg	11	15	0.3	18	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Carbon Tetrachloride	56-23-5	ug/kg	15	15	0.32	9.7	300	G	N	300	C	N	--	--	NS	--	--	NS
Chlorobenzene	108-90-7	ug/kg	15	15	0.23	7.6	100	G	N	40,000	B	N	--	--	NS	--	--	NS
Chloroethane	75-00-3	ug/kg	15	15	0.4	13	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Chloroform	67-66-3	ug/kg	15	15	0.17	3.9	300	G	N	300	C	N	--	--	NS	--	--	NS
Chloromethane	74-87-3	ug/kg	13	15	0.28	1.18	--	--	NS	--	--	NS	--	--	NS	--	--	NS
cis-1,2-Dichloroethene	156-59-2	ug/kg	15	15	0.18	11	300	G	N	300	C	N	--	--	NS	--	--	NS
cis-1,3-Dichloropropene	10061-01-5	ug/kg	15	15	0.29	9	300	G	N	300	C	N	--	--	NS	--	--	NS
Cyclohexane	110-82-7	ug/kg	15	15	0.367	8.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dibromochloromethane	124-48-1	ug/kg	15	15	0.4	8.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dichlorodifluoromethane	75-71-8	ug/kg	15	15	0.37	11	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Ethylbenzene	100-41-4	ug/kg	14	15	0.14	8.4	100	G	N	100	C	N	--	--	NS	--	--	NS
Isopropylbenzene	98-82-8	ug/kg	15	15	0.14	7.9	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methyl Acetate	79-20-9	ug/kg	6	15	4.03	9.7	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methyl tert-Butyl Ether	1634-04-4	ug/kg	15	15	0.26	6.1	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methylcyclohexane	108-87-2	ug/kg	15	15	0.9	9.4	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methylene Chloride	75-09-2	ug/kg	10	15	3.79	14	300	G	N	300	C	N	--	--	NS	--	--	NS
Styrene	100-42-5	ug/kg	15	15	0.25	6.9	300,000	F	N	100	C	N	--	--	NS	--	--	NS
Tetrachloroethene	127-18-4	ug/kg	15	15	0.5	9.5	300	G	N	300	C	N	--	--	NS	--	--	NS
Toluene	108-88-3	ug/kg	14	15	0.45	4.6	200,000	F	N	100	C	N	--	--	NS	--	--	NS
trans-1,2-Dichloroethene	156-60-5	ug/kg	15	15	0.26	10	300	G	N	300	C	N	--	--	NS	--	--	NS
trans-1,3-Dichloropropene	10061-02-6	ug/kg	15	15	0.604	9.9	300	G	N	300	C	N	--	--	NS	--	--	NS
Trichloroethene	79-01-6	ug/kg	14	15	0.63	11	300	G	N	300	C	N	--	--	NS	--	--	NS
Trichlorofluoromethane	75-69-4	ug/kg	15	15	0.24	11	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Vinyl Chloride	75-01-4	ug/kg	15	15	0.429	11	300	G	N	300	C	N	--	--	NS	--	--	NS
Xylenes	1330-20-7	ug/kg	14	15	0.488	23	100	G	N	--	--	NS	--	--	NS	--	--	NS
TCL SVOCs																		
1,1'-Biphenyl	92-52-4	ug/kg	8	9	0.62	3.44	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/kg	9	9	1.1	40.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,3,4,6-Tetrachlorophenol	58-90-2	ug/kg	4	4	22	57	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,2'-oxybis(1-Chloropropane)	108-60-1	ug/kg	5	5	1.58	1.85	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4,5-Trichlorophenol	95-95-4	ug/kg	9	9	4.01	21	4,000	F	N	9,000	B	N	--	--	NS	--	--	NS
2,4,6-Trichlorophenol	88-06-2	ug/kg	9	9	3.14	16	100	G	N	10,000	B	N	--	--	NS	--	--	NS
2,4-Dichlorophenol	120-83-2	ug/kg	9	9	4.22	23	100	G	N	100	C	N	--	--	NS	--	--	NS
2,4-Dimethylphenol	105-67-9	ug/kg	9	9	7.7	20	100	G	N	100	C	N	--	--	NS	--	--	NS
2,4-Dinitrophenol	51-28-5	ug/kg	9	9	3.84	120	20,000	F	N	100	C	**Y**	--	--	NS	--	--	NS
2,4-Dinitrotoluene	121-14-2	ug/kg	9	9	3.78	46	5,300	I	N	19,800	I	N	--	--	NS	--	--	NS
2,6-Dinitrotoluene	606-20-2	ug/kg	9	9	2.2	38.8	4,500	I	N	6,900	I	N	--	--	NS	--	--	NS
2-Chloronaphthalene	91-58-7	ug/kg	9	9	0.59	3.22	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Chlorophenol	95-57-8	ug/kg	9	9	0.52	2.81	7,000	F	N	10,000	B	N	--	--	NS	--	--	NS
2-Methylnaphthalene	91-57-6	ug/kg	4	9	3.29	3.84	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Methylphenol	95-48-7	ug/kg	9	9	5.81	28	100	G	N	100	C	N	--	--	NS	--	--	NS
2-Nitroaniline	88-74-4	ug/kg	9	9	5.52	46	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Nitrophenol	88-75-5	ug/kg	9	9	2.04	43	--	--	NS	--	--	NS	--	--	NS	--	--	NS
3,3'-Dichlorobenzidine	91-94-1	ug/kg	9	9	66.5	270	--	--	NS	--	--	NS	--	--	NS	--	--	NS
3-Nitroaniline	99-09-2	ug/kg	9	9	15	43.3	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4,6-Dinitro-2-methylphenol	534-52-1	ug/kg	9	9	5.41	130	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Bromophenyl-phenylether	101-55-3	ug/kg	9	9	1.7	4.73	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Chloro-3-methylphenol	59-50-7	ug/kg	4	9	2.4	6.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS

Table F.2-2
Non-detected Chemicals MDL Screening for SWMU 57 - Surface Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
4-Chloroaniline	106-47-8	ug/kg	9	9	1.51	68	20,000	F	N	--	--	NS	--	--	NS	--	--	NS
4-Chlorophenyl-phenylether	7005-72-3	ug/kg	9	9	0.61	4.58	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Methylphenol	106-44-5	ug/kg	9	9	7.64	32	100	G	N	100	C	N	--	--	NS	--	--	NS
4-Nitroaniline	100-01-6	ug/kg	9	9	8.7	80	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Nitrophenol	100-02-7	ug/kg	9	9	3.4	39	100	G	N	7,000	B	N	--	--	NS	--	--	NS
Acenaphthene	83-32-9	ug/kg	6	9	0.56	2.41	100	G	N	100	C	N	--	--	NS	--	--	NS
Acenaphthylene	208-96-8	ug/kg	7	9	0.81	2.1	100	G	N	100	C	N	--	--	NS	--	--	NS
Acetophenone	98-86-2	ug/kg	8	9	2.28	23	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Anthracene	120-12-7	ug/kg	7	9	0.58	6.47	100	G	N	100	C	N	--	--	NS	--	--	NS
Atrazine	1912-24-9	ug/kg	9	9	2	9.63	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Benzaldehyde	100-52-7	ug/kg	9	9	4.86	91	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Benzo(a)anthracene	56-55-3	ug/kg	5	9	16	18.6	100	G	N	100	C	N	--	--	NS	--	--	NS
Benzo(a)pyrene	50-32-8	ug/kg	4	9	1.4	7.99	100	G	N	--	--	NS	--	--	NS	--	--	NS
Benzo(b)fluoranthene	205-99-2	ug/kg	3	9	1.2	13.7	100	G	N	100	C	N	--	--	NS	--	--	NS
Benzo(g,h,i)perylene	191-24-2	ug/kg	6	9	3.1	12.2	100	G	N	100	C	N	--	--	NS	--	--	NS
Benzo(k)fluoranthene	207-08-9	ug/kg	7	9	0.97	18.8	100	G	N	100	C	N	--	--	NS	--	--	NS
Bis(2-chloroethoxy)methane	111-91-1	ug/kg	9	9	1.1	4.4	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bis(2-chloroethyl)ether	111-44-4	ug/kg	9	9	1.2	3.1	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bis(2-chloroisopropyl)ether	39638-32-9	ug/kg	4	4	0.42	1.1	--	--	NS	--	--	NS	--	--	NS	--	--	NS
ButylBenzylPhthalate	85-68-7	ug/kg	8	9	2.9	7.3	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Caprolactam	105-60-2	ug/kg	7	9	8.29	80	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Carbazole	86-74-8	ug/kg	9	9	0.68	8.54	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Chrysene	218-01-9	ug/kg	4	9	0.67	14.3	100	G	N	100	C	N	--	--	NS	--	--	NS
Di-n-octylphthalate	117-84-0	ug/kg	9	9	3.72	34	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dibenz(a,h)anthracene	53-70-3	ug/kg	7	9	0.73	8.26	100	G	N	100	C	N	--	--	NS	--	--	NS
Dibenzofuran	132-64-9	ug/kg	8	9	0.36	4.42	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Diethylphthalate	84-66-2	ug/kg	1	9	1.3	1.3	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dimethylphthalate	131-11-3	ug/kg	9	9	0.46	4.63	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Fluoranthene	206-44-0	ug/kg	4	9	3.29	5.3	100	G	N	100	C	N	--	--	NS	--	--	NS
Fluorene	86-73-7	ug/kg	6	9	0.38	2.35	100	G	N	100	C	N	--	--	NS	--	--	NS
Hexachlorobenzene	118-74-1	ug/kg	9	9	1.1	3.51	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Hexachlorobutadiene	87-68-3	ug/kg	9	9	0.94	5.42	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Hexachlorocyclopentadiene	77-47-4	ug/kg	9	9	2.38	14	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Hexachloroethane	67-72-1	ug/kg	9	9	1.1	3.27	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	4	9	0.95	5.49	100	G	N	100	C	N	--	--	NS	--	--	NS
Isophorone	78-59-1	ug/kg	9	9	0.54	2.42	--	--	NS	--	--	NS	--	--	NS	--	--	NS
N-Nitrosodi-n-propylamine	621-64-7	ug/kg	9	9	0.97	4.61	--	--	NS	--	--	NS	--	--	NS	--	--	NS
N-Nitrosodiphenylamine	86-30-6	ug/kg	9	9	1.1	6.65	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Naphthalene	91-20-3	ug/kg	4	9	3.3	3.85	100	G	N	100	C	N	--	--	NS	--	--	NS
Nitrobenzene	98-95-3	ug/kg	9	9	2.1	44	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Pentachlorophenol	87-86-5	ug/kg	9	9	5	13	5,000	A	N	31,000	A	N	2,100	--	N	2,800	A	N
Phenanthrene	85-01-8	ug/kg	5	9	3.22	9.7	100	G	N	100	C	N	--	--	NS	--	--	NS
Phenol	108-95-2	ug/kg	8	9	0.95	5.54	100	G	N	30,000	B	N	--	--	NS	--	--	NS
Pyrene	129-00-0	ug/kg	2	9	2.07	2.07	100	G	N	100	C	N	--	--	NS	--	--	NS
Explosives																		
2,4-Dinitrotoluene	121-14-2	mg/kg	9	9	0.1	0.142	5.3	I	N	19.8	I	N	--	--	NS	--	--	NS
2,6-Dinitrotoluene	606-20-2	mg/kg	9	9	0.2	0.25	4.5	I	N	6.9	I	N	--	--	NS	--	--	NS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	9	9	0.074	0.14	8.6	I	N	18.1	I	N	--	--	NS	--	--	NS
1,3-Dinitrobenzene	99-65-0	mg/kg	9	9	0.076	0.159	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	9	9	0.15	0.167	2.4	H	N	1.2	H	N	--	--	NS	--	--	NS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	9	9	0.151	0.22	80	J	N	--	--	NS	--	--	NS	--	--	NS
2-Nitrotoluene	88-72-2	mg/kg	9	9	0.17	0.266	--	--	NS	--	--	NS	--	--	NS	--	--	NS
3-Nitrotoluene	99-08-1	mg/kg	9	9	0.184	0.21	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Amino-2,6-dinitrotoluene	1946-51-0	mg/kg	9	9	0.162	0.3	80	J	N	--	--	NS	--	--	NS	--	--	NS
4-Nitrotoluene	99-99-0	mg/kg	9	9	0.2	0.251	--	--	NS	--	--	NS	--	--	NS	--	--	NS
HMX	2691-41-0	mg/kg	9	9	0.066	0.229	--	--	NS	6.3	I	N	--	--	NS	--	--	NS
Nitrobenzene	98-95-3	mg/kg	9	9	0.03	0.102	--	--	NS	--	--	NS	--	--	NS	--	--	NS
RDX	121-82-4	mg/kg	9	9	0.048	0.131	100	K	N	98.6	I	N	--	--	NS	--	--	NS
Tetryl	479-45-8	mg/kg	9	9	0.065	0.169	--	--	NS	--	--	NS	--	--	NS	--	--	NS

Table F.2-2
Non-detected Chemicals MDL Screening for SWMU 57 - Surface Soil
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
Nitroglycerin/PETN																		
Nitroglycerin	55-63-0	mg/kg	9	9	0.181	0.39	--	--	NS	--	--	NS	--	--	NS	--	--	NS
PETN	78-11-5	mg/kg	9	9	0.23	0.339	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Cyanide																		
Cyanide	57-12-5	mg/kg	1	5	0.0356	0.0356	--	--	NS	0.9	D	N	--	--	NS	--	--	NS

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
ug/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
MDL = Method Detection Limit
SL = Screening Level
Eco SSL = Ecological Soil Screening Level

Sources:
A = USEPA Eco SSL - Soil Invertebrates, Plants, Avian, Mammalian (http://www.epa.gov/ecotox/ecossl)
B = ORNL - Earthworms - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
C = BTAG - Fauna - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
D = CCME 2006
E = ORNL - Microbial Processes - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
F = ORNL - Plants - Toxilogical Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision Efroymson et al.)
G = BTAG - Flora - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
H = Best, E.P.H., H.E. Tatem, K.N. Geter, M.L. Wells and B.K. Lane. 2004. Toxicity and Metabolites of 2,4,6 Trinitrotoluene (TNT) in Plants and Worms from Exposure to Aged Soil.
I = Kuperman. R. 2003. Development of Ecological Toxicity and Biomagnification Data for Explosives Contaminants in Soil.
J = Pennington, Judith C. 1988. Plant Uptake of 2,4,6-Trinitrotoluene, 4-Amino-2,6-Dinitrotoluene, and 2-Amino-4,6-Dinitrotoluene Using 14C-Labeled and Unlabeled Compounds.
K = Simini, M., R.S. Wentsel, R.T. Checkai, C.T. Phillips, N.A. Chester, M.A. Major, and J.C. Amos. 1995. Evaluation of Soil Toxicity at Joliet Army Ammunition Plant.

Y = MDL exceeds screening level
N = MDL does not exceed screening level
NS = No screening level available

Table F.2-3a
Summary of Total PCBs
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID		57SB4A		57SB5A		57SB6A		57SB7A		57SB8A	
Sample Date		10/7/2003		1/14/2008		1/10/2008		1/11/2008		1/14/2008	
Sample Depth (ft bgs)		0.5		0.5-1		0.5-1.5		0.5-2		0-1	
	CAS #	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
PCBs (ug/kg)											
Aroclor 1254	11097-69-1	12	J,J,g	200		2,000		420		290	
Aroclor 1260	11096-82-5	<46	U	73	J,J,g	2,000		210		140	
Total PCBs	--	12		273		4,000		630		430	

Notes:
CAS = Chemical Abstract Service
ug/kg = Microgram per kilogram
ft bgs = Feet Below Ground Surface
PBC = Polychlorinated Biphenyl
See Table 4-1 for flag definitions

Table F.2-3b
Summary of Low and High Molecular Weight PAHs
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID		57SB1A		57SB2A		57SB3A DUP AVG		57SB4A		57SB4A2		57SB5A		57SB6A		57SB7A		57SB8A	
Sample Date		10/7/2003		10/7/2003		10/7/2003		10/7/2003		10/7/2003		1/14/2008		1/10/2008		1/11/2008		1/14/2008	
Sample Depth (ft bgs)		0-1		0-1		0-1		0.5		1.5		0.5-1		0.5-1.5		0.5-2		0-1	
	CAS #	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TCL PAHs (ug/kg)																			
Acenaphthene	83-32-9	<200	U	<220	U	<220	U	<240	U	<230		0.9	J	12	J	1.8	J	<24	U
Acenaphthylene	208-96-8	<200	U	2	J,J,l	6.5	J	<240	U	<230		<23	U	<59	U	<45	U	<24	U
Anthracene	120-12-7	<200	U	<220	U	6.0025	J	<240	U	<230		<23	U	20	J	<45	U	<24	U
Fluorene	86-73-7	<200	U	<220	U	2.045	J	<240	U	<230		<23	U	10	J	<45	U	4.7	J
Naphthalene	91-20-3	<200	U	<220	U	5	J	<240	U	<230		0.45	J	7	J	2.7	J	0.47	J
Phenanthrene	85-01-8	13	J	18	J	38.5	J	<240	U	<230		<23	U	97		<45	U	<24	U
Low Molecular Weight PAHs	--	13		20		58.05		ND		ND		1.35		146		5		5	
Benzo(a)anthracene	56-55-3	<200	U	<220	U	<220	U	<240	U	<230		0.9	J	42	J	4.5	J	2.3	J
Benzo(a)pyrene	50-32-8	12	J	30	J	16	J	<240	U	<230		<23	U	31	J	8.9	J	<24	U
Benzo(b)fluoranthene	205-99-2	23	J	55	J,J,l	27.5	J	<240	U	<230		<23	U	51	J	7.1	J	1.9	J
Benzo(g,h,i)perylene	191-24-2	<200	U	<220	U	10.325	J	<240	U	<230		<91	U	15	J	8	J	<94	U
Benzo(k)fluoranthene	207-08-9	<200	U	<220	U	<220	U	<240	U	<230		<23	U	19	J	7.1	J	<24	U
Chrysene	218-01-9	17	J	<220	U	22.5	J	<240	U	<230		0.9	J	40	J	8.9	J	<24	U
Dibenz(a,h)anthracene	53-70-3	<200	U	<220	U	<220	U	<240	U	<230		<91	U	3.5	J	2.7	J	<94	U
Fluoranthene	206-44-0	30	J	26	J	42.5	J	<240	U	<230		<23	U	99		12	J	<24	U
Indeno(1,2,3-cd)pyrene	193-39-5	7	J	42	J,J,l	9.5	J	<240	U	<230		<91	U	19	J	2.7	J	<94	U
Pyrene	129-00-0	29	J	38	J	42	J	<240	U	<230		1.8	J	81		18	J	2.3	J
High Molecular Weight PAHs	--	118		191		170.3		ND		ND		3.6		400.5		79.9		6.5	

Notes:
CAS = Chemical Abstract Service
ug/kg = Microgram per kilogram
ND = Not Detected
TAL = Target Analyte List
PAH = Polynuclear Aromatic Hydrocarbon
See Table 4-1 for flag definitions

Table F.2-4
Exposure Point Concentrations in SWMU 57 Surface Soil
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean of Detects	UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Surface Soil	Aluminum	mg/kg	25,663	28,333	33,300	28,333	mg/kg	95% Student's t UCL	ProUCL 4.0
	Antimony	mg/kg	59.63	178.2	340	178.2	mg/kg	95% Adjusted Gamma UCL	ProUCL 4.0
	Arsenic	mg/kg	3.202	3.841	5.2	3.841	mg/kg	95% Student's t UCL	ProUCL 4.0
	Cadmium	mg/kg	17.61	52.73	120	52.73	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.0
	Calcium	mg/kg	1,776	2,297	4,440	2,297	mg/kg	95% Student's t UCL	ProUCL 4.0
	Chromium	mg/kg	187.7	1,166	1,500	1,166	mg/kg	99% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Cobalt	mg/kg	12.1	21.13	41.5	21.13	mg/kg	95% H-UCL	ProUCL 4.0
	Copper	mg/kg	27.74	47.39	110	47.39	mg/kg	95% H-UCL	ProUCL 4.0
	Iron	mg/kg	35,590	44,944	78,700	44,944	mg/kg	95% Student's t UCL	ProUCL 4.0
	Lead	mg/kg	97.97	545.6	680	545.6	mg/kg	99% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Manganese	mg/kg	1,008	1,682	4,400	1,682	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Mercury	mg/kg	0.15	0.224	0.76	0.224	mg/kg	95% H-UCL	ProUCL 4.0
	Selenium	mg/kg	0.495	0.494	0.89	0.494	mg/kg	95% KM (t) UCL	ProUCL 4.0
	Vanadium	mg/kg	145.8	918	1,200	918	mg/kg	99% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Zinc	mg/kg	611.3	1,269	3,700	1,269	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Dieldrin*	mg/kg	--	--	0.0054	0.0054	mg/kg	Maximum Detected Concentration	--
	Endosufan II	mg/kg	--	--	0.14	0.14	mg/kg	Maximum Detected Concentration	--
	Aroclor 1254	mg/kg	0.584	3.34	2	2	mg/kg	Maximum Detected Concentration	UCL>MDC
	Aroclor 1260	mg/kg	0.606	2.19	2	2	mg/kg	Maximum Detected Concentration	UCL>MDC
	Benzo(a)pyrene	mg/kg	0.0196	0.0208	0.031	0.0208	mg/kg	95% KM (t) UCL	ProUCL 4.0

Notes:
FOD = frequency of detection
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram
MDC = Maximum Detected Concentration
* Due to the low frequency of detection, a mean and UCL were not calculated.

Table F.2-5
Plant Screening Level Sources - Soil
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Screening Level (mg/kg)	Source
TAL Metals			
Aluminum	7429-90-5	50	ORNL-Plants
Antimony	7440-36-0	5	ORNL-Plants
Arsenic	7440-38-2	18	ECO SSL
Barium	7440-39-3	500	ORNL-Plants
Beryllium	7440-41-7	10	ORNL-Plants
Cadmium	7440-43-9	32	ECO SSL
Calcium	7440-70-2	4	ORNL-Plants
Chromium	7440-47-3	1	ORNL-Plants
Cobalt	7440-48-4	13	ECO SSL
Copper	7440-50-8	70	ECO SSL
Iron	7439-89-6	NV	--
Lead	7439-92-1	120	ECO SSL
Magnesium	7439-95-4	NV	--
Manganese	7439-96-5	220	ECO SSL
Mercury	7439-97-6	0.3	ORNL-Plants
Nickel	7440-02-0	38	ECO SSL
Potassium	7440-09-7	NV	--
Selenium	7782-49-2	0.52	ECO SSL
Silver	7440-22-4	560	ECO SSL
Sodium	7440-23-5	NV	--
Thallium	7440-28-0	1	ORNL-Plants
Vanadium	7440-62-2	2	ORNL-Plants
Zinc	7440-66-6	160	ECO SSL
Cyanide			
Cyanide	57-12-5	NV	--
Pesticides/PCBs			
Dieldrin	60-57-1	NV	--
Endosulfan II	33213-65-9	NV	--
Endrin	72-20-8	0.1	BTAG - Flora
Heptachlor epoxide	1024-57-3	0.1	BTAG - Flora
Aroclor 1254	11097-69-1	NV	--
Aroclor 1260	11096-82-5	NV	--
TCL VOCs			
2-Butanone	78-93-3	NV	--
Acetone	67-64-1	NV	--
Benzene	71-43-2	0.1	BTAG - Flora
Carbon disulfide	75-15-0	NV	--
Chloromethane	74-87-3	NV	--
Ethylbenzene	100-41-4	0.1	BTAG - Flora
Methyl acetate	79-20-9	NV	--
Methylene chloride	75-09-2	0.3	BTAG - Flora
Toluene	108-88-3	200	ORNL-Plants
Trichloroethene	79-01-6	0.3	BTAG - Flora
Xylenes (total)	1330-20-7	0.1	BTAG - Flora
TCL SVOCs/PAHs			
1,1'-Biphenyl	92-52-4	NV	--
2-Methylnaphthalene	91-57-6	NV	--
4-Chloro-3-Methylphenol	59-50-7	NV	--
Acenaphthene	83-32-9	0.1	BTAG - Flora
Acenaphthylene	208-96-8	0.1	BTAG - Flora
Acetophenone	98-86-2	NV	--
Anthracene	120-12-7	0.1	BTAG - Flora
Benzo(a)anthracene	56-55-3	0.1	BTAG - Flora
Benzo(a)pyrene	50-32-8	0.1	BTAG - Flora
Benzo(b)fluoranthene	205-99-2	0.1	BTAG - Flora
Benzo(g,h,i)perylene	191-24-2	0.1	BTAG - Flora
Benzo(k)fluoranthene	207-08-9	0.1	BTAG - Flora
Bis(2-ethylhexyl)phthalate	117-81-7	NV	--
Butyl Benzyl Phthalate	85-68-7	NV	--
Caprolactam	105-60-2	NV	--
Chrysene	218-01-9	0.1	BTAG - Flora

Table F.2-5
Plant Screening Level Sources - Soil
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Screening Level (mg/kg)	Source
Di-n-butylphthalate	84-74-2	200	ORNL-Plants
Dibenz(a,h)anthracene	53-70-3	0.1	BTAG - Flora
Dibenzofuran	132-64-9	NV	--
Diethylphthalate	84-66-2	NV	--
Fluoranthene	206-44-0	0.1	BTAG - Flora
Fluorene	86-73-7	0.1	BTAG - Flora
Indeno(1,2,3-cd)pyrene	193-39-5	0.1	BTAG - Flora
Naphthalene	91-20-3	0.1	BTAG - Flora
Phenanthrene	85-01-8	0.1	BTAG - Flora
Phenol	108-95-2	0.1	BTAG - Flora
Pyrene	129-00-0	0.1	BTAG - Flora
Low Molecular Weight PAHs	--	NV	--
High Molecular Weight PAHs	--	NV	--

Notes:
CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
NV = No Value Available
TAL = Target Analyte List
TCL = Target Compound List
USEPA Eco SSL - Soil Invertebrates, Plants, Avian, Mammalian (http://www.epa.gov/ecotox/ecossl)
ORNL - Plants - Toxilogical Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision Efroymson et al.)
BTAG - Flora - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon

Table F.2-6
Plant Screening - Soil
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Constituent of Potential Ecological Concern	CAS #	Maximum Soil Concentration (mg/kg)	Screening Level (mg/kg)	Hazard Quotient (unitless)	EPC (mg/kg)	EPC Hazard Quotient (unitless)
Inorganics						
Aluminum	7429-90-5	33,300	50	**6.7E+02**	28,333	**5.7E+02**
Antimony	7440-36-0	340	5	**6.8E+01**	178	**3.6E+01**
Arsenic	7440-38-2	5.2	18	2.9E-01	NC	NC
Barium	7440-39-3	220	500	4.4E-01	NC	NC
Beryllium	7440-41-7	2.2	10	2.2E-01	NC	NC
Cadmium	7440-43-9	120	32	**3.8E+00**	52.73	**1.6E+00**
Calcium	7440-70-2	4,440	4	**1.1E+03**	2,297	**5.7E+02**
Chromium	7440-47-3	1,500	1	**1.5E+03**	1,166	**1.2E+03**
Cobalt	7440-48-4	41.5	13	**3.2E+00**	21	**1.6E+00**
Copper	7440-50-8	110	70	**1.6E+00**	47	6.8E-01
Iron	7439-89-6	78,700	NV	NC	NC	NC
Lead	7439-92-1	680	120	**5.7E+00**	546	**4.5E+00**
Magnesium	7439-95-4	2,700	NV	NC	NC	NC
Manganese	7439-96-5	4,400	220	**2.0E+01**	1,682	**7.6E+00**
Mercury	7439-97-6	0.76	0.3	**2.5E+00**	0.224	7.5E-01
Nickel	7440-02-0	17	38	4.5E-01	NC	NC
Potassium	7440-09-7	1,700	NV	NC	NC	NC
Selenium	7782-49-2	0.89	0.52	**1.7E+00**	0.494	9.5E-01
Silver	7440-22-4	0.2	560	3.6E-04	NC	NC
Sodium	7440-23-5	520	NV	NC	NC	NC
Thallium	7440-28-0	0.34	1	3.4E-01	NC	NC
Vanadium	7440-62-2	1,200	2	**6.0E+02**	918	**4.6E+02**
Zinc	7440-66-6	3,700	160	**2.3E+01**	1,269	**7.9E+00**
Cyanide						
Cyanide	57-12-5	0.165	NV	NC	NC	NC
Pesticides/PCBs						
Dieldrin	60-57-1	0.0054	NV	NC	NC	NC
Endosulfan II	33213-65-9	0.14	NV	NC	NC	NC
Endrin	72-20-8	0.0027	0.1	2.7E-02	NC	NC
Heptachlor epoxide	1024-57-3	0.0096	0.1	9.6E-02	NC	NC
Aroclor 1254	11097-69-1	2	NV	NC	NC	NC
Aroclor 1260	11096-82-5	2	NV	NC	NC	NC
Total PCBs	--	4	NV	NC	NC	NC
TCL VOCs						
2-Butanone	78-93-3	0.031	NV	NC	NC	NC
Acetone	67-64-1	0.32	NV	NC	NC	NC
Benzene	71-43-2	0.0002375	0.1	2.4E-03	NC	NC
Carbon disulfide	75-15-0	0.0052	NV	NC	NC	NC
Chloromethane	74-87-3	0.019	NV	NC	NC	NC
Ethylbenzene	100-41-4	0.0004695	0.1	4.7E-03	NC	NC
Methyl acetate	79-20-9	0.095	NV	NC	NC	NC
Methylene chloride	75-09-2	0.024	0.3	8.0E-02	NC	NC
Toluene	108-88-3	0.00195	200	9.8E-06	NC	NC
Trichloroethene	79-01-6	0.00175	0.3	5.8E-03	NC	NC
Xylenes (total)	1330-20-7	0.0062	0.1	6.2E-02	NC	NC
TCL SVOCs/PAHs						
1,1'-Biphenyl	92-52-4	0.00093	NV	NC	NC	NC
2-Methylnaphthalene	91-57-6	0.009	NV	NC	NC	NC
4-Chloro-3-Methylphenol	59-50-7	0.042	NV	NC	NC	NC
Acetophenone	98-86-2	0.0555	NV	NC	NC	NC
Bis(2-ethylhexyl)phthalate	117-81-7	0.56	NV	NC	NC	NC
Butyl Benzyl Phthalate	85-68-7	0.044	NV	NC	NC	NC
Caprolactam	105-60-2	0.034	NV	NC	NC	NC
Di-n-butylphthalate	84-74-2	0.33	200	1.7E-03	NC	NC
Dibenzofuran	132-64-9	0.0058	NV	NC	NC	NC
Diethylphthalate	84-66-2	0.02	NV	NC	NC	NC
Phenol	108-95-2	0.0014	0.1	1.4E-02	NC	NC
Low Molecular Weight PAHs	--	0.146	NV	NC	NC	NC
High Molecular Weight PAHs	--	0.401	NV	NC	NC	NC

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon

NV = No Value Available
NC = Not Calculated
Hazard Quotient = Soil Concentration/Screening Level
EPC = Exposure Point Concentration
See Table F.2-3a for Total PCBs
See Table F.2-3b for Total Low and High Molecular Weight PAHs

Table F.2-7
Invertebrate and Microbial Screening Level Sources - Soil
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Screening Level (mg/kg)	Source
TAL Metals			
Aluminum	7429-90-5	NV	--
Antimony	7440-36-0	78	ECO SSL
Arsenic	7440-38-2	60	ORNL-Earthworm
Barium	7440-39-3	330	ECO SSL
Beryllium	7440-41-7	40	ECO SSL
Cadmium	7440-43-9	140	ECO SSL
Calcium	7440-70-2	NV	--
Chromium	7440-47-3	0.4	ORNL-Earthworm
Cobalt	7440-48-4	200	BTAG - Fauna
Copper	7440-50-8	80	ECO SSL
Iron	7439-89-6	200	ORNL - Microbial
Lead	7439-92-1	1700	ECO SSL
Magnesium	7439-95-4	NV	--
Manganese	7439-96-5	450	ECO SSL
Mercury	7439-97-6	0.1	ORNL-Earthworm
Nickel	7440-02-0	280	ECO SSL
Potassium	7440-09-7	NV	--
Selenium	7782-49-2	4.1	ECO SSL
Silver	7440-22-4	50	ORNL - Microbial
Sodium	7440-23-5	NV	--
Thallium	7440-28-0	NV	--
Vanadium	7440-62-2	20	ORNL - Microbial
Zinc	7440-66-6	120	Eco SSL
Cyanide			
Cyanide	57-12-5	0.9	CCME-2006
Pesticides/PCBs			
Dieldrin	60-57-1	NV	--
Endosulfan II	33213-65-9	NV	--
Endrin	72-20-8	0.1	BTAG - Fauna
Heptachlor epoxide	1024-57-3	0.1	BTAG - Fauna
Aroclor 1254	11097-69-1	NV	--
Aroclor 1260	11096-82-5	NV	--
TCL VOCs			
2-Butanone	78-93-3	NV	--
Acetone	67-64-1	NV	--
Benzene	71-43-2	0.1	BTAG - Fauna
Carbon disulfide	75-15-0	NV	--
Chloromethane	74-87-3	NV	--
Ethylbenzene	100-41-4	0.1	BTAG - Fauna
Methyl acetate	79-20-9	NV	--
Methylene chloride	75-09-2	0.3	BTAG - Fauna
Toluene	108-88-3	0.1	BTAG - Fauna
Trichloroethene	79-01-6	0.3	BTAG - Fauna
Xylenes (total)	1330-20-7	NV	--
TCL SVOCs/PAHs			
1,1'-Biphenyl	92-52-4	NV	--
2-Methylnaphthalene	91-57-6	NV	--
4-Chloro-3-Methylphenol	59-50-7	NV	--
Acetophenone	98-86-2	NV	--
Bis(2-ethylhexyl)phthalate	117-81-7	NV	--
Butyl Benzyl Phthalate	85-68-7	NV	--
Caprolactam	105-60-2	NV	--
Di-n-butylphthalate	84-74-2	NV	--
Dibenzofuran	132-64-9	NV	--
Diethylphthalate	84-66-2	NV	--
Phenol	108-95-2	30	ORNL-Earthworm
Low Molecular Weight PAHs	--	29	ECO SSL
High Molecular Weight PAHs	--	18	ECO SSL

Table F.2-7
Invertebrate and Microbial Screening Level Sources - Soil
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:
CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
NV = No Value Available
TAL = Target Analyte List
TCL = Target Compound List
USEPA Eco SSL - Soil Invertebrates, Plants, Avian, Mammalian (http://www.epa.gov/ecotox/ecossl)
ORNL - Earthworms - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
ORNL - Microbial Processes - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
BTAG - Fauna - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)

PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon

Table F.2-8
Invertebrate and Microbial Screening - Soil
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Constituent of Potential Ecological Concern	CAS #	Maximum Soil Concentration (mg/kg)	Screening Level (mg/kg)	Hazard Quotient (unitless)	EPC (mg/kg)	EPC Hazard Quotient (unitless)
Inorganics						
Aluminum	7429-90-5	33300	NV	NC	NC	NC
Antimony	7440-36-0	340	78	**4.4E+00**	178	**2.3E+00**
Arsenic	7440-38-2	5.2	60	8.7E-02	NC	NC
Barium	7440-39-3	220	330	6.7E-01	NC	NC
Beryllium	7440-41-7	2.2	40	5.5E-02	NC	NC
Cadmium	7440-43-9	120	140	8.6E-01	NC	NC
Calcium	7440-70-2	4440	NV	NC	NC	NC
Chromium	7440-47-3	1500	0.4	**3.8E+03**	1,166	**2.9E+03**
Cobalt	7440-48-4	41.5	200	2.1E-01	NC	NC
Copper	7440-50-8	110	80	**1.4E+00**	47	5.9E-01
Iron	7439-89-6	78700	200	**3.9E+02**	44,944	**2.2E+02**
Lead	7439-92-1	680	1700	4.0E-01	NC	NC
Magnesium	7439-95-4	2700	NV	NC	NC	NC
Manganese	7439-96-5	4400	450	**9.8E+00**	1,682	**3.7E+00**
Mercury	7439-97-6	0.76	0.1	**7.6E+00**	0.22	**2.2E+00**
Nickel	7440-02-0	17	280	6.1E-02	NC	NC
Potassium	7440-09-7	1700	NV	NC	NC	NC
Selenium	7782-49-2	0.89	4	2.2E-01	NC	NC
Silver	7440-22-4	0.2	50	4.0E-03	NC	NC
Sodium	7440-23-5	520	NV	NC	NC	NC
Thallium	7440-28-0	0.34	NV	NC	NC	NC
Vanadium	7440-62-2	1200	20	**6.0E+01**	918	**4.6E+01**
Zinc	7440-66-6	3700	120	**3.1E+01**	1,269	**1.1E+01**
Cyanide						
Cyanide	57-12-5	0.165	1	1.8E-01	NC	NC
Pesticides/PCBs						
Dieldrin	60-57-1	0.0054	NV	NC	NC	NC
Endosulfan II	33213-65-9	0.14	NV	NC	NC	NC
Endrin	72-20-8	0.0027	0.1	2.7E-02	NC	NC
Heptachlor epoxide	1024-57-3	0.0096	0.1	9.6E-02	NC	NC
Aroclor 1254	11097-69-1	2	NV	NC	NC	NC
Aroclor 1260	11096-82-5	2	NV	NC	NC	NC
TCL VOCs						
2-Butanone	78-93-3	0.031	NV	NC	NC	NC
Acetone	67-64-1	0.32	NV	NC	NC	NC
Benzene	71-43-2	0.0002375	0.1	2.4E-03	NC	NC
Carbon disulfide	75-15-0	0.0052	NV	NC	NC	NC
Chloromethane	74-87-3	0.019	NV	NC	NC	NC
Ethylbenzene	100-41-4	0.0004695	0.1	4.7E-03	NC	NC
Methyl acetate	79-20-9	0.095	NV	NC	NC	NC
Methylene chloride	75-09-2	0.024	0.3	8.0E-02	NC	NC
Toluene	108-88-3	0.00195	0.1	2.0E-02	NC	NC
Trichloroethene	79-01-6	0.00175	0.3	5.8E-03	NC	NC
Xylenes (total)	1330-20-7	0.0062	NV	NC	NC	NC
TCL SVOCs/PAHs						
1,1'-Biphenyl	92-52-4	0.00093	NV	NC	NC	NC
2-Methylnaphthalene	91-57-6	0.009	NV	NC	NC	NC
4-Chloro-3-Methylphenol	59-50-7	0.042	NV	NC	NC	NC
Acetophenone	98-86-2	0.0555	NV	NC	NC	NC
Bis(2-ethylhexyl)phthalate	117-81-7	0.56	NV	NC	NC	NC
Butyl Benzyl Phthalate	85-68-7	0.044	NV	NC	NC	NC
Caprolactam	105-60-2	0.034	NV	NC	NC	NC
Di-n-butylphthalate	84-74-2	0.33	NV	NC	NC	NC
Dibenzofuran	132-64-9	0.0058	NV	NC	NC	NC
Diethylphthalate	84-66-2	0.02	NV	NC	NC	NC
Phenol	108-95-2	0.0014	30	4.7E-05	NC	NC
Low Molecular Weight PAHs	--	0.146	29	5.0E-03	NC	NC
High Molecular Weight PAHs	--	0.401	18	2.2E-02	NC	NC

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
NV = No Value Available
NC = Not Calculated
Hazard Quotient = Soil Concentration/Screening Level
EPC = Exposure Point Concentration
See Table F.2-3b for Total Low and High Molecular Weight PAHs

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Table F.2-9
Wildlife Profiles
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

							Preliminary Assessment					Refined Assessment					
Representative Species			Composition of Diet [1] (%)				Minimum Body Weight [1]	Maximum Body Weight [1]	Maximum Food Ingestion Rate [2]	Maximum Substrate Ingestion Rate [3]		Average Body Weight [1]	Average Food Ingestion Rate [2]	Average Substrate Ingestion Rate [3]	Home Range (ha)	Proportion of Year Species Active	AUFs
Food-web Classification	Common Name	Scientific Name	Plants (incl. fungi)	Inverte-brates	Small mammals	Fish	kg	kg	kg dw/day	% of dry intake	kg dry wt./day	kg	kg dw/day	kg dry wt./day			Study Area (0.065) hectares
Birds																	
soil-probing invertivore	American robin	*Turdus migratorius*	62%	38%			0.0635	0.103	0.020	5%	0.001	0.077	0.016	0.0008	0.48	1	0.14
large carnivore	Red-tailed hawk	*Buteo jamaicensis*			100%		0.957	1.235	0.063	0%	0	1.134	0.059	0	250	1	0.0003
Mammals																	
small herbivore	Meadow vole	*Microtus pennsylvanicus*	100%				0.017	0.0524	0.010	2.4%	0.00024	0.037	0.008	0.00019	0.037	1	1
medium carnivore	Red fox	*Vulpes vulpes*	17%	4%	79%		2.95	7.04	0.342	2.8%	0.0096	4.53	0.238	0.0067	96	1	0.0007
small invertivore	Short-tailed shrew	*Blarina brevicauda*	14%	86%			0.0125	0.0225	0.003	13%	0.00039	0.015	0.002	0.00026	0.39	1	0.17

Notes:
kg = Kilogram
kg dw/day = Kilogram Dry-weight per Day
L/day = Liter per Day
ha = Hectares
AUF = Area Use Factor

[1]Wildlife Exposure Factors Handbook. U.S. Environmental Protection Agency (EPA). 1993. Office of Research and Development. 2 Volumes. EPA/600/R93/187a&b. December.
[2] Estimated food intake rate (kg [dw]/day) calculated as follows:
FI ((kg/day) = 0.0687 $Wt.^{0.882}$ for mammals (red fox and short-tailed shrew)
FI ((g/day) = 0.577 $Wt.^{0.727}$ for herbivores (meadow vole)
FI ((g/day) = 0.301 $Wt.^{0.751}$ for non-passerine birds (red-tailed hawk)
FI ((g/day) = 0.398 $Wt.^{0.850}$ for passerine birds (american robin)
[3]Estimating Exposure to Terrestrial Wildlife to Contaminants. Sample and Sutter. 1994. ES/ER/TM-125.
The soil ingestion rate for the american robin set equal to 38% of the american woodcock value (0.34*10.4%=4%), based on a robin diet of 38% invertbrates.

Table F.2-10
Wildlife TRVs
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	AVIAN TEST SPECIES				MAMMALIAN TEST SPECIES					AVIAN RECEPTORS				MAMMALIAN RECEPTORS					
											American Robin		Red-tailed Hawk		Meadow Vole		Red Fox		Short-tailed Shrew	
		Chronic LOAEL	Chronic NOAEL	Test Animal	Source	Chronic LOAEL	Chronic NOAEL	Test Animal	Test Animal Body Weight (kg)	Source	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL
		(mg/kg-bw/d)				(mg/kg-bw/d)					(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)	
Arsenic	7440-38-2	1.28E+01	5.14E+00	mallard duck	ORNL 1996	1.26	0.126	mouse	0.03	ORNL 1996	1.28E+01	5.14E+00	1.28E+01	5.14E+00	1.20E+00	1.20E-01	3.59E-01	3.59E-02	1.50E+00	1.50E-01
Cadmium	7440-43-9	2.00E+01	1.45E+00	mallard duck	ORNL 1996	10	1	rat	0.3	ORNL 1996	2.00E+01	1.45E+00	2.00E+01	1.45E+00	1.69E+01	1.69E+00	5.07E+00	5.07E-01	2.11E+01	2.11E+00
Chromium	7440-47-3	5.00E+00	1.00E+00	black duck	ORNL 1996	32.8	3.28	rat	0.35	ORNL 1996	5.00E+00	1.00E+00	5.00E+00	1.00E+00	5.75E+01	5.75E+00	1.73E+01	1.73E+00	7.21E+01	7.21E+00
Copper	7440-50-8	6.17E+01	4.70E+01	1 day old chicks	ORNL 1996	15.4	11.7	mink	1	ORNL 1996	6.17E+01	4.70E+01	6.17E+01	4.70E+01	3.51E+01	2.67E+01	1.06E+01	8.02E+00	4.40E+01	3.34E+01
Lead	7439-92-1	1.13E+01	1.13E+00	Japanese quail	ORNL 1996	80	8	rat	0.35	ORNL 1996	1.13E+01	1.13E+00	1.13E+01	1.13E+00	1.40E+02	1.40E+01	4.22E+01	4.22E+00	1.76E+02	1.76E+01
Mercury	7439-97-6	9.00E-01	4.50E-01	Japanese Quail	ORNL 1996	132	13.2	mink	1	ORNL 1996	9.00E-01	4.50E-01	9.00E-01	4.50E-01	3.01E+02	3.01E+01	9.05E+01	9.05E+00	3.77E+02	3.77E+01
Nickel	7440-02-0	1.07E+02	7.74E+01	mallard duckling	ORNL 1996	80	40	rat	0.35	ORNL 1996	1.07E+02	7.74E+01	1.07E+02	7.74E+01	1.40E+02	7.01E+01	4.22E+01	2.11E+01	1.76E+02	8.79E+01
Selenium	7782-49-2	8.00E-01	4.00E-01	mallard duck	ORNL 1996	0.33	0.2	rat	0.35	ORNL 1996	8.00E-01	4.00E-01	8.00E-01	4.00E-01	5.79E-01	3.51E-01	1.74E-01	1.05E-01	7.25E-01	4.40E-01
Silver	7440-22-4	1.24E+02	1.66E+01	turkey	Matuk et al. 1981	222	22.2	rat	0.35	Matuk et al. 1981	1.24E+02	1.66E+01	1.24E+02	1.66E+01	3.89E+02	3.89E+01	1.17E+02	1.17E+01	4.88E+02	4.88E+01
Zinc	7440-66-6	1.31E+02	1.45E+01	white leghorn hen	ORNL 1996	320	160	rat	0.35	ORNL 1996	1.31E+02	1.45E+01	1.31E+02	1.45E+01	5.61E+02	2.81E+02	1.69E+02	8.44E+01	7.03E+02	3.52E+02
PAHs																				
Acenaphthene	83-32-9	5.05E+00	1.01E+00	red-winged blackbird	USACE 1998	87.5	17.5	mouse	0.03	USACE 1998	5.05E+00	1.01E+00	5.05E+00	1.01E+00	8.30E+01	1.66E+01	2.50E+01	4.99E+00	1.04E+02	2.08E+01
Acenaphthylene	208-96-8	--	--	--	USACE 1998	500	100	rat	0.35	USACE 1998	NV	NV	NV	NV	8.77E+02	1.75E+02	2.64E+02	5.27E+01	1.10E+03	2.20E+02
Benzo(a)anthracene	56-55-3	--	--	--	USACE 1998	2	0.2	rodents	0.165	USACE 1998	NV	NV	NV	NV	2.91E+00	2.91E-01	8.74E-01	8.74E-02	3.64E+00	3.64E-01
Benzo(a)pyrene	50-32-8	2.50E+00	5.00E-01	duck	ORNL 1996	10	1	mouse	0.03	ORNL 1996	2.50E+00	5.00E-01	2.50E+00	5.00E-01	9.49E+00	9.49E-01	2.85E+00	2.85E-01	1.19E+01	1.19E+00
Benzo(b)fluoranthene	205-99-2	--	--	--	ORNL 1996	10	1	mouse	0.03	ORNL 1996	NV	NV	NV	NV	9.49E+00	9.49E-01	2.85E+00	2.85E-01	1.19E+01	1.19E+00
Benzo(g,h,i)perylene	191-24-2	--	--	--	USACE 1998	2.5	0.5	mouse	0.03	USACE 1998	NV	NV	NV	NV	2.37E+00	4.74E-01	7.13E-01	1.43E-01	2.97E+00	5.95E-01
Benzo(k)fluoranthene	207-08-9	--	--	--	USACE 1998	72	7.2	rodents	0.165	USACE 1998	NV	NV	NV	NV	1.05E+02	1.05E+01	3.15E+01	3.15E+00	1.31E+02	1.31E+01
Chrysene	218-01-9	--	--	--	USACE 1998	99	9.9	rodents	0.165	USACE 1998	NV	NV	NV	NV	1.44E+02	1.44E+01	4.32E+01	4.32E+00	1.80E+02	1.80E+01
Dibenzo(a,h)anthracene	53-70-3	--	--	--	USACE 1998	13.33	1.333	rodents	0.165	USACE 1998	NV	NV	NV	NV	1.94E+01	1.94E+00	5.82E+00	5.82E-01	2.43E+01	2.43E+00
Fluoranthene	206-44-0	--	--	--	USACE 1998	100	20	rodents	0.165	USACE 1998	NV	NV	NV	NV	1.45E+02	2.91E+01	4.37E+01	8.74E+00	1.82E+02	3.64E+01
Fluorene	86-73-7	5.05E+00	1.01E+00	red-winged blackbird	USACE 1998	2.5	0.5	mouse	0.03	USACE 1998	5.05E+00	1.01E+00	5.05E+00	1.01E+00	2.37E+00	4.74E-01	7.13E-01	1.43E-01	2.97E+00	5.95E-01
Indeno(1,2,3-cd)pyrene	193-39-5	--	--	--	USACE 1998	72	7.2	rodents	0.165	USACE 1998	NV	NV	NV	NV	1.05E+02	1.05E+01	3.15E+01	3.15E+00	1.31E+02	1.31E+01
Phenanthrene	85-01-8	5.65E+00	1.13E+00	red-winged blackbird	USACE 1998	35	7	mouse	0.03	USACE 1998	5.65E+00	1.13E+00	5.65E+00	1.13E+00	3.32E+01	6.64E+00	9.98E+00	2.00E+00	4.16E+01	8.32E+00
Pyrene	129-00-0	--	--	--	USACE 1998	40	8	mouse	0.03	USACE 1998	NV	NV	NV	NV	3.80E+01	7.59E+00	1.14E+01	2.28E+00	4.76E+01	9.51E+00
Pesticides																				
Dieldrin	60-57-1	7.70E-01	7.70E-02	barn owl	ORNL 1996	0.2	0.02	rat	0.35	ORNL 1996	7.70E-01	7.70E-02	7.70E-01	7.70E-02	3.51E-01	3.51E-02	1.05E-01	1.05E-02	4.40E-01	4.40E-02
Endosulfan	115-29-7	1.00E+02	1.00E+01	gray partridge	ORNL 1996	1.5	0.15	rat	0.35	ORNL 1996	1.00E+02	1.00E+01	1.00E+02	1.00E+01	2.63E+00	2.63E-01	7.91E-01	7.91E-02	3.30E+00	3.30E-01
Endosulfan II	33213-65-9	1.00E+02	1.00E+01	gray partridge	Endosulfan Value	1.5	0.15	rat	0.35	Endosulfan Value	1.00E+02	1.00E+01	1.00E+02	1.00E+01	2.63E+00	2.63E-01	7.91E-01	7.91E-02	3.30E+00	3.30E-01
Endrin	72-20-8	1.70E-01	2.80E-02	mallard duck	ORNL 1996	0.92	0.092	mouse	0.03	ORNL 1996	1.70E-01	2.80E-02	1.70E-01	2.80E-02	8.73E-01	8.73E-02	2.62E-01	2.62E-02	1.09E+00	1.09E-01
Heptachlor epoxide	1024-57-3	4.95E+00	9.90E-01	Japanese quail	USACE 1998	0.25	0.025	rat	0.35	USACE 1998	4.95E+00	9.90E-01	4.95E+00	9.90E-01	4.38E-01	4.38E-02	1.32E-01	1.32E-02	5.49E-01	5.49E-02
PCBs																				
Aroclor 1016	12674-11-2	1.80E+00	1.80E-01	ring-necked pheasant	Aroclor 1254 Value	3.43	1.37	mink	1	ORNL 1996	1.80E+00	1.80E-01	1.80E+00	1.80E-01	7.82E+00	3.12E+00	2.35E+00	9.39E-01	9.80E+00	3.91E+00
Aroclor 1254	11097-69-1	1.80E+00	1.80E-01	ring-necked pheasant	ORNL 1996	3.43	1.37	mink	1	Aroclor 1016 Value	1.80E+00	1.80E-01	1.80E+00	1.80E-01	7.82E+00	3.12E+00	2.35E+00	9.39E-01	9.80E+00	3.91E+00
Aroclor 1260	11096-82-5	1.80E+00	1.80E-01	ring-necked pheasant	Aroclor 1254 Value	3.43	1.37	mink	1	Aroclor 1016 Value	1.80E+00	1.80E-01	1.80E+00	1.80E-01	7.82E+00	3.12E+00	2.35E+00	9.39E-01	9.80E+00	3.91E+00

Notes:
CAS = Chemical Abstract Service
TRV = Toxic Reference Value
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw/d = Body Weight Per Day
kg = kilogram
PAH = Polynuclear Aromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
USACE = U.S. Army Corps of Engineers
ORNL = Oak Ridge National Laboratory
NOAEL and LOAEL values were derived from acute values by applying an uncertainty factor of 150.
LD_{50} = Lethal Dose for 50% of test organisms

Sources:
ORNL 1996. Sample, B.E., D.M. Opresko and G.W. Suter II. 1996. Toxicological Benchmarks for Wildlife: 1996 Revision. ES/ER/TM-86/R3. Oak Ridge National Laboratory, Oak Ridge, Tennessee.
USACE 1998. U.S. Army Corps of Engineers (USACE). 1998. Final Ecological Risk Assessment, RCRA Facility Investigation, for Sunflower Army Ammunition Plant, De Soto, Kansas. USACE Kansas City District.
Matuk et al. 1981. Matuk, Y., M. Gosh and C. McCulloch. 1981. Distribution of silver in the eyes and plasma proteins of the albino rat. Can. J. Ophthalmol. 16: 145-150. (Cited in ATSDR, 1990)

Table F.2-11
Soil Biocaccumulation/Bioconcentration Factors- Soil to Plant Pathway
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

					Preliminary Assessment		Refined Assessment			
Chemical	**CAS**	**Log K_{ow} Range**	**Selected K_{ow}**	**Source**	**BAF**	**Basis**	**C_s EPC (mg/kg)**	**BAF[1]**	**Basis**	**Source**
Inorganics										
ARSENIC	7440-38-2	-- - --	--	--	1.103	90th percentile	3.84	0.0375	Median	Bechtel Jacobs 1998
CADMIUM	7440-43-9	-- - --	--	--	3.25	90th percentile	52.73	0.1028	$C_p = e^{(0.546*ln(Cs) - 0.475)}$	Bechtel Jacobs 1998
CHROMIUM	7440-47-3	-- - --	--	--	0.084	90th percentile	1166.00	0.0410	Median	Bechtel Jacobs 1998
COPPER	7440-50-8	-- - --	--	--	0.625	90th percentile	47.39	0.1882	$C_p = e^{(0.394*ln(Cs) + 0.668)}$	Bechtel Jacobs 1998
LEAD	7439-92-1	-- - --	--	--	0.468	90th percentile	545.60	0.0167	$C_p = e^{(0.561*ln(Cs) - 1.328)}$	Bechtel Jacobs 1998
MERCURY	7439-97-6	-- - --	--	--	5.0	90th percentile	0.22	0.7314	$C_p = e^{(0.544*ln(Cs) - 0.995)}$	Bechtel Jacobs 1998
NICKEL	7440-02-0	-- - --	--	--	1.411	90th percentile	NC	NC	$C_p = e^{(0.748*ln(Cs) + 2.223)}$	Bechtel Jacobs 1998
SELENIUM	7782-49-2	-- - --	--	--	3.012	90th percentile	0.49	0.4722	$C_p = e^{(1.104*ln(Cs) - 0.677)}$	Bechtel Jacobs 1998
SILVER	7440-22-4	-- - --	--	--	0.037	90th percentile	NC	0.0140	Median	Bechtel Jacobs 1998
ZINC	7440-66-6	-- - --	--	--	1.82	90th percentile	1269.00	0.1995	$C_p = e^{(0.554*ln(Cs) + 1.575)}$	Bechtel Jacobs 1998
Pesticides										
DIELDRIN	60-57-1	3.63 - 6.2	5.37	USEPA 1995	1	Default Value	0.01	0.41	Median	USEPA 2005
ENDOSULFAN II	33213-65-9	3.62 - 4.52	4.52	USEPA 1995	1	Default Value	0.14	0.0945	K_{ow} Regression Eq.	Travis and Arms 1988
ENDRIN	72-20-8	2.92 - 5.2	5.06	USEPA 1995	1	Default Value	NC	0.0461	K_{ow} Regression Eq.	Travis and Arms 1988
HEPTACHLOR EPOXIDE	1024-57-3	3.5 - 5.4	5	USEPA 1995	1	Default Value	NC	0.0499	K_{ow} Regression Eq.	Travis and Arms 1988
PCBs										
AROCLOR-1254	11097-69-1	-- - --	6.5	Jones et al. 1997	0.0068	K_{ow} Regression Eq.	2.00	0.0068	K_{ow} Regression Eq.	Travis and Arms 1988
AROCLOR-1260	11096-82-5	-- - --	6.8	Jones et al. 1997	0.0045	K_{ow} Regression Eq.	2.00	0.0045	K_{ow} Regression Eq.	Travis and Arms 1988
VOCs and SVOCs										
ACENAPHTHENE	83-32-9	3.77 - 4.49	3.92	USEPA 1995	4.6	Anthracene as Surrogate	NC	NC	$C_p = e^{(-0.8556*ln(Cs) - 5.562)}$	USEPA 2005
ACENAPHTHYLENE	208-96-8	-- - --	4.1	USEPA 1995	4.6	Anthracene as Surrogate	NC	NC	$C_p = e^{(0.791*ln(Cs) - 1.144)}$	USEPA 2005
ANTHRACENE	120-12-7	4.44 - 4.8	4.55	USEPA 1995	4.6	Maximum	NC	NC	$C_p = e^{(0.778*ln(Cs) - 0.989)}$	USEPA 2005
BENZO(A)ANTHRACENE	56-55-3	5.61 - 5.79	5.7	USEPA 1995	0.54	Maximum	NC	NC	$C_p = e^{(0.5944*ln(Cs) - 2.708)}$	USEPA 2005
BENZO(A)PYRENE	50-32-8	5.98 - 6.34	6.11	USEPA 1995	3.3	Maximum	NC	NC	$C_p = e^{(0.975*ln(Cs) - 2.0615)}$	USEPA 2005
BENZO(B)FLUORANTHENE	205-99-2	5.79 - 6.4	6.2	USEPA 1995	0.48	Maximum	NC	0.31	Median BAF	USEPA 2005
BENZO(G,H,I)PERYLENE	191-24-2	6.58 - 7.05	6.7	USEPA 1995	1.6	Maximum	NC	NC	$C_p = e^{(1.183*ln(Cs) - 0.931)}$	USEPA 2005
BENZO(K)FLUORANTHENE	207-08-9	6.12 - 6.27	6.2	USEPA 1995	1.0	Maximum	NC	NC	$C_p = e^{(0.860*ln(Cs) - 2.158)}$	USEPA 2005
CHRYSENE	218-01-9	5.41 - 5.79	5.7	USEPA 1995	1.05	Maximum	NC	NC	$C_p = e^{(0.594*ln(Cs) - 2.708)}$	USEPA 2005
DIBENZO(A,H)ANTHRACENE	53-70-3	6.5 - 6.88	6.69	USEPA 1995	0.23	Maximum	NC	0.13	Median BAF	USEPA 2005
FLUORANTHENE	206-44-0	4.84 - 5.39	5.12	USEPA 1995	6.0	Maximum	NC	0.50	Median BAF	USEPA 2005
FLUORENE	86-73-7	4.04 - 4.4	4.21	USEPA 1995	0.057	Maximum	NC	NC	$C_p = e^{(-0.856*ln(Cs) - 5.562)}$	USEPA 2005
INDENO(1,2,3-CD)PYRENE	193-39-5	6.58 - 6.72	6.65	USEPA 1995	0.15	Maximum	NC	0.11	Median BAF	USEPA 2005
PHENANTHRENE	85-01-8	4.37 - 4.57	4.55	USEPA 1995	11	Maximum	NC	NC	$C_p = e^{(0.620*ln(Cs) - 0.167)}$	USEPA 2005
PYRENE	129-00-0	4.76 - 5.52	5.11	USEPA 1995	3.7	Maximum	NC	0.72	Median BAF	USEPA 2005

Notes:
CAS = Chemical Abstract Services
BAF = Bioaccumulation Factor
K_{ow} = Chemical octanol-water coefficient
NC = Not Calculated
C_s = Chemical Concentration in Soil
C_p = Chemical Concentration in Plant Matter (dry weight)
[1] = BAFs for chemical using Cp regression equation calculated by as follows: BAF = C_p/C_s

Source(s):

USEPA 1995: United States Environmental Protection Agency. 1995. Karickhoff, S.W. , and J.M. Long. Summary of Measured, Calculated, and Recommended Log K_{ow} Values. Environmental Research Laboratory. Athens, Georgia.
Jones et al. 1997: Jones et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision
Bechtel Jacobs 1998: Bechtel Jacobs Company. September 1998. Emperical Models for the Uptake of Inorganic Chemical from Soil by Plants.
USEPA 2005: United States Environmental Protection Agency (USEPA). February 2005. Guidance for Developing Ecological Soil Screening Levels.
Travis and Arms 1988: Travis and Arms. 1988. Bioconcentration of Organics in Beef, Milk, and Vegetation. BAF values calculated for Tier I using lowest Kow value and for Tier II using the selected Kow value.
K_{ow} Regression Equation: BAF =10^((-0.578*K_{ow})+1.588))

Table F.2-12
Soil Biocaccumulation/Bioconcentration Factors - Soil to Invertebrate Pathway
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

							Preliminary Assessment		Refined Assessment			
Chemical	**CAS**	**Log K_{ow} Range**	**Selected Log K_{ow}**	**Reference**	**K_{oc}**	**Reference**	**Value**	**Basis**	**C_s EPC (mg/kg)**	**BAF[1]**	**Basis**	**Source**
Inorganics												
ARSENIC	7440-38-2	-- - --	--	--	--	--	0.52	90th percentile	3.841	0.1626	$C_e = e^{(0.706*ln(Cs) - 1.421)}$	Sample et al. 1998
CADMIUM	7440-43-9	-- - --	--	--	--	--	40.7	90th percentile	52.73	3.6735	$C_e = e^{(0.795*ln(Cs) + 2.114)}$	Sample et al. 1998
CHROMIUM	7440-47-3	-- - --	--	--	--	--	3.16	90th percentile	1166	0.31	Median	Sample et al. 1998
COPPER	7440-50-8	-- - --	--	--	--	--	1.53	90th percentile	47.39	0.52	Median	Sample et al. 1998
LEAD	7439-92-1	-- - --	--	--	--	--	1.52	90th percentile	545.6	0.2383	$C_e = e^{(0.807*ln(Cs) - 0.218)}$	Sample et al. 1998
MERCURY	7439-97-6	-- - --	--	--	--	--	20.6	90th percentile	0.224	1.69	Median	Sample et al. 1998
NICKEL	7440-02-0	-- - --	--	--	--	--	4.73	90th percentile	NC	1.06	Median	Sample et al. 1998
SELENIUM	7782-49-2	-- - --	--	--	--	--	1.34	90th percentile	0.494	1.1200	$C_e = e^{(0.733*ln(Cs) - 0.075)}$	Sample et al. 1998
SILVER	7440-22-4	-- - --	--	--	--	--	15.3	90th percentile	NC	2.05	Median	Sample et al. 1998
ZINC	7440-66-6	-- - --	--	--	--	--	12.9	90th percentile	1269	0.7025	$C_e = e^{(0.328*ln(Cs) + 4.449)}$	Sample et al. 1998
Pesticides												
DIELDRIN	60-57-1	3.63 - 6.2	5.37	USEPA 1995	--	--	79.6	Maximum	0.0054	15.4988	$C_e = e^{(0.876*ln(Cs) + 2.276)}$	USEPA 2005
ENDOSULFAN II	33213-65-9	3.62 - 4.52	4.52	USEPA 1995	6.77E+03	SRC, CF	33.62	Jager Model	0.14	33.62	Jager Model	USEPA 2005
ENDRIN	72-20-8	2.92 - 5.2	5.06	USEPA 1995	1.14E+04	SRC, CF	3.60	Not Specified	NC	3.60	Not Specified	Edwards and Bohlen 1992
HEPTACHLOR EPOXIDE	1024-57-3	3.5 - 5.4	5	USEPA 1995	1.06E+01	SRC, CF	8.39	Not Specified	NC	8.39	Not Specified	USEPA 1999
PCBs												
AROCLOR-1254	11097-69-1	-- - --	6.5	Jones et al. 1997	--	--	15.9	90th percentile	2	6.67	Median	Sample et al. 1998
AROCLOR-1260	11096-82-5	-- - --	6.8	Jones et al. 1997	--	--	15.9	90th percentile	2	6.67	Median	Sample et al. 1998
VOCs and SVOCs												
ACENAPHTHENE	83-32-9	3.77 - 4.49	3.92	USEPA 1995	1.09E+04	USEPA 2005	19.66	Jager Model	NC	6.28	Jager Model	USEPA 2005
ACENAPHTHYLENE	208-96-8	-- - --	4.07	USEPA 1995	9.47E+02	USEPA 2005	97.58	Jager Model	NC	97.58	Jager Model	USEPA 2005
ANTHRACENE	120-12-7	4.44 - 4.8	4.55	USEPA 1995	2.35E+04	USEPA 2005	16.97	Jager Model	NC	10.29	Jager Model	USEPA 2005
BENZO(A)ANTHRACENE	56-55-3	5.61 - 5.79	5.7	USEPA 1995	3.58E+05	USEPA 2005	8.10	Jager Model	NC	6.76	Jager Model	USEPA 2005
BENZO(A)PYRENE	50-32-8	5.98 - 6.34	6.11	USEPA 1995	9.69E+05	USEPA 2005	9.00	Jager Model	NC	5.68	Jager Model	USEPA 2005
BENZO(B)FLUORANTHENE	205-99-2	5.79 - 6.4	6.2	USEPA 1995	5.96E+05	USEPA 2005	16.50	Jager Model	NC	11.06	Jager Model	USEPA 2005
BENZO(G,H,I)PERYLENE	191-24-2	6.58 - 7.05	6.7	USEPA 1995	1.43E+06	USEPA 2005	25.29	Jager Model	NC	12.55	Jager Model	USEPA 2005
BENZO(K)FLUORANTHENE	207-08-9	6.12 - 6.27	6.2	USEPA 1995	5.96E+05	USEPA 2005	12.72	Jager Model	NC	11.06	Jager Model	USEPA 2005
CHRYSENE	218-01-9	5.41 - 5.79	5.7	USEPA 1995	2.48E+05	USEPA 2005	11.69	Jager Model	NC	9.76	Jager Model	USEPA 2005
DIBENZO(A,H)ANTHRACENE	53-70-3	6.5 - 6.88	6.69	USEPA 1995	1.79E+06	USEPA 2005	14.37	Jager Model	NC	9.82	Jager Model	USEPA 2005
FLUORANTHENE	206-44-0	4.84 - 5.39	4.95	USEPA 1995	4.17E+04	USEPA 2005	31.19	Jager Model	NC	12.92	Jager Model	USEPA 2005
FLUORENE	86-73-7	4.04 - 4.4	4.18	USEPA 1995	2.83E+03	USEPA 2005	63.24	Jager Model	NC	40.70	Jager Model	USEPA 2005
INDENO(1,2,3-CD)PYRENE	193-39-5	6.58 - 6.72	6.58	USEPA 1995	1.17E+06	USEPA 2005	15.96	Jager Model	NC	12.15	Jager Model	USEPA 2005
PHENANTHRENE	85-01-8	4.37 - 4.57	4.55	USEPA 1995	3.30E+04	USEPA 2005	7.62	Jager Model	NC	7.32	Jager Model	USEPA 2005
PYRENE	129-00-0	4.76 - 5.52	4.88	USEPA 1995	6.27E+04	USEPA 2005	26.91	Jager Model	NC	7.47	Jager Model	USEPA 2005

Notes:
CAS = Chemical Abstract Services
C_s = Chemical Concentration in Soil
C_e = Chemical Concentration in Earthworm (dry weight)
K_{ow} = Chemical octanol-water coefficient
K_{oc} = Chemical water to soil partitioning coefficient
K_{ww} = Chemical worm to soil partitioning coefficient
foc = mean fraction organic content in soil (0.00235 mean from physical samples - see Appendix C.1)
[1] = BAFs for chemical using Ce regression equation calculated by as follows: BAF = C_e/C_s

Source(s):
USEPA 1995: United States Environmental Protection Agency. Karickhoff, S.W. , and J.M. Long. 1995. Summary of Measured, Calculated, and Recommended Log K_{ow} Values. Environmental Research Laboratory. Athens, Georgia.
Jones et al. 1997: Jones et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision
Sample et al. 1998: Sample, B.E., Beauchamp, J.J., Efroymson, R.A., Sutter, G.W., Ashwood, T.L., February 1998. Development and Validation of Bioaccumulation Models for Earthworms.
Jager Model: As presented in USEPA 2005, Guidance for Developing Ecological Screening Levels, Appendix 4-1, Table 5.
BAF = K_{ww}(L/kg worl dw)/K_d (L/kg soil dw)
K_{ww} (dry weight) = 10^(0.87*logK_{ow} - 2.0) / 0.16
Wet weight to dry weight assuming 16% solids
$K_d = f_{oc} * K_{oc}$
foc = 0.00235 from site specific physical soil data
Note: The maximum Kow utilized for the preliminary calculation and the Selected Kow utilized for the refined calculation.
Edwards and Bohlen 1992: Edwards, C.A. and Bohlen, P.J. 1992. The effects of toxic chemicals on earthworms. Reviews of Environmental Contamination and Toxicology, 125: 23-99.
USEPA 2005: United States Environmental Protection Agency (USEPA). February 2005. Guidance for Developing Ecological Soil Screening Levels.
SRC/CF: Syracuse Research Corporation (SRC). Physical Properties Database. http://www.syrres.com/esc/physdemo.htm

Table F.2-13
Soil Bioaccumulation/Bioconcentration Factors - Soil to Mammal Pathway
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

					Preliminary Assessment		Refined Assessment			
Chemical	**CAS**	**Log K_{ow} Range**	**Selected K_{ow}**	**Reference**	**Value**	**Basis**	**C_s (mg/kg)**	**BAF[1]**	**Basis**	**Source**
Inorganics										
ARSENIC	7440-38-2	-- - --	--	--	0.0149	90th percentile	3.841	0.0062	$C_m = e^{(0.819*ln(Cs) - 4.847)}$	Sample et al. 1998
CADMIUM	7440-43-9	-- - --	--	--	3.991	90th percentile	52.73	0.0351	$C_m = e^{(0.472*ln(Cs) - 1.257)}$	Sample et al. 1998
CHROMIUM	7440-47-3	-- - --	--	--	0.333	90th percentile	1166	0.0355	$C_m = e^{(0.734*ln(Cs) - 1.46)}$	Sample et al. 1998
COPPER	7440-50-8	-- - --	--	--	1.045	90th percentile	47.39	0.2839	$C_m = e^{(0.144*ln(Cs) + 2.042)}$	Sample et al. 1998
LEAD	7439-92-1	-- - --	--	--	0.286	90th percentile	545.6	0.0321	$C_m = e^{(0.442*ln(Cs) + 0.0761)}$	Sample et al. 1998
MERCURY	7439-97-6	-- - --	--	--	0.192	90th percentile	0.224	0.0543	Median	Sample et al. 1998
NICKEL	7440-02-0	-- - --	--	--	0.589	90th percentile	NC	NC	$C_m = e^{(0.466*ln(Cs) - 0.246)}$	Sample et al. 1998
SELENIUM	7782-49-2	-- - --	--	--	1.187	90th percentile	0.494	1.0243	$C_m = e^{(0.376*ln(Cs) -0.416)}$	Sample et al. 1998
SILVER	7440-22-4	-- - --	--	--	0.501	90th percentile	NC	0.004	Median	Sample et al. 1998
ZINC	7440-66-6	-- - --	--	--	2.69	90th percentile	1269	0.1025	$C_m = e^{(0.071*ln(Cs) + 4.363)}$	Sample et al. 1998
Pesticides										
DIELDRIN	60-57-1	3.63 - 6.2	5.37	USEPA 1995	1	Default Value	0.0054	0.0005	$C_m = e^{(0.6076*ln(Cs) - 1.9582)}$	USEPA 2005
ENDOSULFAN II	33213-65-9	3.62 - 4.52	4.52	USEPA 1995	1	Default Value	0.14	1	Default Value	--
ENDRIN	72-20-8	2.92 - 5.2	5.06	USEPA 1995	1	Default Value	NC	1	Default Value	--
HEPTACHLOR EPOXIDE	1024-57-3	3.5 - 5.4	5	USEPA 1995	1	Default Value	NC	1	Default Value	--
PCBs										
AROCLOR-1254	11097-69-1	-- - --	6.5	Jones et al. 1997	1	Default Value	2	1	Default Value	--
AROCLOR-1260	11096-82-5	-- - --	6.8	Jones et al. 1997	1	Default Value	2	1	Default Value	--
VOCs and SVOCs										
ACENAPHTHENE	83-32-9	3.77 - 4.49	3.92	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
ACENAPHTHYLENE	208-96-8	-- - --	4.07	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
ANTHRACENE	120-12-7	4.44 - 4.8	4.55	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
BENZO(A)ANTHRACENE	56-55-3	5.61 - 5.79	5.7	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
BENZO(A)PYRENE	50-32-8	5.98 - 6.34	6.11	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
BENZO(B)FLUORANTHENE	205-99-2	5.79 - 6.4	6.2	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
BENZO(G,H,I)PERYLENE	191-24-2	6.58 - 7.05	6.7	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
BENZO(K)FLUORANTHENE	207-08-9	6.12 - 6.27	6.2	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
CHRYSENE	218-01-9	5.41 - 5.79	5.7	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
DIBENZO(A,H)ANTHRACENE	53-70-3	6.5 - 6.88	6.69	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
FLUORANTHENE	206-44-0	4.84 - 5.39	5.12	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
FLUORENE	86-73-7	4.04 - 4.4	4.21	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
INDENO(1,2,3-CD)PYRENE	193-39-5	6.58 - 6.72	6.65	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
PHENANTHRENE	85-01-8	4.37 - 4.57	4.55	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
PYRENE	129-00-0	4.76 - 5.52	5.11	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
Dioxin/Furans										
2,3,7,8-TCDD	1746-01-6	6.42 - 7.02	6.53	USEPA 1995	2.2	90th percentile	0.00000959	0.7199	$C_m = e^{(0.1089*ln(Cs) + 0.7044)}$	Sample et al. 1998

Notes:
CAS = Chemical Abstract Services
C_s = Chemical Concentration in Soil
C_d = Chemical Concentration in Prey (assumed to be 100% earthworms (dry weight))
C_m = Chemical Concentration in Mammal (dry weight)
K_{ow} = Chemical octanol to water partitioning coefficient
[1] = BAFs for chemical using Ce regression equation calculated by as follows: BAF = C_m/C_s

Source(s):
USEPA 1995: United States Environmental Protection Agency. Karickhoff, S.W. , and J.M. Long. 1995. Summary of Measured, Calculated, and Recommended Log K_{ow} Values. Environmental Research Laboratory. Athens, Georgia.
Sample et al. 1998: Sample et al. 1998. Development and Validation of Bioaccumulation Models for Small Mammals.
Jones et al. 1997: Jones et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision
USEPA 2005: United States Environmental Protection Agency (USEPA). February 2005. Guidance for Developing Ecological Soil Screening Levels.

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Table F.2-14
Preliminary Wildlife Risk Characterization - Meadow Vole
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment – Soil: Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics													
Arsenic	7440-38-2	1.20E-01	1.20E+00	5.2	1.1E+00	5.7E+00	1.8E-01	1.8E+00	**2.88E+01**	**2.9E+00**	**Y**	3.841	**2.1E+01**
Cadmium	7440-43-9	1.69E+00	1.69E+01	120	3.3E+00	3.9E+02	8.8E-01	8.8E+00	**1.37E+02**	**1.4E+01**	**Y**	52.73	**6.0E+01**
Chromium	7440-47-3	5.75E+00	5.75E+01	1500	8.4E-02	1.3E+02	9.1E+01	9.1E+02	**1.66E+01**	**1.7E+00**	**Y**	1166	**1.3E+01**
Copper	7440-50-8	2.67E+01	3.51E+01	110	6.3E-01	6.9E+01	7.0E+01	9.2E+01	**1.57E+00**	**1.2E+00**	**Y**	47.39	6.8E-01
Lead	7439-92-1	1.40E+01	1.40E+02	680	4.7E-01	3.2E+02	4.8E+01	4.8E+02	**1.40E+01**	**1.4E+00**	**Y**	545.6	**1.1E+01**
Mercury	7439-97-6	3.01E+01	3.01E+02	0.76	5.0E+00	3.8E+00	1.0E+01	1.0E+02	7.46E-02	7.5E-03	N	--	--
Nickel	7440-02-0	7.01E+01	1.40E+02	17	1.4E+00	2.4E+01	8.3E+01	1.7E+02	2.05E-01	1.0E-01	N	--	--
Selenium	7782-49-2	3.51E-01	5.79E-01	0.89	3.0E+00	2.7E+00	2.0E-01	3.2E-01	**4.53E+00**	**2.7E+00**	**Y**	0.494	**2.5E+00**
Silver	7440-22-4	3.89E+01	3.89E+02	0.2	3.7E-02	7.4E-03	1.1E+03	1.1E+04	1.84E-04	1.8E-05	N	--	--
Zinc	7440-66-6	2.81E+02	5.61E+02	3700	1.8E+00	6.7E+03	2.6E+02	5.2E+02	**1.43E+01**	**7.2E+00**	**Y**	1269	**4.9E+00**
Pesticides/PCBs													
Dieldrin	60-57-1	3.51E-02	3.51E-01	0.0054	1.0E+00	5.4E-03	5.8E-02	5.8E-01	9.27E-02	9.3E-03	N	--	--
Endosulfan II	33213-65-9	2.63E-01	2.63E+00	0.14	1.0E+00	1.4E-01	4.4E-01	4.4E+00	3.21E-01	3.2E-02	N	--	--
Endrin	72-20-8	8.73E-02	8.73E-01	0.0027	1.0E+00	2.7E-03	1.4E-01	1.4E+00	1.86E-02	1.9E-03	N	--	--
Heptachlor epoxide	1024-57-3	4.38E-02	4.38E-01	0.0096	1.0E+00	9.6E-03	7.3E-02	7.3E-01	1.32E-01	1.3E-02	N	--	--
Aroclor 1254	11097-69-1	6.45E-02	6.45E-01	2	6.8E-03	1.4E-02	3.6E+00	3.6E+01	5.61E-01	5.6E-02	N	--	--
Aroclor 1260	11096-82-5	6.45E-02	6.45E-01	2	4.5E-03	9.1E-03	3.8E+00	3.8E+01	5.20E-01	5.2E-02	N	--	--
TCL SVOCs/PAHs													
Acenaphthene	83-32-9	1.66E+01	8.30E+01	0.012	4.6E+00	5.5E-02	6.1E+00	3.1E+01	1.97E-03	3.9E-04	N	--	--
Acenaphthylene	208-96-8	1.75E+02	8.77E+02	0.0065	4.6E+00	3.0E-02	6.4E+01	3.2E+02	1.01E-04	2.0E-05	N	--	--
Anthracene	120-12-7	4.80E+02	4.80E+03	0.02	4.6E+00	9.2E-02	1.8E+02	1.8E+03	1.13E-04	1.1E-05	N	--	--
Benzo(a)anthracene	56-55-3	2.91E-01	2.91E+00	0.042	5.4E-01	2.3E-02	8.8E-01	8.8E+00	4.79E-02	4.8E-03	N	--	--
Benzo(a)pyrene	50-32-8	9.49E-01	9.49E+00	0.031	3.3E+00	1.0E-01	4.9E-01	4.9E+00	6.39E-02	6.4E-03	N	--	--
Benzo(b)fluoranthene	205-99-2	9.49E-01	9.49E+00	0.055	4.8E-01	2.6E-02	3.2E+00	3.2E+01	1.72E-02	1.7E-03	N	--	--
Benzo(g,h,i)perylene	191-24-2	4.74E-01	2.37E+00	0.015	1.6E+00	2.4E-02	5.0E-01	2.5E+00	3.02E-02	6.0E-03	N	--	--
Benzo(k)fluoranthene	207-08-9	1.05E+01	1.05E+02	0.019	1.0E+00	1.9E-02	1.7E+01	1.7E+02	1.09E-03	1.1E-04	N	--	--
Chrysene	218-01-9	1.44E+01	1.44E+02	0.04	1.1E+00	4.2E-02	2.3E+01	2.3E+02	1.76E-03	1.8E-04	N	--	--
Dibenz(a,h)anthracene	53-70-3	1.94E+00	1.94E+01	0.0035	2.3E-01	8.1E-04	1.3E+01	1.3E+02	2.70E-04	2.7E-05	N	--	--
Fluoranthene	206-44-0	2.91E+01	1.45E+02	0.099	6.0E+00	5.9E-01	8.2E+00	4.1E+01	1.21E-02	2.4E-03	N	--	--
Fluorene	86-73-7	4.74E-01	2.37E+00	0.01	5.7E-02	5.7E-04	1.0E+01	5.0E+01	1.00E-03	2.0E-04	N	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	1.05E+01	1.05E+02	0.042	1.5E-01	6.3E-03	1.0E+02	1.0E+03	4.11E-04	4.1E-05	N	--	--
Phenanthrene	85-01-8	6.64E+00	3.32E+01	0.097	1.1E+01	1.1E+00	1.0E+00	5.1E+00	9.47E-02	1.9E-02	N	--	--
Pyrene	129-00-0	7.59E+00	3.80E+01	0.081	3.7E+00	3.0E-01	3.5E+00	1.7E+01	2.34E-02	4.7E-03	N	--	--

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soi)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Minimum Body Weigth of Receptor (kg)

IR_{food} = Maximum Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)

DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = 100% Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

EPC = Exposure Point Concentration

Meadow Vole Specific Data from Table F.2-9

BW=	0.017	kg
IR_{food} =	0.010	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00024	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Concentration

LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Concentration

EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.2-15
Refined Wildlife Risk Characterization - Meadow Vole
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment						
				Soil						
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics										
Arsenic	7440-38-2	1.20E-01	1.20E+00	3.841	3.8E-02	1.4E-01	9.0E+00	9.0E+01	4.3E-01	4.3E-02
Cadmium	7440-43-9	1.69E+00	1.69E+01	52.73	1.0E-01	5.4E+00	6.2E+01	6.2E+02	8.5E-01	8.5E-02
Chromium	7440-47-3	5.75E+00	5.75E+01	1166	4.1E-02	4.8E+01	4.1E+02	4.1E+03	**2.8E+00**	2.8E-01
Copper	7440-50-8	2.67E+01	3.51E+01	47.39	1.9E-01	8.9E+00	5.8E+02	7.7E+02	8.1E-02	6.2E-02
Lead	7439-92-1	1.40E+01	1.40E+02	545.6	1.7E-02	9.1E+00	1.6E+03	1.6E+04	3.4E-01	3.4E-02
Selenium	7782-49-2	3.51E-01	5.79E-01	0.494	4.7E-01	2.3E-01	3.3E+00	5.4E+00	1.5E-01	9.2E-02
Zinc	7440-66-6	2.81E+02	5.61E+02	1269	2.0E-01	2.5E+02	5.8E+03	1.2E+04	2.2E-01	1.1E-01

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soi)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Meadow Vole Specific Data from Table F.2-9

BW=	0.037	kg
IR_{food} =	0.008	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	1.00	unitless
IR_{soil} =	0.00019	kg dw/day
AF =	1	unitless

Table F.2-16
Preliminary Wildlife Risk Characterization - Short-tailed Shrew
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment – Soil: Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Most Contaminated Dietary Component	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics																
Arsenic	7440-38-2	1.50E-01	1.50E+00	5.2	1.1E+00	5.7E+00	5.2E-01	2.7E+00	Plant	5.1E-01	5.1E+00	**1.0E+01**	**1.0E+00**	**Y**	3.841	**7.6E+00**
Cadmium	7440-43-9	2.11E+00	2.11E+01	120	3.3E+00	3.9E+02	4.1E+01	4.9E+03	Invertebrate	2.2E-01	2.2E+00	**5.6E+02**	**5.6E+01**	**Y**	52.73	**2.4E+02**
Chromium	7440-47-3	7.21E+00	7.21E+01	1500	8.4E-02	1.3E+02	3.2E+00	4.7E+03	Invertebrate	9.1E+00	9.1E+01	**1.6E+02**	**1.6E+01**	**Y**	1166	**1.3E+02**
Copper	7440-50-8	3.34E+01	4.40E+01	110	6.3E-01	6.9E+01	1.5E+00	1.7E+02	Invertebrate	8.4E+01	1.1E+02	**1.3E+00**	1.0E+00	**Y**	47.39	5.7E-01
Lead	7439-92-1	1.76E+01	1.76E+02	680	4.7E-01	3.2E+02	1.5E+00	1.0E+03	Invertebrate	4.4E+01	4.4E+02	**1.5E+01**	**1.5E+00**	**Y**	545.6	**1.2E+01**
Mercury	7439-97-6	3.77E+01	3.77E+02	0.76	5.0E+00	3.8E+00	2.1E+01	1.6E+01	Invertebrate	7.6E+00	7.6E+01	1.0E-01	1.0E-02	N	--	--
Nickel	7440-02-0	8.79E+01	1.76E+02	17	1.4E+00	2.4E+01	4.7E+00	8.0E+01	Invertebrate	7.5E+01	1.5E+02	2.3E-01	1.1E-01	N	--	--
Selenium	7782-49-2	4.40E-01	7.25E-01	0.89	3.0E+00	2.7E+00	1.3E+00	1.2E+00	Plant	5.8E-01	9.6E-01	**1.5E+00**	9.3E-01	**Y**	0.494	8.5E-01
Silver	7440-22-4	4.88E+01	4.88E+02	0.2	3.7E-02	7.4E-03	1.5E+01	3.1E+00	Invertebrate	1.3E+01	1.3E+02	1.5E-02	1.5E-03	N	--	--
Zinc	7440-66-6	3.52E+02	7.03E+02	3700	1.8E+00	6.7E+03	1.3E+01	4.8E+04	Invertebrate	1.1E+02	2.3E+02	**3.3E+01**	**1.6E+01**	**Y**	1269	**1.1E+01**
Pesticides/PCBs																
Dieldrin	60-57-1	4.40E-02	4.40E-01	0.0054	1.0E+00	5.4E-03	8.0E+01	4.3E-01	Invertebrate	2.3E-03	2.3E-02	**2.4E+00**	2.4E-01	**Y**	0.0054	**2.4E+00**
Endosulfan II	33213-65-9	3.30E-01	3.30E+00	0.14	1.0E+00	1.4E-01	3.4E+01	4.7E+00	Invertebrate	4.1E-02	4.1E-01	**3.4E+00**	3.4E-01	**Y**	0.14	**3.4E+00**
Endrin	72-20-8	1.09E-01	1.09E+00	0.0027	1.0E+00	2.7E-03	3.6E+00	9.7E-03	Invertebrate	1.2E-01	1.2E+00	2.2E-02	2.2E-03	N	--	--
Heptachlor epoxide	1024-57-3	5.49E-02	5.49E-01	0.0096	1.0E+00	9.6E-03	8.4E+00	8.1E-02	Invertebrate	2.7E-02	2.7E-01	3.6E-01	3.6E-02	N	--	--
Aroclor 1254	11097-69-1	8.09E-02	8.09E-01	2	6.8E-03	1.4E-02	1.6E+01	3.2E+01	Invertebrate	2.1E-02	2.1E-01	**9.5E+01**	**9.5E+00**	**Y**	2	**9.5E+01**
Aroclor 1260	11096-82-5	8.09E-02	8.09E-01	2	4.5E-03	9.1E-03	1.6E+01	3.2E+01	Invertebrate	2.1E-02	2.1E-01	**9.5E+01**	**9.5E+00**	**Y**	2	**9.5E+01**
TCL SVOCs/PAHs																
Acenaphthene	83-32-9	2.08E+01	1.04E+02	0.012	4.6E+00	5.5E-02	2.0E+01	2.4E-01	Invertebrate	4.4E+00	2.2E+01	2.7E-03	5.5E-04	N	--	--
Acenaphthylene	208-96-8	2.20E+02	1.10E+03	0.0065	4.6E+00	3.0E-02	9.8E+01	6.3E-01	Invertebrate	9.4E+00	4.7E+01	6.9E-04	1.4E-04	N	--	--
Anthracene	120-12-7	6.01E+02	6.01E+03	0.02	4.6E+00	9.2E-02	1.7E+01	3.4E-01	Invertebrate	1.5E+02	1.5E+03	1.4E-04	1.4E-05	N	--	--
Benzo(a)anthracene	56-55-3	3.64E-01	3.64E+00	0.042	5.4E-01	2.3E-02	8.1E+00	3.4E-01	Invertebrate	1.8E-01	1.8E+00	2.3E-01	2.3E-02	N	--	--
Benzo(a)pyrene	50-32-8	1.19E+00	1.19E+01	0.031	3.3E+00	1.0E-01	9.0E+00	2.8E-01	Invertebrate	5.4E-01	5.4E+00	5.7E-02	5.7E-03	N	--	--
Benzo(b)fluoranthene	205-99-2	1.19E+00	1.19E+01	0.055	4.8E-01	2.6E-02	1.7E+01	9.1E-01	Invertebrate	3.0E-01	3.0E+00	1.8E-01	1.8E-02	N	--	--
Benzo(g,h,i)perylene	191-24-2	5.95E-01	2.97E+00	0.015	1.6E+00	2.4E-02	2.5E+01	3.8E-01	Invertebrate	9.7E-02	4.9E-01	1.5E-01	3.1E-02	N	--	--
Benzo(k)fluoranthene	207-08-9	1.31E+01	1.31E+02	0.019	1.0E+00	1.9E-02	1.3E+01	2.4E-01	Invertebrate	4.3E+00	4.3E+01	4.5E-03	4.5E-04	N	--	--
Chrysene	218-01-9	1.80E+01	1.80E+02	0.04	1.1E+00	4.2E-02	1.2E+01	4.7E-01	Invertebrate	6.4E+00	6.4E+01	6.3E-03	6.3E-04	N	--	--
Dibenz(a,h)anthracene	53-70-3	2.43E+00	2.43E+01	0.0035	2.3E-01	8.1E-04	1.4E+01	5.0E-02	Invertebrate	7.0E-01	7.0E+00	5.0E-03	5.0E-04	N	--	--
Fluoranthene	206-44-0	3.64E+01	1.82E+02	0.099	6.0E+00	5.9E-01	3.1E+01	3.1E+00	Invertebrate	4.8E+00	2.4E+01	2.0E-02	4.1E-03	N	--	--
Fluorene	86-73-7	5.95E-01	2.97E+00	0.01	5.7E-02	5.7E-04	6.3E+01	6.3E-01	Invertebrate	3.9E-02	2.0E-01	2.6E-01	5.1E-02	N	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	1.31E+01	1.31E+02	0.042	1.5E-01	6.3E-03	1.6E+01	6.7E-01	Invertebrate	3.4E+00	3.4E+01	1.2E-02	1.2E-03	N	--	--
Phenanthrene	85-01-8	8.32E+00	4.16E+01	0.097	1.1E+01	1.1E+00	7.6E+00	7.4E-01	Plant	3.1E+00	1.6E+01	3.1E-02	6.2E-03	N	--	--
Pyrene	129-00-0	9.51E+00	4.76E+01	0.081	3.7E+00	3.0E-01	2.7E+01	2.2E+00	Invertebrate	1.5E+00	7.3E+00	5.5E-02	1.1E-02	N	--	--

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Minimum Body Weigth of Receptor (kg)

IR_{food} = Maximum Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)

DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = 100% Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

EPC = Exposure Point Concentration

Short-tailed Shrew Specific Data from Table F.2-9

BW=	0.0125	kg
IR_{food} =	0.003	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00039	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate soil screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Screening Level

LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Screening Level

EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.2-17
Refined Wildlife Risk Characterization - Short-tailed Shrew
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment								
				Soil								
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics												
Arsenic	7440-38-2	1.50E-01	1.50E+00	3.841	3.8E-02	1.4E-01	1.63E-01	6.2E-01	2.4E+01	2.4E+02	1.6E-01	1.6E-02
Cadmium	7440-43-9	2.11E+00	2.11E+01	52.73	1.0E-01	5.4E+00	3.67E+00	1.9E+02	2.8E+01	2.8E+02	**1.9E+00**	1.9E-01
Chromium	7440-47-3	7.21E+00	7.21E+01	1166	4.1E-02	4.8E+01	3.06E-01	3.6E+02	8.0E+02	8.0E+03	**1.5E+00**	1.5E-01
Copper	7440-50-8	3.34E+01	4.40E+01	47.39	1.9E-01	8.9E+00	5.15E-01	2.4E+01	2.5E+03	3.2E+03	1.9E-02	1.5E-02
Lead	7439-92-1	1.76E+01	1.76E+02	545.6	1.7E-02	9.1E+00	2.38E-01	1.3E+02	2.3E+03	2.3E+04	2.4E-01	2.4E-02
Selenium	7782-49-2	4.40E-01	7.25E-01	0.494	4.7E-01	2.3E-01	1.12E+00	5.5E-01	1.7E+01	2.8E+01	3.0E-02	1.8E-02
Zinc	7440-66-6	3.52E+02	7.03E+02	1269	2.0E-01	2.5E+02	7.03E-01	8.9E+02	2.0E+04	4.1E+04	6.2E-02	3.1E-02
Pesticides/PCBs												
Dieldrin	60-57-1	4.40E-02	4.40E-01	0.0054	4.1E-01	2.2E-03	1.55E+01	8.4E-02	1.4E-01	1.4E+00	3.8E-02	3.8E-03
Aroclor 1254	11097-69-1	8.09E-02	8.09E-01	2	6.8E-03	1.4E-02	6.67E+00	1.3E+01	6.1E-01	6.1E+00	**3.3E+00**	3.3E-01
Aroclor 1260	11096-82-5	8.09E-02	8.09E-01	2	4.5E-03	9.1E-03	6.67E+00	1.3E+01	6.1E-01	6.1E+00	**3.3E+00**	3.3E-01

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Short-tailed Shrew Specific Data from Table F.2-9

BW=	0.015	kg
IR_{food} =	0.002	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	0.14	unitless
DF_{inv} =	0.86	unitless
IR_{soil} =	0.00026	kg dw/day
AF =	0.170	unitless

[a] = The following equation was used to calculate soil screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.2-18
Preliminary Wildlife Risk Characterization - Red Fox
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment – Soil: Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Most Contaminated Dietary Component	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics																		
Arsenic	7440-38-2	3.59E-02	3.59E-01	5.2	1.1E+00	5.7E+00	5.2E-01	2.7E+00	1.5E-02	7.7E-02	Plant	2.7E-01	2.7E+00	**1.9E+01**	**1.9E+00**	**Y**	3.841	**1.4E+01**
Cadmium	7440-43-9	5.07E-01	5.07E+00	120	3.3E+00	3.9E+02	4.1E+01	4.9E+03	4.0E+00	4.8E+02	Invertebrate	1.1E-01	1.1E+00	**1.1E+03**	**1.1E+02**	**Y**	52.73	**4.9E+02**
Chromium	7440-47-3	1.73E+00	1.73E+01	1500	8.4E-02	1.3E+02	3.2E+00	4.7E+03	3.3E-01	5.0E+02	Invertebrate	4.7E+00	4.7E+01	**3.2E+02**	**3.2E+01**	**Y**	1166	**2.5E+02**
Copper	7440-50-8	8.02E+00	1.06E+01	110	6.3E-01	6.9E+01	1.5E+00	1.7E+02	1.0E+00	1.1E+02	Invertebrate	4.4E+01	5.8E+01	**2.5E+00**	**1.9E+00**	**Y**	47.39	**1.1E+00**
Lead	7439-92-1	4.22E+00	4.22E+01	680	4.7E-01	3.2E+02	1.5E+00	1.0E+03	2.9E-01	1.9E+02	Invertebrate	2.3E+01	2.3E+02	**2.9E+01**	**2.9E+00**	**Y**	545.6	**2.3E+01**
Mercury	7439-97-6	9.05E+00	9.05E+01	0.76	5.0E+00	3.8E+00	2.1E+01	1.6E+01	1.9E-01	1.5E-01	Invertebrate	3.8E+00	3.8E+01	2.0E-01	2.0E-02	N	--	--
Nickel	7440-02-0	2.11E+01	4.22E+01	17	1.4E+00	2.4E+01	4.7E+00	8.0E+01	5.9E-01	1.0E+01	Invertebrate	3.8E+01	7.6E+01	4.4E-01	2.2E-01	N	--	--
Selenium	7782-49-2	1.05E-01	1.74E-01	0.89	3.0E+00	2.7E+00	1.3E+00	1.2E+00	1.2E+00	1.1E+00	Plant	3.0E-01	4.9E-01	**3.0E+00**	**1.8E+00**	**Y**	0.494	**1.7E+00**
Silver	7440-22-4	1.17E+01	1.17E+02	0.2	3.7E-02	7.4E-03	1.5E+01	3.1E+00	5.0E-01	1.0E-01	Invertebrate	6.6E+00	6.6E+01	3.0E-02	3.0E-03	N	--	--
Zinc	7440-66-6	8.44E+01	1.69E+02	3700	1.8E+00	6.7E+03	1.3E+01	4.8E+04	2.7E+00	9.9E+03	Invertebrate	5.6E+01	1.1E+02	**6.6E+01**	**3.3E+01**	**Y**	1269	**2.3E+01**
Pesticides/PCBs																		
Dieldrin	60-57-1	1.05E-02	1.05E-01	0.0054	1.0E+00	5.4E-03	8.0E+01	4.3E-01	1.0E+00	5.4E-03	Invertebrate	1.1E-03	1.1E-02	**4.7E+00**	4.7E-01	**Y**	0.0054	**4.7E+00**
Endosulfan II	33213-65-9	7.91E-02	7.91E-01	0.14	1.0E+00	1.4E-01	3.4E+01	4.7E+00	1.0E+00	1.4E-01	Invertebrate	2.0E-02	2.0E-01	**6.9E+00**	6.9E-01	**Y**	0.14	**6.9E+00**
Endrin	72-20-8	2.62E-02	2.62E-01	0.0027	1.0E+00	2.7E-03	3.6E+00	9.7E-03	1.0E+00	2.7E-03	Invertebrate	6.2E-02	6.2E-01	4.3E-02	4.3E-03	N	--	--
Heptachlor epoxide	1024-57-3	1.32E-02	1.32E-01	0.0096	1.0E+00	9.6E-03	8.4E+00	8.1E-02	1.0E+00	9.6E-03	Invertebrate	1.4E-02	1.4E-01	7.1E-01	7.1E-02	N	--	--
Aroclor 1254	11097-69-1	1.94E-02	1.94E-01	2	6.8E-03	1.4E-02	1.6E+01	3.2E+01	1.0E+00	2.0E+00	Invertebrate	1.1E-02	1.1E-01	**1.9E+02**	**1.9E+01**	**Y**	2	**1.9E+02**
Aroclor 1260	11096-82-5	1.94E-02	1.94E-01	2	4.5E-03	9.1E-03	1.6E+01	3.2E+01	1.0E+00	2.0E+00	Invertebrate	1.1E-02	1.1E-01	**1.9E+02**	**1.9E+01**	**Y**	2	**1.9E+02**
TCL SVOCs/PAHs																		
Acenaphthene	83-32-9	4.99E+00	2.50E+01	0.012	4.6E+00	5.5E-02	2.0E+01	2.4E-01	1.0E+00	1.2E-02	Invertebrate	2.2E+00	1.1E+01	5.5E-03	1.1E-03	N	--	--
Acenaphthylene	208-96-8	5.27E+01	2.64E+02	0.0065	4.6E+00	3.0E-02	9.8E+01	6.3E-01	1.0E+00	6.5E-03	Invertebrate	4.7E+00	2.3E+01	1.4E-03	2.8E-04	N	--	--
Anthracene	120-12-7	1.44E+02	1.44E+03	0.02	4.6E+00	9.2E-02	1.7E+01	3.4E-01	1.0E+00	2.0E-02	Invertebrate	7.3E+01	7.3E+02	2.7E-04	2.7E-05	N	--	--
Benzo(a)anthracene	56-55-3	8.74E-02	8.74E-01	0.042	5.4E-01	2.3E-02	8.1E+00	3.4E-01	1.0E+00	4.2E-02	Invertebrate	9.3E-02	9.3E-01	4.5E-01	4.5E-02	N	--	--
Benzo(a)pyrene	50-32-8	2.85E-01	2.85E+00	0.031	3.3E+00	1.0E-01	9.0E+00	2.8E-01	1.0E+00	3.1E-02	Invertebrate	2.7E-01	2.7E+00	1.1E-01	1.1E-02	N	--	--
Benzo(b)fluoranthene	205-99-2	2.85E-01	2.85E+00	0.055	4.8E-01	2.6E-02	1.7E+01	9.1E-01	1.0E+00	5.5E-02	Invertebrate	1.5E-01	1.5E+00	3.7E-01	3.7E-02	N	--	--
Benzo(g,h,i)perylene	191-24-2	1.43E-01	7.13E-01	0.015	1.6E+00	2.4E-02	2.5E+01	3.8E-01	1.0E+00	1.5E-02	Invertebrate	4.9E-02	2.4E-01	3.1E-01	6.2E-02	N	--	--
Benzo(k)fluoranthene	207-08-9	3.15E+00	3.15E+01	0.019	1.0E+00	1.9E-02	1.3E+01	2.4E-01	1.0E+00	1.9E-02	Invertebrate	2.1E+00	2.1E+01	8.9E-03	8.9E-04	N	--	--
Chrysene	218-01-9	4.32E+00	4.32E+01	0.04	1.1E+00	4.2E-02	1.2E+01	4.7E-01	1.0E+00	4.0E-02	Invertebrate	3.2E+00	3.2E+01	1.3E-02	1.3E-03	N	--	--
Dibenz(a,h)anthracene	53-70-3	5.82E-01	5.82E+00	0.0035	2.3E-01	8.1E-04	1.4E+01	5.0E-02	1.0E+00	3.5E-03	Invertebrate	3.5E-01	3.5E+00	1.0E-02	1.0E-03	N	--	--
Fluoranthene	206-44-0	8.74E+00	4.37E+01	0.099	6.0E+00	5.9E-01	3.1E+01	3.1E+00	1.0E+00	9.9E-02	Invertebrate	2.4E+00	1.2E+01	4.1E-02	8.2E-03	N	--	--
Fluorene	86-73-7	1.43E-01	7.13E-01	0.01	5.7E-02	5.7E-04	6.3E+01	6.3E-01	1.0E+00	1.0E-02	Invertebrate	1.9E-02	9.7E-02	5.1E-01	1.0E-01	N	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	3.15E+00	3.15E+01	0.042	1.5E-01	6.3E-03	1.6E+01	6.7E-01	1.0E+00	4.2E-02	Invertebrate	1.7E+00	1.7E+01	2.5E-02	2.5E-03	N	--	--
Phenanthrene	85-01-8	2.00E+00	9.98E+00	0.097	1.1E+01	1.1E+00	7.6E+00	7.4E-01	1.0E+00	9.7E-02	Plant	1.6E+00	7.8E+00	6.2E-02	1.2E-02	N	--	--
Pyrene	129-00-0	2.28E+00	1.14E+01	0.081	3.7E+00	3.0E-01	2.7E+01	2.2E+00	1.0E+00	8.1E-02	Invertebrate	7.3E-01	3.7E+00	1.1E-01	2.2E-02	N	--	--

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Minimum Body Weigth of Receptor (kg)

IR_{food} = Maximum Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)

DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = 100% Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

EPC = Exposure Point Concentration

Red FoxSpecific Data from Table F.2-9

BW=	2.9500	kg
IR_{food} =	0.342	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00960	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Screening Level

LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Screening Level

EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.2-19
Refined Wildlife Risk Characterization - Red Fox
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment										
				Soil										
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics														
Arsenic	7440-38-2	3.59E-02	3.59E-01	3.841	3.8E-02	1.4E-01	1.6E-01	6.2E-01	6.2E-03	2.4E-02	2.1E+04	2.1E+05	1.8E-04	1.8E-05
Cadmium	7440-43-9	5.07E-01	5.07E+00	52.73	1.0E-01	5.4E+00	3.7E+00	1.9E+02	3.5E-02	1.9E+00	6.3E+04	6.3E+05	8.4E-04	8.4E-05
Chromium	7440-47-3	1.73E+00	1.73E+01	1166	4.1E-02	4.8E+01	3.1E-01	3.6E+02	3.5E-02	4.1E+01	6.2E+05	6.2E+06	1.9E-03	1.9E-04
Copper	7440-50-8	8.02E+00	1.06E+01	47.39	1.9E-01	8.9E+00	5.2E-01	2.4E+01	2.8E-01	1.3E+01	7.1E+05	9.4E+05	6.6E-05	5.0E-05
Lead	7439-92-1	4.22E+00	4.22E+01	545.6	1.7E-02	9.1E+00	2.4E-01	1.3E+02	3.2E-02	1.8E+01	1.7E+06	1.7E+07	3.1E-04	3.1E-05
Selenium	7782-49-2	1.05E-01	1.74E-01	0.494	4.7E-01	2.3E-01	1.1E+00	5.5E-01	1.0E+00	5.1E-01	3.0E+03	4.9E+03	1.7E-04	1.0E-04
Zinc	7440-66-6	8.44E+01	1.69E+02	1269	2.0E-01	2.5E+02	7.0E-01	8.9E+02	1.0E-01	1.3E+02	1.3E+07	2.7E+07	9.5E-05	4.7E-05
Pesticides/PCBs														
Dieldrin	60-57-1	1.05E-02	1.05E-01	0.0054	4.1E-01	2.2E-03	1.5E+01	8.4E-02	5.0E-04	2.7E-06	4.0E+02	4.0E+03	1.4E-05	1.4E-06
Aroclor 1254	11097-69-1	1.94E-02	1.94E-01	2	6.8E-03	1.4E-02	6.7E+00	1.3E+01	1.0E+00	2.0E+00	4.9E+02	4.9E+03	4.1E-03	4.1E-04
Aroclor 1260	11096-82-5	1.94E-02	1.94E-01	2	4.5E-03	9.1E-03	6.7E+00	1.3E+01	1.0E+00	2.0E+00	4.9E+02	4.9E+03	4.1E-03	4.1E-04

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Red FoxSpecific Data from Table F.2-9

BW=	4.5300	kg
IR_{food} =	0.238	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	0.17	unitless
DF_{inv} =	0.04	unitless
DF_{mam} =	0.79	unitless
IR_{soil} =	0.00670	kg dw/day
AF =	0.0007	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.2-20
Preliminary Wildlife Risk Characterization - American Robin
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment												
				Soil												
				Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Most Contaminated Dietary Component	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics																
Arsenic	7440-38-2	5.14E+00	1.28E+01	5.2	1.1E+00	5.7E+00	5.2E-01	2.7E+00	Plant	1.4E+01	3.5E+01	3.7E-01	1.5E-01	N	--	--
Cadmium	7440-43-9	1.45E+00	2.00E+01	120	3.3E+00	3.9E+02	4.1E+01	4.9E+03	Invertebrate	1.1E-01	1.6E+00	**1.1E+03**	**7.7E+01**	**Y**	52.73	**4.7E+02**
Chromium	7440-47-3	1.00E+00	5.00E+00	1500	8.4E-02	1.3E+02	3.2E+00	4.7E+03	Invertebrate	9.9E-01	4.9E+00	**1.5E+03**	**3.0E+02**	**Y**	1166	**1.2E+03**
Copper	7440-50-8	4.70E+01	6.17E+01	110	6.3E-01	6.9E+01	1.5E+00	1.7E+02	Invertebrate	9.4E+01	1.2E+02	**1.2E+00**	8.9E-01	**Y**	47.39	5.0E-01
Lead	7439-92-1	1.13E+00	1.13E+01	680	4.7E-01	3.2E+02	1.5E+00	1.0E+03	Invertebrate	2.3E+00	2.3E+01	**3.0E+02**	**3.0E+01**	**Y**	545.6	**2.4E+02**
Mercury	7439-97-6	4.50E-01	9.00E-01	0.76	5.0E+00	3.8E+00	2.1E+01	1.6E+01	Invertebrate	6.9E-02	1.4E-01	**1.1E+01**	**5.5E+00**	**Y**	0.224	**3.2E+00**
Nickel	7440-02-0	7.74E+01	1.07E+02	17	1.4E+00	2.4E+01	4.7E+00	8.0E+01	Invertebrate	5.1E+01	7.1E+01	3.3E-01	2.4E-01	N	--	--
Selenium	7782-49-2	4.00E-01	8.00E-01	0.89	3.0E+00	2.7E+00	1.3E+00	1.2E+00	Plant	4.1E-01	8.3E-01	**2.1E+00**	**1.1E+00**	**Y**	0.494	**1.2E+00**
Silver	7440-22-4	1.66E+01	1.24E+02	0.2	3.7E-02	7.4E-03	1.5E+01	3.1E+00	Invertebrate	3.4E+00	2.6E+01	5.8E-02	7.8E-03	N	--	--
Zinc	7440-66-6	1.45E+01	1.31E+02	3700	1.8E+00	6.7E+03	1.3E+01	4.8E+04	Invertebrate	3.6E+00	3.2E+01	**1.0E+03**	**1.2E+02**	**Y**	1269	**3.6E+02**
Pesticides/PCBs																
Dieldrin	60-57-1	7.70E-02	7.70E-01	0.0054	1.0E+00	5.4E-03	8.0E+01	4.3E-01	Invertebrate	3.1E-03	3.1E-02	**1.8E+00**	1.8E-01	**Y**	0.0054	**1.8E+00**
Endosulfan II	33213-65-9	1.00E+01	1.00E+02	0.14	1.0E+00	1.4E-01	3.4E+01	4.7E+00	Invertebrate	9.4E-01	9.4E+00	1.5E-01	1.5E-02	N	--	--
Endrin	72-20-8	2.80E-02	1.70E-01	0.0027	1.0E+00	2.7E-03	3.6E+00	9.7E-03	Invertebrate	2.4E-02	1.5E-01	1.1E-01	1.8E-02	N	--	--
Heptachlor epoxide	1024-57-3	9.90E-01	4.95E+00	0.0096	1.0E+00	9.6E-03	8.4E+00	8.1E-02	Invertebrate	3.7E-01	1.9E+00	2.6E-02	5.2E-03	N	--	--
Aroclor 1254	11097-69-1	4.10E-01	4.10E+00	2	6.8E-03	1.4E-02	1.6E+01	3.2E+01	Invertebrate	8.2E-02	8.2E-01	**2.5E+01**	**2.5E+00**	**Y**	2	**2.5E+01**
Aroclor 1260	11096-82-5	4.10E-01	4.10E+00	2	4.5E-03	9.1E-03	1.6E+01	3.2E+01	Invertebrate	8.2E-02	8.2E-01	**2.5E+01**	**2.5E+00**	**Y**	2	**2.5E+01**
TCL SVOCs/PAHs																
Acenaphthene	83-32-9	1.01E+00	5.05E+00	0.012	4.6E+00	5.5E-02	2.0E+01	2.4E-01	Invertebrate	1.6E-01	8.1E-01	7.4E-02	1.5E-02	N	--	--
Acenaphthylene	208-96-8	NV	NV	0.0065	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Anthracene	120-12-7	NV	NV	0.02	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Benzo(a)anthracene	56-55-3	NV	NV	0.042	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Benzo(a)pyrene	50-32-8	5.00E-01	2.50E+00	0.031	3.3E+00	1.0E-01	9.0E+00	2.8E-01	Invertebrate	1.8E-01	8.8E-01	1.8E-01	3.5E-02	N	--	--
Benzo(b)fluoranthene	205-99-2	NV	NV	0.055	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Benzo(g,h,i)perylene	191-24-2	NV	NV	0.015	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Benzo(k)fluoranthene	207-08-9	NV	NV	0.019	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Chrysene	218-01-9	NV	NV	0.04	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Dibenz(a,h)anthracene	53-70-3	NV	NV	0.0035	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Fluoranthene	206-44-0	NV	NV	0.099	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Fluorene	86-73-7	1.01E+00	5.05E+00	0.01	5.7E-02	5.7E-04	6.3E+01	6.3E-01	Invertebrate	5.1E-02	2.5E-01	2.0E-01	3.9E-02	N	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	NV	NV	0.042	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Phenanthrene	85-01-8	1.13E+00	5.65E+00	0.097	1.1E+01	1.1E+00	7.6E+00	7.4E-01	Plant	3.2E-01	1.6E+00	3.0E-01	6.0E-02	N	--	--
Pyrene	129-00-0	NV	NV	0.081	--	--	--	--	--	--	--	**--**	**--**	--	--	--

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Minimum Body Weigth of Receptor (kg)

IR_{food} = Maximum Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)

DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = 100% Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

EPC = Exposure Point Concentration

American Robin Specific Data from Table F.2-9

BW=	0.0635	kg
IR_{food} =	0.020	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00100	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate soil screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Concentration

LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Concentration

EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.2-21
Refined Wildlife Risk Characterization - American Robin
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment								
				Soil								
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics												
Arsenic	7440-38-2	5.14E+00	1.28E+01	3.841	3.8E-02	1.4E-01	1.6E-01	6.2E-01	1.3E+03	3.3E+03	2.9E-03	1.2E-03
Cadmium	7440-43-9	1.45E+00	2.00E+01	52.73	1.0E-01	5.4E+00	3.7E+00	1.9E+02	3.3E+01	4.6E+02	**1.6E+00**	1.2E-01
Chromium	7440-47-3	1.00E+00	5.00E+00	1166	4.1E-02	4.8E+01	3.1E-01	3.6E+02	1.8E+02	9.0E+02	**6.5E+00**	**1.3E+00**
Copper	7440-50-8	4.70E+01	6.17E+01	47.39	1.9E-01	8.9E+00	5.2E-01	2.4E+01	4.5E+03	5.9E+03	1.1E-02	8.1E-03
Lead	7439-92-1	1.13E+00	1.13E+01	545.6	1.7E-02	9.1E+00	2.4E-01	1.3E+02	2.6E+02	2.6E+03	**2.1E+00**	2.1E-01
Selenium	7782-49-2	4.00E-01	8.00E-01	0.494	4.7E-01	2.3E-01	1.1E+00	5.5E-01	1.8E+01	3.6E+01	2.7E-02	1.4E-02
Zinc	7440-66-6	1.45E+01	1.31E+02	1269	2.0E-01	2.5E+02	7.0E-01	8.9E+02	1.1E+03	1.0E+04	**1.1E+00**	1.2E-01
Pesticides/PCBs												
Dieldrin	60-57-1	7.70E-02	7.70E-01	0.0054	4.1E-01	2.2E-03	1.5E+01	8.4E-02	4.3E-01	4.3E+00	1.3E-02	1.3E-03
Aroclor 1254	11097-69-1	4.10E-01	4.10E+00	2	6.8E-03	1.4E-02	6.7E+00	1.3E+01	5.5E+00	5.5E+01	3.7E-01	3.7E-02
Aroclor 1260	11096-82-5	4.10E-01	4.10E+00	2	4.5E-03	9.1E-03	6.7E+00	1.3E+01	5.5E+00	5.5E+01	3.7E-01	3.7E-02

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

American Robin Specific Data from Table F.2-9

BW=	0.0773	kg
IR_{food} =	0.016	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	0.62	unitless
DF_{inv} =	0.38	unitless
IR_{soil} =	0.0008	kg dw/day
AF =	0.140	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.2-22
Preliminary Wildlife Risk Characterization - Red-tailed Hawk
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment – Soil: Maximum Detected Concentration (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics													
Arsenic	7440-38-2	5.14E+00	1.28E+01	5.2	1.5E-02	7.7E-02	5.2E+03	2.1E+03	9.9E-04	4.0E-04	N	--	--
Cadmium	7440-43-9	1.45E+00	2.00E+01	120	4.0E+00	4.8E+02	5.5E+00	4.0E-01	**2.2E+01**	**1.6E+00**	**Y**	52.73	**9.6E+00**
Chromium	7440-47-3	1.00E+00	5.00E+00	1500	3.3E-01	5.0E+02	4.6E+01	9.1E+00	**3.3E+01**	**6.6E+00**	**Y**	1166	**2.6E+01**
Copper	7440-50-8	4.70E+01	6.17E+01	110	1.0E+00	1.1E+02	6.8E+02	5.2E+02	1.6E-01	1.2E-01	N	--	--
Lead	7439-92-1	1.13E+00	1.13E+01	680	2.9E-01	1.9E+02	6.0E+01	6.0E+00	**1.1E+01**	**1.1E+00**	**Y**	545.6	**9.1E+00**
Mercury	7439-97-6	4.50E-01	9.00E-01	0.76	1.9E-01	1.5E-01	3.6E+01	1.8E+01	2.1E-02	1.1E-02	N	--	--
Nickel	7440-02-0	7.74E+01	1.07E+02	17	5.9E-01	1.0E+01	2.0E+03	1.4E+03	8.5E-03	6.2E-03	N	--	--
Selenium	7782-49-2	4.00E-01	8.00E-01	0.89	1.2E+00	1.1E+00	5.1E+00	2.6E+00	1.7E-01	8.7E-02	N	--	--
Silver	7440-22-4	1.66E+01	1.24E+02	0.2	5.0E-01	1.0E-01	5.0E+02	6.7E+01	4.0E-04	5.3E-05	N	--	--
Zinc	7440-66-6	1.45E+01	1.31E+02	3700	2.7E+00	9.9E+03	8.2E+01	9.1E+00	**4.5E+01**	**5.0E+00**	**Y**	1269	**1.5E+01**
Pesticides/PCBs													
Dieldrin	60-57-1	7.70E-02	7.70E-01	0.0054	1.0E+00	5.4E-03	1.2E+00	1.2E-01	4.6E-03	4.6E-04	N	--	--
Endosulfan II	33213-65-9	1.00E+01	1.00E+02	0.14	1.0E+00	1.4E-01	1.5E+02	1.5E+01	9.2E-04	9.2E-05	N	--	--
Endrin	72-20-8	2.80E-02	1.70E-01	0.0027	1.0E+00	2.7E-03	4.3E-01	7.0E-02	6.3E-03	1.0E-03	N	--	--
Heptachlor epoxide	1024-57-3	9.90E-01	4.95E+00	0.0096	1.0E+00	9.6E-03	1.5E+01	3.0E+00	6.4E-04	1.3E-04	N	--	--
Aroclor 1254	11097-69-1	4.10E-01	4.10E+00	2	1.0E+00	2.0E+00	6.2E+00	6.2E-01	3.2E-01	3.2E-02	N	--	--
Aroclor 1260	11096-82-5	4.10E-01	4.10E+00	2	1.0E+00	2.0E+00	6.2E+00	6.2E-01	3.2E-01	3.2E-02	N	--	--
TCL SVOCs/PAHs													
Acenaphthene	83-32-9	1.01E+00	5.05E+00	0.012	1.0E+00	1.2E-02	1.5E+01	3.1E+00	7.8E-04	1.6E-04	N	--	--
Acenaphthylene	208-96-8	NV	NV	0.0065	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	NV	NV	0.02	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	NV	NV	0.042	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	5.00E-01	2.50E+00	0.031	1.0E+00	3.1E-02	7.6E+00	1.5E+00	4.1E-03	8.2E-04	N	--	--
Benzo(b)fluoranthene	205-99-2	NV	NV	0.055	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NV	NV	0.015	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	NV	NV	0.019	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	NV	NV	0.04	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NV	NV	0.0035	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	NV	NV	0.099	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	1.01E+00	5.05E+00	0.01	1.0E+00	1.0E-02	1.5E+01	3.1E+00	6.5E-04	1.3E-04	N	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	NV	NV	0.042	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	1.13E+00	5.65E+00	0.097	1.0E+00	9.7E-02	1.7E+01	3.4E+00	5.7E-03	1.1E-03	N	--	--
Pyrene	129-00-0	NV	NV	0.081	--	--	--	--	--	--	--	--	--

Notes:

CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10
BW_i = Minimum Body Weigth of Receptor (kg)
IR_{food} = Maximum Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)
DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = 100% Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
EPC = Exposure Point Concentration

Red-tailed Hawk Specific Data from Table F.2-9

BW=	0.957	kg
IR_{food} =	0.063	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{mam} =	1.00	unitless
IR_{soil} =	0.00	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screenning levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Concentration
LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Concentration
EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.2-23
Refined Wildlife Risk Characterization - Red-tailed Hawk
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment						
				Soil						
				EPC (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Calculated NOAEL-Based Soil Screening Level[a] (mg/kg)	Calculated LOAEL-Based Soil Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics										
Cadmium	7440-43-9	1.45E+00	2.00E+01	52.73	3.5E-02	1.9E+00	3.1E+06	4.2E+07	1.7E-05	1.3E-06
Chromium	7440-47-3	1.00E+00	5.00E+00	1166.00	3.5E-02	4.1E+01	2.1E+06	1.0E+07	5.6E-04	1.1E-04
Lead	7439-92-1	1.13E+00	1.13E+01	545.60	3.2E-02	1.8E+01	2.6E+06	2.6E+07	2.1E-04	2.1E-05
Zinc	7440-66-6	1.45E+01	1.31E+02	1269.00	1.0E-01	1.3E+02	1.0E+07	9.5E+07	1.2E-04	1.3E-05

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Red-tailed Hawk Specific Data from Table F.2-9

BW=	1.134	kg
IR_{food} =	0.059	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{mam} =	1.00	unitless
IR_{soil} =	0.0	kg dw/day
AF =	0.0003	unitless

Table F.2-24
Wildlife Summary
Screening Level Ecological Risk Assessment
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS#	Meadow Vole					Short-tailed Shrew					Red Fox					American Robin					Red-tailed Hawk				
		Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ
Inorganics																										
Arsenic	7440-38-2	**2.9E+01**	**2.9E+00**	**2.1E+01**	4.3E-01	4.3E-02	**1.0E+01**	**1.0E+00**	**7.6E+00**	1.6E-01	1.6E-02	**1.9E+01**	**1.9E+00**	**1.4E+01**	1.8E-04	1.8E-05	3.7E-01	1.5E-01	NC	NC	NC	9.9E-04	4.0E-04	NC	NC	NC
Cadmium	7440-43-9	**1.4E+02**	**1.4E+01**	**6.0E+01**	8.5E-01	8.5E-02	**5.6E+02**	**5.6E+01**	**2.4E+02**	**1.9E+00**	1.9E-01	**1.1E+03**	**1.1E+02**	**4.9E+02**	8.4E-04	8.4E-05	**1.1E+03**	**7.7E+01**	**4.7E+02**	**1.6E+00**	1.2E-01	**2.2E+01**	**1.6E+00**	**9.6E+00**	1.7E-05	1.3E-06
Chromium	7440-47-3	**1.7E+01**	**1.7E+00**	**1.3E+01**	**2.8E+00**	2.8E-01	**1.6E+02**	**1.6E+01**	**1.3E+02**	**1.5E+00**	1.5E-01	**3.2E+02**	**3.2E+01**	**2.5E+02**	1.9E-03	1.9E-04	**1.5E+03**	**3.0E+02**	**1.2E+03**	**6.5E+00**	**1.3E+00**	**3.3E+01**	**6.6E+00**	**2.6E+01**	5.6E-04	1.1E-04
Copper	7440-50-8	**1.6E+00**	**1.2E+00**	6.8E-01	8.1E-02	6.2E-02	**1.3E+00**	1.0E+00	5.7E-01	1.9E-02	1.5E-02	**2.5E+00**	**1.9E+00**	**1.1E+00**	6.6E-05	5.0E-05	**1.2E+00**	8.9E-01	5.0E-01	1.1E-02	8.1E-03	1.6E-01	1.2E-01	NC	NC	NC
Lead	7439-92-1	**1.4E+01**	**1.4E+00**	**1.1E+01**	3.4E-01	3.4E-02	**1.5E+01**	**1.5E+00**	**1.2E+01**	2.4E-01	2.4E-02	**2.9E+01**	**2.9E+00**	**2.3E+01**	3.1E-04	3.1E-05	**3.0E+02**	**3.0E+01**	**2.4E+02**	**2.1E+00**	2.1E-01	**1.1E+01**	**1.1E+00**	**9.1E+00**	2.1E-04	2.1E-05
Mercury	7439-97-6	7.5E-02	7.5E-03	NC	NC	NC	1.0E-01	1.0E-02	NC	NC	NC	2.0E-01	2.0E-02	NC	NC	NC	**1.1E+01**	**5.5E+00**	**3.2E+00**	1.7E-02	8.3E-03	2.1E-02	1.1E-02	NC	NC	NC
Nickel	7440-02-0	2.0E-01	1.0E-01	NC	NC	NC	2.3E-01	1.1E-01	NC	NC	NC	4.4E-01	2.2E-01	NC	NC	NC	3.3E-01	2.4E-01	NC	NC	NC	8.5E-03	6.2E-03	NC	NC	NC
Selenium	7782-49-2	**4.5E+00**	**2.7E+00**	**2.5E+00**	1.5E-01	9.2E-02	**1.5E+00**	9.3E-01	8.5E-01	3.0E-02	1.8E-02	**3.0E+00**	**1.8E+00**	**1.7E+00**	1.7E-04	1.0E-04	**2.1E+00**	**1.1E+00**	**1.2E+00**	2.7E-02	1.4E-02	1.7E-01	8.7E-02	NC	NC	NC
Silver	7440-22-4	1.8E-04	1.8E-05	NC	NC	NC	1.5E-02	1.5E-03	NC	NC	NC	3.0E-02	3.0E-03	NC	NC	NC	5.8E-02	7.8E-03	NC	NC	NC	4.0E-04	5.3E-05	NC	NC	NC
Zinc	7440-66-6	**1.4E+01**	**7.2E+00**	**4.9E+00**	2.2E-01	1.1E-01	**3.3E+01**	**1.6E+01**	**1.1E+01**	6.2E-02	3.1E-02	**6.6E+01**	**3.3E+01**	**2.3E+01**	9.5E-05	4.7E-05	**1.0E+03**	**1.2E+02**	**3.6E+02**	**1.1E+00**	1.2E-01	**4.5E+01**	**5.0E+00**	**1.5E+01**	1.2E-04	1.3E-05
Pesticides/PCBs																										
Dieldrin	60-57-1	9.3E-02	9.3E-03	NC	NC	NC	**2.4E+00**	2.4E-01	**2.4E+00**	3.8E-02	3.8E-03	**4.7E+00**	4.7E-01	**4.7E+00**	1.4E-05	1.4E-06	**1.8E+00**	1.8E-01	**1.8E+00**	1.3E-02	1.3E-03	4.6E-03	4.6E-04	NC	NC	NC
Endosulfan II	33213-65-9	3.2E-01	3.2E-02	NC	NC	NC	**3.4E+00**	3.4E-01	**3.4E+00**	2.8E-01	2.8E-02	**6.9E+00**	6.9E-01	**6.9E+00**	1.4E-04	1.4E-05	1.5E-01	1.5E-02	NC	NC	NC	9.2E-04	9.2E-05	NC	NC	NC
Endrin	72-20-8	1.9E-02	1.9E-03	NC	NC	NC	2.2E-02	2.2E-03	NC	NC	NC	4.3E-02	4.3E-03	NC	NC	NC	1.1E-01	1.8E-02	NC	NC	NC	6.3E-03	1.0E-03	NC	NC	NC
Heptachlor epoxide	1024-57-3	1.3E-01	1.3E-02	NC	NC	NC	3.6E-01	3.6E-02	NC	NC	NC	7.1E-01	7.1E-02	NC	NC	NC	2.6E-02	5.2E-03	NC	NC	NC	6.4E-04	1.3E-04	NC	NC	NC
Aroclor 1254	11097-69-1	5.6E-01	5.6E-02	NC	NC	NC	**9.5E+01**	**9.5E+00**	**9.5E+01**	**3.3E+00**	3.3E-01	**1.9E+02**	**1.9E+01**	**1.9E+02**	4.1E-03	4.1E-04	**2.5E+01**	**2.5E+00**	**2.5E+01**	3.7E-01	3.7E-02	3.2E-01	3.2E-02	NC	NC	NC
Aroclor 1260	11096-82-5	5.2E-01	5.2E-02	NC	NC	NC	**9.5E+01**	**9.5E+00**	**9.5E+01**	**3.3E+00**	3.3E-01	**1.9E+02**	**1.9E+01**	**1.9E+02**	4.1E-03	4.1E-04	**2.5E+01**	**2.5E+00**	**2.5E+01**	3.7E-01	3.7E-02	3.2E-01	3.2E-02	NC	NC	NC
TCL SVOCs/PAHs																										
Acenaphthene	83-32-9	2.0E-03	3.9E-04	NC	NC	NC	2.7E-03	5.5E-04	NC	NC	NC	5.5E-03	1.1E-03	NC	NC	NC	7.4E-02	1.5E-02	NC	NC	NC	7.8E-04	1.6E-04	NC	NC	NC
Acenaphthylene	208-96-8	1.0E-04	2.0E-05	NC	NC	NC	6.9E-04	1.4E-04	NC	NC	NC	1.4E-03	2.8E-04	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	120-12-7	1.1E-04	1.1E-05	NC	NC	NC	1.4E-04	1.4E-05	NC	NC	NC	2.7E-04	2.7E-05	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	56-55-3	4.8E-02	4.8E-03	NC	NC	NC	2.3E-01	2.3E-02	NC	NC	NC	4.5E-01	4.5E-02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	50-32-8	6.4E-02	6.4E-03	NC	NC	NC	5.7E-02	5.7E-03	NC	NC	NC	1.1E-01	1.1E-02	NC	NC	NC	1.8E-01	3.5E-02	NC	NC	NC	4.1E-03	8.2E-04	NC	NC	NC
Benzo(b)fluoranthene	205-99-2	1.7E-02	1.7E-03	NC	NC	NC	1.8E-01	1.8E-02	NC	NC	NC	3.7E-01	3.7E-02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	191-24-2	3.0E-02	6.0E-03	NC	NC	NC	1.5E-01	3.1E-02	NC	NC	NC	3.1E-01	6.2E-02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	207-08-9	1.1E-03	1.1E-04	NC	NC	NC	4.5E-03	4.5E-04	NC	NC	NC	8.9E-03	8.9E-04	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	218-01-9	1.8E-03	1.8E-04	NC	NC	NC	6.3E-03	6.3E-04	NC	NC	NC	1.3E-02	1.3E-03	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Dibenz(a,h)anthracene	53-70-3	2.7E-04	2.7E-05	NC	NC	NC	5.0E-03	5.0E-04	NC	NC	NC	1.0E-02	1.0E-03	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	206-44-0	1.2E-02	2.4E-03	NC	NC	NC	2.0E-02	4.1E-03	NC	NC	NC	4.1E-02	8.2E-03	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	86-73-7	1.0E-03	2.0E-04	NC	NC	NC	2.6E-01	5.1E-02	NC	NC	NC	5.1E-01	1.0E-01	NC	NC	NC	2.0E-01	3.9E-02	NC	NC	NC	6.5E-04	1.3E-04	NC	NC	NC
Indeno(1,2,3-cd)pyrene	193-39-5	4.1E-04	4.1E-05	NC	NC	NC	1.2E-02	1.2E-03	NC	NC	NC	2.5E-02	2.5E-03	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	85-01-8	9.5E-02	1.9E-02	NC	NC	NC	3.1E-02	6.2E-03	NC	NC	NC	6.2E-02	1.2E-02	NC	NC	NC	3.0E-01	6.0E-02	NC	NC	NC	5.7E-03	1.1E-03	NC	NC	NC
Pyrene	129-00-0	2.3E-02	4.7E-03	NC	NC	NC	5.5E-02	1.1E-02	NC	NC	NC	1.1E-01	2.2E-02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Notes:
CAS = Chemical Abstract Services
NC = Not Calculated
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
HQ = Hazard Quotient
EPC = Exposure Point Concentration

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Table F.2-25
Summary of Risk Screening Results for Surface Soil vs BTAG Sediment Values - Pond Area Only
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	BTAG Sediment Screening Value	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples Exeeding BTAG Sediment Screening Value	# of Detections	# of Samples
TAL Metals (mg/kg)							
Aluminum	7429-90-5	--	23,000	33,300	**--**	6	6
Antimony	7440-36-0	2	6.3	340	**6**	6	6
Arsenic	7440-38-2	9.8	2	5.1	0	6	6
Barium	7440-39-3	--	51	220	**--**	6	6
Beryllium	7440-41-7	--	0.45	2.2	**--**	6	6
Cadmium	7440-43-9	0.99	1.5	120	**6**	6	6
Calcium	7440-70-2	--	372	3,500	**--**	6	6
Chromium	7440-47-3	43.4	37	1,500	**4**	6	6
Cobalt	7440-48-4	50	5.2	41	0	6	6
Copper	7440-50-8	31.6	12	110	**2**	6	6
Iron	7439-89-6	20,000	24,000	78,700	**6**	6	6
Lead	7439-92-1	35.8	18	680	**2**	6	6
Magnesium	7439-95-4	--	710	1,600	**--**	6	6
Manganese	7439-96-5	460	170	4,400	**4**	6	6
Mercury	7439-97-6	0.18	0.041	0.17	0	6	6
Nickel	7440-02-0	22.7	6.3	17	0	6	6
Potassium	7440-09-7	--	900	1,700	**--**	6	6
Selenium	7782-49-2	2	0.14	0.89	0	5	6
Silver	7440-22-4	1	0.023	0.2	0	6	6
Sodium	7440-23-5	--	127	520	**--**	6	6
Thallium	7440-28-0	--	0.18	0.34	**--**	6	6
Vanadium	7440-62-2	--	30	1,200	**--**	6	6
Zinc	7440-66-6	121	88	3,700	**5**	6	6
Pesticides/PCBs (ug/kg)							
Dieldrin	60-57-1	1.9	5.4	5.4	**1**	1	5
Endosulfan II	33213-65-9	14	140	140	**1**	1	5
Endrin	72-20-8	2.22	2.7	2.7	**1**	1	5
Heptachlor epoxide	1024-57-3	2.47	9.6	9.6	**1**	1	5
Aroclor 1254	11097-69-1	--	12	2,000	**--**	5	5
Aroclor 1260	11096-82-5	--	73	2,000	**--**	4	5
Total PCBs	11097-69-1	59.8	12	4,000	**4**	5	5
TCL VOCs (ug/kg)							
2-Butanone	78-93-3	--	17	30	**--**	3	6
Acetone	67-64-1	--	34	190	**--**	6	6
Carbon disulfide	75-15-0	900	0.64	5.2	0	4	6
Methyl acetate	79-20-9	--	4.7	32	**--**	4	6
Xylenes (total) [1]	1330-20-7	25.2	6.2	6.2	0	1	6

Table F.2-25
Summary of Risk Screening Results for Surface Soil vs BTAG Sediment Values - Pond Area Only
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	BTAG Sediment Screening Value	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples Exeeding BTAG Sediment Screening Value	# of Detections	# of Samples
TCL SVOCs (ug/kg)							
1,1'-Biphenyl	92-52-4	1,220	0.93	0.93	0	1	6
2-Methylnaphthalene	91-57-6	20.2	0.9	8.1	0	4	6
4-Chloro-3-Methylphenol	59-50-7	--	17	18	**--**	2	6
Bis(2-ethylhexyl)phthalate	117-81-7	180	21	560	**2**	6	6
Di-n-butylphthalate	84-74-2	6,470	15	76	0	6	6
Dibenzofuran	132-64-9	415	5.8	5.8	0	1	6
Diethylphthalate	84-66-2	603	1.8	11	0	5	6
Phenol	108-95-2	420	1.4	1.4	0	1	6
Low Molecular Weight PAHs	--	190	1.35	146	0	4	6
High Moleculat Weight PAHs	--	76	3.6	401	**2**	4	6
Cyanide (mg/kg)							
Cyanide	57-12-5	0.1	0.05	0.05	0	1	2

Notes:
CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
ug/kg = Microgram per kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
ND = Not Detected
BTAG = Biological Technical Assistance Group Screening Level
Sediment - BTAG Sediment Screening Values, 2006
[1] = Xylenes-m value used

APPENDIX F.3

ECOLOGICAL SITE RECONNAISSANCE
JULY 2005

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URS

Memorandum

To:	Darren Renne	From:	Gary Long
cc:	Jim Spencer	Office:	Fort Washington
		Date:	July 29, 2005

Subject: RFAAP Ecological Reconnaissance
Project No. 11656351.10000

On July 21, 2005 an ecological reconnaissance was conducted for SWMUs 45, 54, and 57 at the Radford Army Ammunition Plant in Radford, Virginia. The objectives of the reconnaissance were to: 1) gather information and photo documentation to sufficiently characterize ecological resources associated with the SWMUs; and 2) gather information to support the development of ecological conceptual site models (ECSMs) for the SWMUs, including identifying potential ecological receptors. Bulleted summaries of general observations made at each SWMU are provided below and a photographic log of the reconnaissance is attached.

SWMU 45

- Former waste management area (sanitary landfill) adjacent to New River;
- Pine plantation community with nearly complete vegetative cover;
- Characterized by a tall stands of loblolly pine *(Pinus taeda);* understory species include wingstem (*Verbesina alternifolia*), boxelder (*Acer negundo*), foxtail (*Alopecurus sp.*), deer tongue (*Dichanthelium clandestinum*), and immature sycamore (*Platanus occidentalis*);
- Pines approximately 40 to 50 years old based on aerial photos; successional habitat provides cover for some habitat but less cover relative to hardwood forest;
- *In situ* soil pH measurements*:*
    - 45A: 6.6 with 60% moisture;
    - 45B: 6.7 with 50% moisture.
- GPS Coordinates (NAD83 Zone 17 in meters) of monitoring wells within SWMU 45*:*
    - MW1: 4116096.56149 N; 539930.37501 E;
    - MW2: 4116164.80394 N; 539894.54883 E;
    - MW3: 4116174.21090 N; 539928.52689 E.

SWMU 54

- Disposal area for ash from propellant burning operations adjacent to New River (investigated as areas A and B);

- SWMU supports complete vegetative cover of successional/transitional species typical of open habitats including: various grasses, broomsedge (*Andropogon virginicus*), wingstem, mullien (*Verbascum thapsus*), ironweed (*Vernonia*), Queen Anne's lace (*Daucus carota*), deer tongue, thistle, and pine saplings;

- Trees harvested from area approximately 4 years ago; prior to harvesting, SWMU characterized as a pine plantation (1999 Biological Survey of RFAAP); vegetation is maintained (bush-hogged) approximately annually;

- *In situ* soil pH measurements*:*
    - 54 Area A: 6.2 with 40% moisture;
    - 54 Area B: 6.8 with 60% moisture.
- Adjacent habitats: To the east, there is a narrow riparian corridor containing sycamore and ash separates the open habitat of SWMU 54 from the New River. South of the SWMU, a stand of mixed hardwoods and pines is present. To the west and north, there is additional open successional/transitional habitat similar to SWMU 54 with intermittent stands of pines.

- Drainage feature: A drainage feature is present flowing west to east to the south of SWMU 54. The drainage is likely intermittent and does not support permanent aquatic communities; no invertebrates or fish were observed. At the time of the reconnaissance, the feature consisted of a 1-foot wide incised channel with flowing water that was approximately 3" deep. The substrate in the drainage is predominately sand-silt; there is little instream cover.

<u>SWMU 57</u>

- A former asphalt-lined lagoon that received acidic (chromic acid) wastewater;

- Hydrophytic vegetation has established in the bottom of the former lagoon, consisting primarily of cattail (*Typha*), black willow (*Salix nigra*), and rush (*Juncus*);

- Some standing water observed in the bottom of the lagoon with duckweed (*Lemna*) on the surface;

- Amphibian activity observed in the lagoon;

- Edges of the lagoon within the fenced area have upland species (primarily blackberry (*Rubus*)). Upland species dominate the vegetation outside the fenced area and include: broomsedge, thistle, Queen Anne's Lace, mullien, and various grasses.

- Drainage feature runs from SWMU 57 west towards SWMUs 68 and 69. Feature did not convey water at the time of the reconnaissance and did not support hydrophytic vegetation.

- *In situ* soil pH measurement made outside of the fence area of SWMU 57:
    - 57: 6.2 with 100% moisture.

The observations made during the July 21, 2005 ecological site reconnaissance should be sufficient to characterize ecological resources within and adjacent to SWMUs 45, 54, and 57. The observations will facilitate the development of ECSMs and the selection of potential ecological receptors.

URS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
RFAAP	Radford, Virginia	11656351.10000

Photo No.	Date:
1	7/21/05

Direction Photo Taken:

S

Description:

SWMU 54: View looking south along fence line towards Area A; New River flows north to the left of the frame.

Photo No.	Date:
2	7/21/05

Direction Photo Taken:

SSW

Description:

SWMU 54: View across SWMU 54; Area A is towards the left side of the frame and Area B is to the right.

URS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
RFAAP	Radford, Virginia	11656351.10000

Photo No.	Date:
3	7/21/05

Direction Photo Taken:
W

Description:

SWMU 54: View of Area B in SWMU 54

Photo No.	Date:
4	7/21/05

Direction Photo Taken:
S

Description:

SWMU 54: View of Area A in SWMU 54

URS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
RFAAP	Radford, Virginia	11656351.10000

Photo No.	Date:
5	7/21/05

Direction Photo Taken:
W

Description:

SWMU 54: View of drainage running west-east to the New River south of SWMU 54. Drainage had flowing water during the time of the recon but does not appear to support a permanent aquatic community as no invertebrates nor fish were observed.

Photo No.	Date:
6	7/21/05

Direction Photo Taken:
SE

Description:

SWMU 54: Overview of SWMU 54 from road on the top of the ridge to the west.

URS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
RFAAP	Radford, Virginia	11656351.10000

Photo No.	Date:
7	7/21/05

Direction Photo Taken:
NW

Description:

SWMU 57: View of SWMU 57 from road to the east of the SWMU. Note hydrophytic vegetation (Typha and Salix) within the former lagoon area..

Photo No.	Date:
8	7/21/05

Direction Photo Taken:
SSW

Description:

SWMU 57: View of SWMU 57 looking SSW.

URS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
RFAAP	Radford, Virginia	11656351.10000

Photo No.	Date:
9	7/21/05

Direction Photo Taken:
E

Description:

SWMU 57: View of drainage from SWMU 57 (in background)

Photo No.	Date:
10	7/21/05

Direction Photo Taken:

SE

Description:

View of drainage from area south of SWMU 57. Hydrophytic vegetation (Typha and Juncus) observed in drainage pattern.

URS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
RFAAP	Radford, Virginia	11656351.10000

Photo No.	Date:
11	7/21/05

Direction Photo Taken:

WSW

Description:

SWMU 69: View of SWMU 69 looking WSW from an area just north of SWMU 68.

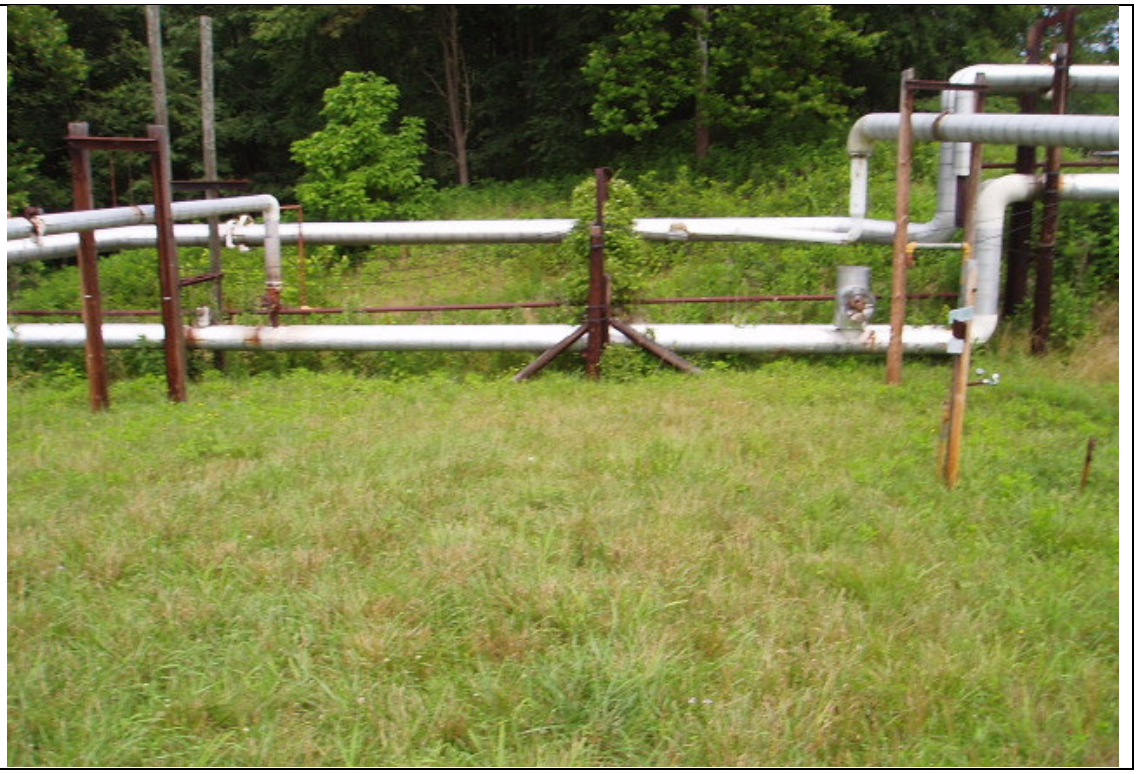
Photo No.	Date:
12	7/21/05

Direction Photo Taken:

NNW

Description:

SWMU 68: Looking across SWMU 68 towards SWMU 69 (background). Note vegetation covering SWMU 68 is regularly maintained.



URS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
RFAAP	Radford, Virginia	11656351.10000

Photo No.	Date:
13	7/21/05

Direction Photo Taken:
NW

Description:

SWMU 45: Looking NW towards SWMU 45 along road (left). Note MW-1 in the foreground of the frame.

Photo No.	Date:
14	7/21/05

Direction Photo Taken:

NW

Description:

SWMU 45: Looking towards SWMU 45 from a point NW of MW-1.

URS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
RFAAP	Radford, Virginia	11656351.10000

Photo No.	Date:
15	7/21/05

Direction Photo Taken:

NW

Description:

SWMU 45: Looking across potential waste area in SWMU 45. Note security fence along New River riparian zone in the background of the frame.

Photo No.	Date:
16	7/21/05

Direction Photo Taken:

WSW

Description:

SWMU 45: View of clearing along New River (right of frame) security fence from MW-3 (left foreground).

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
RFAAP	Radford, Virginia	11656351.10000

Photo No.	Date:
17	7/21/05

Direction Photo Taken:

SE

Description:

SWMU 45: View from clearing along New River security fence looking across SWMU 54 towards the plant area.

Photo No.	Date:
18	7/21/05

Direction Photo Taken:

NW

Description:

SWMU 45: View from SWMU 45 looking towards New River security fence across MW-2 (middle of frame).

APPENDIX G

REMEDIAL GOAL CALCULATIONS

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Table G-1
Remedial Goal Equations
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Remedial Goal Equations used for Soil

Ingestion

Carcinogens

$$RG_o = \frac{TR*BW*AT\text{-}C}{CSF_o*EF*ED*IR\text{-}S*FI*CF_1}$$

Noncarcinogens

$$RG_o = \frac{THQ*BW*AT\text{-}N*RfD_o}{EF*ED*IR\text{-}S*FI*CF_1}$$

Dermal

Carcinogens

$$RG_d = \frac{TR*BW*AT\text{-}C}{CSF_d*SA*AF*ABS_d*EF*ED*CF_1}$$

Noncarcinogens

$$RG_d = \frac{THQ*BW*AT\text{-}N*RfD_d}{SA*AF*ABS_d*EF*ED*CF_1}$$

Inhalation (soil only)

Carcinogens

$$RG_i = \frac{TR*BW*AT\text{-}C}{CSF_i*EF*ED*IR\text{-}A*ET*(1/VF+1/PEF)}$$

Noncarcinogens

$$RG_i = \frac{THQ*BW*AT\text{-}N*RfD_i}{EF*ED*IR\text{-}A*ET*(1/VF+1/PEF)}$$

Overall Remedial Goal Equation

$$RG = \frac{1}{(1/RG_o + 1/RG_d + 1/RG_i)}$$

NOTES:

RG =	remedial goal soil	mg/kg
TR =	target risk	unitless
THQ =	target hazard quotient	unitless

Receptor specific parameters provided in Appendix E.1, Table E.1-4.1a through E.1-4.1d

BW =	body weight (receptor specific - kg)	kg
AT-C =	averaging time (25,550 days)	days
AT-N =	averaging time (receptor specific)	days
EF =	exposure frequency (receptor specific)	days/year
ED =	exposure duration (receptor specific)	years
ET =	exposure time (receptor specific)	hours/day
EV =	event frequency (receptor specific)	events/day
IR-S =	ingestion rate -soil (receptor specific)	mg/day
IR-A =	inhalation rate (receptor specific)	m^3/hour
SA =	skin surface contact area (receptor specific)	cm^2
AF =	adherence factor (receptor specific)	mg/cm^2

Table G-1
Remedial Goal Equations
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

NOTES CONTINUED:

Toxicity Data provided in Appendix E.1, Tables E.1-5.1, E.1-5.2, E.1-6.1, and E.1-6.2

RfD_o =	oral reference dose (see Table E.1-5.1)	mg/kg-day
RfD_d =	dermal reference dose (see Table E.1-5.1)	mg/kg-day
RfD_i =	inhalation reference dose (see Table E.1-5.2)	mg/kg-day
CSF_o =	oral carcinogenic slope factor (see Table E.1-6.1)	$(mg/kg\text{-}day)^{-1}$
CSF_d =	dermal carcinogenic slope factor (see Table E.1-6.1)	$(mg/kg\text{-}day)^{-1}$
CSF_i =	inhalation carcinogenic slope factor (see Table E.1-6.2)	$(mg/kg\text{-}day)^{-1}$

Additional parameters used for soil calculations provided in Appendix E.1

FI =	fraction ingested (1.0)	unitless
ABS_d =	absorption factor (see Table E.1-4.3)	unitless
VF =	volatilization factor (see Table E.1-4.3)	m^3/kg
PEF =	particulate emission factor (see Table E.1-4.4)	m^3/kg
CF_1 =	conversion factor (1E-06)	kg/mg
CF_2 =	conversion factor (1E-03)	cm^3/L
CF_3 =	conversion factor (1E-03)	mg/ug

Table G-2
Remedial Goal Calculations - Maintenance Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current Future
Medium:	Soil
Receptor:	Maintenance Worker

		INGESTION			DERMAL				INGESTION/DERMAL	INHALATION			Remedial Goal Calculation												
																		Cancer RG (mg/kg)				Noncancer RG (mg/kg)				Lowest RG
Chemical	CAS Number	CSFo (mg/kg-day -1)	RfDo (mg/kg-day)	(C/S)	CSFd (mg/kg-day -1)	RfDd (mg/kg-day)	(C/S)	ABSd	Ingestion/Dermal Target Organ	CSF/Unit Risk (mg/kg-day -1)	RfD (mg/kg-day)	(C/S)	Inhalation Target Organ	VF	PEF	(1/VF+1/PEF)	TR	THQ	RGo	RGd	RGi	RG	RGo	RGd	RGi	RG	(mg/kg)
Aluminum	7429-90-5	--	1.00E+00	(C)	--	1.00E+00	(C)	1.00E-02	developmental CNS	--	1.00E-03	(C)	CNS	--	1.04E+09	9.57E-10	--	5.E-01	--	--	--	--	2.56E+06	7.74E+07	2.81E+07	2.27E+06	2.27E+06
Antimony	7440-36-0	--	4.00E-04	(C)	--	6.00E-05	(C)	1.00E-02	blood	--	--	--	--	--	1.04E+09	9.57E-10	--	1.E+00	--	--	--	--	2.04E+03	9.29E+03	--	1.68E+03	1.68E+03
Manganese	7439-96-5	--	2.00E-02	(C)	--	8.00E-04	(C)	1.00E-02	CNS	--	1.43E-05	(C)	CNS	--	1.04E+09	9.57E-10	--	5.E-01	--	--	--	--	5.11E+04	6.19E+04	4.02E+05	2.62E+04	2.62E+04

Notes:
See Table G-1 for Remedial Goal Equations and acronyms
(C/S) = Chronic or Subchronic Value

Table G-3
Remedial Goal Calculations - Commercial Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Soil
Receptor:	Commercial Worker

		INGESTION			DERMAL			INGESTION/DERMAL	INHALATION			Remedial Goal Calculation													
																	Cancer RG (mg/kg)				Noncancer RG (mg/kg)				Lowest RG
Chemical	CAS Number	CSFo (mg/kg-day -1)	RfDo (mg/kg-day)	(C/S)	CSFd (mg/kg-day -1)	RfDd (mg/kg-day)	(C/S)	ABSd	Ingestion/Dermal Target Organ	CSF/Unit Risk (mg/kg-day -1)	RfD (mg/kg-day)	(C/S)	Inhalation Target Organ	VF	PEF	(1/VF+1/PEF)	TR	THQ	RGo	RGd	RGi	RG	RGo	RGd	RGi	RG	(mg/kg)
Aluminum	7429-90-5	--	1.00E+00	(C)	--	1.00E+00	(C)	1.00E-02	developmental CNS	--	1.00E-03	(C)	CNS	--	1.04E+09	9.57E-10	--	5.E-01	--	--	--	--	1.02E+06	1.55E+07	6.67E+06	8.38E+05	8.38E+05
Antimony	7440-36-0	--	4.00E-04	(C)	--	6.00E-05	(C)	1.00E-02	blood	--	--	--	--	--	1.04E+09	9.57E-10	--	1.E+00	--	--	--	--	8.18E+02	1.86E+03	--	5.68E+02	5.68E+02
Manganese	7439-96-5	--	2.00E-02	(C)	--	8.00E-04	(C)	1.00E-02	CNS	--	1.43E-05	(C)	CNS	--	1.04E+09	9.57E-10	--	5.E-01	--	--	--	--	2.04E+04	1.24E+04	9.54E+04	7.14E+03	7.14E+03

Notes:
See Table G-1 for Remedial Goal Equations and acronyms
(C/S) = Chronic or Subchronic Value

Table G-4
Remedial Goal Calculations - Construction Worker
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Soil
Receptor:	Construction Worker

		INGESTION			DERMAL			INGESTION/DERMAL	INHALATION			Remedial Goal Calculation													
																	Cancer RG (mg/kg)				Noncancer RG (mg/kg)				Lowest RG
Chemical	CAS Number	CSFo (mg/kg-day -1)	RfDo (mg/kg-day)	(C/S)	CSFd (mg/kg-day -1)	RfDd (mg/kg-day)	(C/S)	ABSd	Ingestion/Dermal Target Organ	CSF/Unit Risk (mg/kg-day -1)	RfD (mg/kg-day)	(C/S)	Inhalation Target Organ	VF	PEF	(1/VF+1/PEF)	TR	THQ	RGo	RGd	RGi	RG	RGo	RGd	RGi	RG	(mg/kg)
Aluminum	7429-90-5	--	1.00E+00	(C)	--	1.00E+00	(C)	1.00E-02	developmental CNS	--	1.00E-03	(C)	CNS	--	1.82E+06	5.48E-07	--	5.E-01	--	--	--	--	1.55E+05	5.16E+06	4.66E+03	4.52E+03	4.52E+03
Antimony	7440-36-0	--	2.00E-04	(S)	--	3.00E-05	(S)	1.00E-02	blood	--	1.10E-04	(S)	respiratory	--	1.82E+06	5.48E-07	--	1.E+00	--	--	--	--	6.19E+01	3.10E+02	1.03E+03	4.91E+01	4.91E+01
Manganese	7439-96-5	--	2.00E-02	(C)	--	8.00E-04	(C)	1.00E-02	CNS	--	1.43E-05	(C)	CNS	--	1.82E+06	5.48E-07	--	5.E-01	--	--	--	--	3.10E+03	4.13E+03	6.67E+01	6.42E+01	6.42E+01

Notes:
See Table G-1 for Remedial Goal Equations and acronyms
(C/S) = Chronic or Subchronic Value

Table G-5
Remedial Goal Calculations - Child Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Soil
Receptor:	Child Resident

		INGESTION			DERMAL				INGESTION/DERMAL	INHALATION				Remedial Goal Calculation											
																		Cancer RG (mg/kg)				Noncancer RG (mg/kg)				Lowest RG
Chemical	CAS Number	CSFo (mg/kg-day -1)	RfDo (mg/kg-day)	(C/S)	CSFd (mg/kg-day -1)	RfDd (mg/kg-day)	(C/S)	ABSd	Ingestion/Dermal Target Organ	CSF/Unit Risk (mg/kg-day -1)	RfD (mg/kg-day)	(C/S)	Inhalation Target Organ	VF	PEF	(1/VF+1/PEF)	TR	THQ	RGo	RGd	RGi	RG	RGo	RGd	RGi	RG	(mg/kg)
Aluminum	7429-90-5	--	1.00E+00	(C)	--	1.00E+00	(C)	1.00E-02	developmental CNS	--	1.00E-03	(C)	CNS	--	1.04E+09	9.57E-10	--	5.E-01	--	--	--	--	3.91E+04	1.40E+06	2.72E+06	3.75E+04	3.75E+04
Antimony	7440-36-0	--	4.00E-04	(C)	--	6.00E-05	(C)	1.00E-02	blood	--	--	--	--	--	1.04E+09	9.57E-10	--	5.E-01	--	--	--	--	1.56E+01	8.38E+01	--	1.32E+01	1.32E+01
Cadmium	7440-43-9	--	1.00E-03	(C)	--	2.50E-05	(C)	1.00E-03	kidney	6.30E+00	5.70E-05	(C)	respiratory/ kidney/ liver	--	1.04E+09	9.57E-10	1.00E-06	3.E-01	--	--	1.01E+04	1.01E+04	2.58E+01	2.30E+02	1.02E+05	2.32E+01	2.32E+01
Chromium	7440-47-3	--	3.00E-03	(C)	--	7.50E-05	(C)	1.00E-02	GI tract/fetus/bone marrow/liver	4.10E+01	2.90E-05	(C)	respiratory	--	1.04E+09	9.57E-10	1.00E-06	3.E-01	--	--	1.55E+03	1.55E+03	7.74E+01	6.91E+01	5.21E+04	3.65E+01	3.65E+01
Iron	7439-89-6	--	7.00E-01	(C)	--	7.00E-01	(C)	1.00E-02	blood/ liver/ GI tract	--	--	--	--	--	1.04E+09	9.57E-10	--	3.E-01	--	--	--	--	1.81E+04	6.45E+05	--	1.76E+04	1.76E+04
Manganese	7439-96-5	--	2.00E-02	(C)	--	8.00E-04	(C)	1.00E-02	CNS	--	1.43E-05	(C)	CNS	--	1.04E+09	9.57E-10	--	5.E-01	--	--	--	--	7.82E+02	1.12E+03	3.90E+04	4.55E+02	4.55E+02

Notes:
See Table G-1 for Remedial Goal Equations and acronyms
(C/S) = Chronic or Subchronic Value

Table G-6
Remedial Goal Calculations - Adult Resident
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Soil
Receptor:	Adult Resident

		INGESTION			DERMAL				INGESTION/DERMAL	INHALATION										Remedial Goal Calculation								
																				Cancer RG (mg/kg)				Noncancer RG (mg/kg)				Lowest RG
Chemical	CAS Number	CSFo (mg/kg-day -1)	RfDo (mg/kg-day)	(C/S)	CSFd (mg/kg-day -1)	RfDd (mg/kg-day)	(C/S)	ABSd	Ingestion/Dermal Target Organ	CSF/Unit Risk (mg/kg-day -1)	RfD (mg/kg-day)	(C/S)	Inhalation Target Organ	VF	PEF	(1/VF+1/PEF)	TR	THQ	RGo	RGd	RGi	RG	RGo	RGd	RGi	RG	(mg/kg)
Aluminum	7429-90-5	--	1.00E+00	(C)	--	1.00E+00	(C)	1.00E-02	developmental CNS	--	1.00E-03	(C)	CNS	--	1.04E+09	9.57E-10	--	5.E-01	--	--	--	--	3.65E+05	9.15E+06	2.30E+07	3.46E+05	3.46E+05
Antimony	7440-36-0	--	4.00E-04	(C)	--	6.00E-05	(C)	1.00E-02	blood	--	--	--	--	--	1.04E+09	9.57E-10	--	5.E-01	--	--	--	--	1.46E+02	5.49E+02	--	1.15E+02	1.15E+02
Cadmium	7440-43-9	--	1.00E-03	(C)	--	2.50E-05	(C)	1.00E-03	kidney	6.30E+00	5.70E-05	(C)	respiratory/ kidney/ liver	--	1.04E+09	9.57E-10	1.00E-06	3.E-01	--	--	2.13E+04	2.13E+04	2.41E+02	1.51E+03	8.64E+05	2.08E+02	2.08E+02
Chromium	7440-47-3	--	3.00E-03	(C)	--	7.50E-05	(C)	1.00E-02	GI tract/fetus/bone marrow/liver	4.10E+01	2.90E-05	(C)	respiratory	--	1.04E+09	9.57E-10	1.00E-06	3.E-01	--	--	3.27E+03	3.27E+03	7.23E+02	4.53E+02	4.40E+05	2.78E+02	2.78E+02
Iron	7439-89-6	--	7.00E-01	(C)	--	7.00E-01	(C)	1.00E-02	blood/ liver/ GI tract	--	--	--	--	--	1.04E+09	9.57E-10	--	3.E-01	--	--	--	--	1.69E+05	4.23E+06	--	1.62E+05	1.62E+05
Manganese	7439-96-5	--	2.00E-02	(C)	--	8.00E-04	(C)	1.00E-02	CNS	--	1.43E-05	(C)	CNS	--	1.04E+09	9.57E-10	--	5.E-01	--	--	--	--	7.30E+03	7.32E+03	3.29E+05	3.61E+03	3.61E+03

Notes:
See Table G-1 for Remedial Goal Equations and acronyms
(C/S) = Chronic or Subchronic Value

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APPENDIX H

ANALYTICAL DATA EVALUATION

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APPENDIX H.1

DATA QUALITY OBJECTIVES

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TABLE H.1-1
DATA USABILITY WORKSHEET
SITE: SWMU 57
MEDIUM: Soil

Activity	Comment
Field Sampling	
Discuss sampling problems and field conditions that affect data usability.	There were no problems identified during field sampling that affected data usability.
Are samples representative of receptor exposure for this medium (e.g., sample depth, grab vs. composite, filtered vs. unfiltered, low flow, etc.)?	Yes. Samples are representative of receptor exposure. Surface soil samples and subsurface soil samples were collected from discrete intervals.
Assess the effect of field QC results on data usability.	Field duplicate samples were collected at the rate of 1 per 10 soil samples. The average concentration of the soil sample and its duplicate sample were used in the risk assessments. Equipment rinsate blank samples were collected at the rate of 1 per 20 soil samples. Low-level detections at concentrations below the laboratory reporting limit were reported in one or more of the equipment blank samples for selected metals, VOCs, and SVOCs. No significant impact on data usability resulted from these detections. Matrix spike (MS)/matrix spike duplicate (MSD) samples were at the rate of 1 per 20 soil samples. No significant impact on data usability was identified based on the matrix spike results.
Summarize the effect of field sampling issues on the risk assessment, if applicable.	No significant sampling issues were noted. See Sections 6.0 and 7.0 of the RFI/CMS Report discuss the uncertainty analysis for the human health and ecological risk assessments for sampling and analysis.
Analytical Techniques	
Were the analytical methods appropriate for quantitative risk assessment?	Yes. Low-level SW-846 analytical methods were used for soil analysis in accordance with the MWP and WPA 021. Soil samples were analyzed for VOCs by SW-846 Method 8260B, SVOCs by SW-846 Method 8270C, PAHs by SW-846 Method 8310, explosives by SW-846 Methods 8330 and 8332, pesticides by SW-846 Method 8081A, PCBs by SW-846 Method 8082, herbicides by SW-846 Method 8151, and metals by SW-846 6010B, 6020, 7471A, and 9012A.
Were detection limits adequate?	Low-level SW-846 Methods were used. The detection limits were adequate for screening against adjusted RBCs except as noted in Table E.1-2.3. As discussed in the uncertainties in Sections 6.0 and 7.0, the lack of sensitivity could lead to an underestimation of risk at the site.

TABLE H.1-1
DATA USABILITY WORKSHEET
SITE: SWMU 57
MEDIUM: Soil

Activity	Comment
Summarize the effect of analytical technique issues on risk assessment, if applicable.	There were no analytical technical issues which significantly affected the risk assessments. Sections 6.0 and 7.0 of the RFI/CMS Report discuss the uncertainty analysis for the human health and ecological risk assessments for sampling and analysis.
Data Quality Objectives	
Precision – How were duplicates handled?	Field duplicate samples were collected at the rate of 1 per 10 soil samples. The average concentration of the soil sample and its duplicate sample were used in the risk assessments.
Accuracy – How were split samples handled?	Split samples were not collected.
Representativeness – Indicate any problems associated with data representativeness (e.g., trip blank or rinsate blank contamination, COC problems, etc.).	No significant issues regarding data representativeness were noted.
Completeness – Indicate any problems associated with data completeness (e.g., incorrect sample analysis, incomplete sample records, problems with field procedures, etc.).	No significant issues regarding completeness of the data were noted. The overall completeness goal of 90±2% for field activities was exceeded for analytical analysis and field data collection.
Comparability – Indicate any problems associated with data comparability.	No significant issues regarding comparability of the data were noted.
Were the DQOs specified in the QAPP satisfied?	Yes, the DQOs specified in the QAPP were satisfied.
Summarize the effect of DQO issues on the risk assessment, if applicable.	Not applicable.
Data Validation and Interpretation	
What are the data validation requirements for this region?	EPA Region III modifications to the National Functional Guidelines for Data Validation.
What method or guidance was used to validate the data?	EPA Region III National Functional Guidelines for Data Validation.
Was the data validation method consistent with regional guidance? Discuss any discrepancies.	Yes, there were no discrepancies.
Were all data qualifiers defined? Discuss those which were not.	Yes, they were defined in the guidance document, data validation reports included in Appendix G.2 of the RFI/CMS Report, and in the data tables included in Section 4.0 of the RFI/CMS Report.
Which qualifiers represent usable data?	B, E, J, K, L, U, UJ, UL
Which qualifiers represent unusable data?	R

TABLE H.1-1
DATA USABILITY WORKSHEET
SITE: SWMU 57
MEDIUM: Soil

Activity	Comment
How are tentatively identified compounds handled?	Detected tentatively identified compounds are qualified NJ. These compounds are not used in the risk assessments.
Summarize the effect of data validation and interpretation issues on the risk assessment, if applicable.	Section 6.0 of the RFI/CMS Report discusses uncertainties associated with qualified data.
Additional notes:	None.

Table H.1-1a
Summary of Analytes Detected in Field Quality Control Samples
(Modified from SSP Report - May 2007)
SWMU 57 RFI/CMS Report
Radford Army Ammuniton Plant, Radford, Virginia

Sample ID / Sample Date	CAS #	EQB3 10/7/2003 Result	EQB3 LQ, VQ, r	MDL	RL	Trip Blank 10/7/2003 Result	Trip Blank LQ, VQ, r	MDL	RL
TAL Metals (µg/L)									
Iron	7439-89-6	4.8	J,B,p	2.95	100	NT			
Lead	7439-92-1	0.3	J	0.281	1	NT			
Sodium	7440-23-5	160	J,B,p	76.9	200	NT			
TCL Method 8260 VOCs (µg/L)									
Acetone	67-64-1	2.3	J,B,z	1.07	20	<20	U	1.07	20
Methylene chloride	75-09-2	0.67	J,B,z	0.117	20	0.91	J,B,z	0.177	20
TCL Method 8270 SVOCs (µg/L)									
4-Chloro-3-Methylphenol	59-50-7	0.14	J	0.018	5	NT			
Bis(2-ethylhexyl)phthalate	117-81-7	1.4	J,B,z	0.149	5	NT			
Butylbenzylphthalate	85-68-7	1	J,B,z	0.015	5	NT			
Diethylphthalate	84-66-2	0.11	J	0.074	5	NT			
TCL Method 8270 SVOCs TICs (µg/L)									
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	1.24	E,NJ,t	0	0.01	NT			
Erucylamide	112-84-5	26.3	E,NJ,t	0	0.1	NT			

Notes:

CAS = Chemical Abstracts Service
EQB = Equipment Blank
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
TIC = Tentatively Identified Compound
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested

Data Qualifiers

B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of 1.
J	Estimated value.
U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
p	Preparation blank contamination
t	Tentatively identified Compound
z	Method blank and/or storage blank contamination

Table H.1-1b
Detected Analytes in Soil Field Blanks
SWWU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS #	EQBK-1 1/8/2008		MDL	RL	EQBK-2 1/9/2008		MDL	RL	EQBK-3 1/10/2008		MDL	RL	EQBK-4 1/11/2008		MDL	RL
		Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (ug/L)																	
Calcium	7440-70-2	1,100		40	500	200	J	40	500	200	J	40	500	180	J	40	500
Iron	7439-89-6	<20	U	5.7	20	8.3	J	5.7	20	18	J	5.7	20	<20	U	5.7	20
Antimony	7440-36-0	0.65	J	0.44	3	<3	U	0.44	3	<3	U	0.44	3	<3	U	0.44	3
Barium	7440-39-3	<2	U	0.52	2	<2	U	0.52	2	0.69	J	0.52	2	<2	U	0.52	2
Chromium	7440-47-3	0.87	J,B,p	0.31	2	0.8	J,B,p	0.31	2	0.86	J,B,p	0.31	2	0.75	J,B,p	0.31	2
Copper	7440-50-8	0.44	J	0.33	1	0.36	J	0.33	1	<1	U	0.33	1	<1	U	0.33	1
Lead	7439-92-1	0.41	J	0.33	1	<1	U	0.33	1	0.36	J,B,p	0.33	1	0.61	J,B,p	0.33	1
Manganese	7439-96-5	1.9	J	0.43	3	4.2		0.43	3	3.5		0.43	3	2.2	J	0.43	3
Mercury	7439-97-6	0.05	J	0.046	0.2	<0.2	U	0.046	0.2	<0.2	U	0.046	0.2	<0.2	U	0.046	0.2
Nickel	7440-02-0	<2	U	0.28	2	0.4	J	0.28	2	<2	U	0.28	2	1.5	J	0.28	2
Zinc	7440-66-6	15		0.84	10	13		0.84	10	9.9	J	0.84	10	9.9	J	0.84	10
TCL VOCs (ug/L)																	
Acetone	67-64-1	2.7	J,B,z	1.2	20	2.8	J,B,z	1.2	20	3	J,B,z	1.2	20	3	J,B,z	1.2	20
Chloroform	67-66-3	<1	U	0.061	1	<1	U	0.061	1	<1	U	0.061	1	<1	U	0.061	1
Methylene Chloride	75-09-2	0.51	J,B,y	0.051	5	0.46	J,B,y	0.051	5	0.54	J,B,y	0.051	5	0.48	J,B,y	0.051	5
Toluene	108-88-3	0.08	J,B,y	0.072	1	0.08	J,B,y	0.072	1	0.08	J,B,y	0.072	1	0.08	J,B,y	0.072	1
TCL SVOCs (ug/L)																	
Acetophenone	98-86-2	NT				NT				NT				0.075	J	0.043	5
Butyl Benzyl Phthalate	85-68-7	NT				NT				NT				<5	U	0.029	5
Diethyl Phthalate	84-66-2	NT				NT				NT				<5	U	0.034	5
Di-n-butyl Phthalate	84-74-2	NT				NT				NT				0.72	J,B,z	0.38	5
Naphthalene	91-20-3	NT				NT				NT				<0.5	U	0.023	0.5
Phenanthrene	85-01-8	NT				NT				NT				<0.5	U	0.015	0.5

TABLE H.1-2
DATA USABILITY WORKSHEET
SITE: SWMU 57
MEDIUM: Groundwater

Activity	Comment
Field Sampling	
Discuss sampling problems and field conditions that affect data usability.	There were no problems identified during field sampling that affected data usability.
Are samples representative of receptor exposure for this medium (e.g., sample depth, grab vs. composite, filtered vs. unfiltered, low flow, etc.)?	Yes. Both filtered and unfiltered samples were collected for metals. Filtered metals samples were used in the risk assessment and are considered representative of dissolved concentrations in groundwater. Low-flow groundwater sampling techniques were used to collect the samples representative of groundwater quality.
Assess the effect of field QC results on data usability.	Field duplicate samples were collected at the rate of 1 per 10 groundwater samples. The average concentration of the groundwater sample and its duplicate sample were used in the risk assessments. Equipment rinsate blank samples were collected at the rate of 1 per 20 groundwater samples. Low-level detections at concentrations below the laboratory reporting limit were reported in one or more of the equipment blank samples for selected metals, VOCs, and SVOCs. No significant impact on data usability resulted from these detections. Matrix spike (MS)/matrix spike duplicate (MSD) samples were at the rate of 1 per 20 groundwater samples. No significant impact on data usability was identified based on the matrix spike results.
Summarize the effect of field sampling issues on the risk assessment, if applicable.	No significant sampling issues were noted. Section 6.0 of the RFI/CMS Report discusses the uncertainty analysis for the human health risk assessment for sampling and analysis.
Analytical Techniques	
Were the analytical methods appropriate for quantitative risk assessment?	Yes. Low-level SW-846 and EPA analytical methods were used for groundwater analysis in accordance with the MWP and WPA 021. Groundwater samples were analyzed for VOCs by SW-846 by Method 8260B, SVOCs by SW-846 Method 8270C, explosives by SW-846 Methods 8330 and 8332, pesticides by SW-846 Method 8081A, PCBs by SW-846 Method 8082, metals by SW-846 Methods 6010B, 6020, and 7470A, and perchlorate by SW-846 Method 6850.

TABLE H.1-2
DATA USABILITY WORKSHEET
SITE: SWMU 57
MEDIUM: Groundwater

Activity	Comment
Were detection limits adequate?	Yes. Low-level SW-846 Methods were used. The detection limits were adequate for screening against adjusted RBCs except as noted in Table E.1-2.5. As discussed in the uncertainties in Section 6.0, the lack of sensitivity could lead to an underestimation of risk at the site.
Summarize the effect of analytical technique issues on risk assessment, if applicable.	There were no analytical technical issues which significantly affected the risk assessments. Section 6.0 of the RFI/CMS Report discusses the uncertainty analysis for the human health for sampling and analysis.
Data Quality Objectives	
Precision – How were duplicates handled?	Field duplicate samples were collected at the rate of 1 per 10 groundwater samples. The average concentration of the groundwater sample and its duplicate sample were used in the risk assessment.
Accuracy – How were split samples handled?	Split samples were not collected.
Representativeness – Indicate any problems associated with data representativeness (e.g., trip blank or rinsate blank contamination, COC problems, etc.).	No significant issues regarding data representativeness were noted.
Completeness – Indicate any problems associated with data completeness (e.g., incorrect sample analysis, incomplete sample records, problems with field procedures, etc.).	No significant issues regarding completeness of the data were noted. The overall completeness goal of 90±2% for field activities was exceeded for analytical analysis and field data collection.
Comparability – Indicate any problems associated with data comparability.	No significant issues regarding comparability of the data were noted.
Were the DQOs specified in the QAPP satisfied?	Yes, the DQOs specified in the QAPP were satisfied.
Summarize the effect of DQO issues on the risk assessment, if applicable.	Not applicable.
Data Validation and Interpretation	
What are the data validation requirements for this region?	EPA Region III modifications to the National Functional Guidelines for Data Validation.
What method or guidance was used to validate the data?	EPA Region III National Functional Guidelines for Data Validation.
Was the data validation method consistent with regional guidance? Discuss any discrepancies.	Yes, there were no discrepancies.

Table H.1-1b
Detected Analytes in Soil Field Blanks
SWWU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS #	EQBK-5 1/14/2008		MDL	RL	Trip Blank 1 1/8/2008		MDL	RL	Trip Blank 2 1/9/2008		MDL	RL	Trip Blank 3 1/10/2008		MDL	RL
		Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (ug/L)																	
Calcium	7440-70-2	59	J	40	500	NT				NT				NT			
Iron	7439-89-6	<20	U	5.7	20	NT				NT				NT			
Antimony	7440-36-0	<3	U	0.44	3	NT				NT				NT			
Barium	7440-39-3	<2	U	0.52	2	NT				NT				NT			
Chromium	7440-47-3	0.9	J,B,p	0.31	2	NT				NT				NT			
Copper	7440-50-8	0.55	J	0.33	1	NT				NT				NT			
Lead	7439-92-1	<1	U	0.33	1	NT				NT				NT			
Manganese	7439-96-5	<3	U	0.43	3	NT				NT				NT			
Mercury	7439-97-6	<0.2	U	0.046	0.2	NT				NT				NT			
Nickel	7440-02-0	<2	U	0.28	2	NT				NT				NT			
Zinc	7440-66-6	15		0.84	10	NT				NT				NT			
TCL VOCs (ug/L)																	
Acetone	67-64-1	2.5	J,B,z	1.2	20	4.1	J,B,z	1.2	20	3.3	J,B,z	1.2	20	4.4	J,B,z	1.2	20
Chloroform	67-66-3	0.84	J	0.061	1	<1	U	0.061	1	<1	U	0.061	1	<1	U	0.061	1
Methylene Chloride	75-09-2	0.62	J,B,y	0.051	5	0.69	J	0.051	5	0.69	J	0.051	5	0.69	J	0.051	5
Toluene	108-88-3	0.09	J,B,y	0.072	1	0.15	J	0.072	1	0.16	J	0.072	1	0.17	J	0.072	1
TCL SVOCs (ug/L)																	
Acetophenone	98-86-2	<5	U	0.043	5	NT				NT				NT			
Butyl Benzyl Phthalate	85-68-7	0.085	J,B,z	0.029	5	NT				NT				NT			
Diethyl Phthalate	84-66-2	0.038	J	0.034	5	NT				NT				NT			
Di-n-butyl Phthalate	84-74-2	1.1	J,B,z	0.38	5	NT				NT				NT			
Naphthalene	91-20-3	0.066	J	0.023	0.5	NT				NT				NT			
Phenanthrene	85-01-8	0.019	J	0.015	0.5	NT				NT				NT			

Table H.1-1b
Detected Analytes in Soil Field Blanks
SWWU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date	CAS #	Trip Blank 4 1/11/2008 Result	LQ, VQ, r	MDL	RL	Trip Blank 5 1/14/2008 Result	LQ, VQ, r	MDL	RL
TAL Metals (ug/L)									
Calcium	7440-70-2	NT				NT			
Iron	7439-89-6	NT				NT			
Antimony	7440-36-0	NT				NT			
Barium	7440-39-3	NT				NT			
Chromium	7440-47-3	NT				NT			
Copper	7440-50-8	NT				NT			
Lead	7439-92-1	NT				NT			
Manganese	7439-96-5	NT				NT			
Mercury	7439-97-6	NT				NT			
Nickel	7440-02-0	NT				NT			
Zinc	7440-66-6	NT				NT			
TCL VOCs (ug/L)									
Acetone	67-64-1	3.5	J,B,z	1.2	20	3.2	J,B,z	1.2	20
Chloroform	67-66-3	<1	U	0.061	1	<1	U	0.061	1
Methylene Chloride	75-09-2	0.66	J	0.051	5	0.67	J	0.051	5
Toluene	108-88-3	0.1	J	0.072	1	0.15	J	0.072	1
TCL SVOCs (ug/L)									
Acetophenone	98-86-2	NT				NT			
Butyl Benzyl Phthalate	85-68-7	NT				NT			
Diethyl Phthalate	84-66-2	NT				NT			
Di-n-butyl Phthalate	84-74-2	NT				NT			
Naphthalene	91-20-3	NT				NT			
Phenanthrene	85-01-8	NT				NT			

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested

Data Qualifiers

- B Analyte found in associated blank as well as in the sample.
- J Estimated value.
- U The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
- p Preparation blank contamination
- y Trip blank contamination
- z Method blank and/or storage blank contamination

TABLE H.1-2
DATA USABILITY WORKSHEET
SITE: SWMU 57
MEDIUM: Groundwater

Activity	Comment
Were all data qualifiers defined? Discuss those which were not.	Yes, they were defined in the guidance document, data validation reports included in Appendix G.2 of the RFI/CMS Report, and in the data tables included in Section 4.0 of the RFI/CMS Report.
Which qualifiers represent usable data?	B, J, L, U
Which qualifiers represent unusable data?	R
How are tentatively identified compounds handled?	Detected tentatively identified compounds are qualified NJ. These compounds are not used in the risk assessment.
Summarize the effect of data validation and interpretation issues on the risk assessment, if applicable.	Section 6.0 of the RFI/CMS Report discusses uncertainties associated with qualified data.
Additional notes:	None.

Table H.1-2
Detected Analyes in Groundwater Field Blanks
SWMU 57 RFI/CMS Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	Units	EQBK6 2/13/2008 Result	LQ, VQ, r	MDL	RL	Trip Blank 6 2/13/2008 Result	LQ, VQ, r	MDL	RL
TAL Metals									
Chromium, Total	ug/L	0.81	J,B,p	0.31	2	NT			
Iron, Total	ug/L	6.2	J	5.7	20	NT			
Zinc, Total	ug/L	6.5	J,L,m	0.84	10	NT			
TCL VOCs									
Acetone	ug/L	4.8	J,B,z	1.2	20	<20	U	1.2	20
Toluene	ug/L	0.13	J,B,y	0.072	1	0.3	J	0.072	1
TCL SVOCs									
Acetophenone	ug/L	0.057	J	0.043	5	NT			
Benzaldehyde	ug/L	0.066	J	0.051	5	NT			
Butyl Benzyl Phthalate	ug/L	0.075	J	0.029	5	NT			
Diethylphthalate	ug/L	0.038	J	0.034	5	NT			
Di-n-butylphthalate	ug/L	2.3	J	0.38	5	NT			
Isophorone	ug/L	0.075	J,B,z	0.031	5	NT			
Naphthalene	ug/L	0.1	J	0.023	0.5	NT			

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested

Data Qualifiers:
B = Not detected substantially above the level reported in laboratory or field blanks.
J = Analyte present. Reported value may not be accurate or precise.
L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.
U = Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
m = MS/MSD recovery failure
p = Preparation blank contamination
y = Trip blank contamination
z = Method blank contamination

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APPENDIX H.2

LABORATORY ANALYTICAL DATA (FORM 1s)

APPENDIX H.2.1
SITE SCREENING PROCESS SAMPLING
2002-2003

APPENDIX H.2.2
RCRA FACILITY INVESTIGATION SAMPLING
2007-2008

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APPENDIX H.2.1
SITE SCREENING PROCESS SAMPLING
2002-2003

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DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-4 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford SSP

Reviewer: AS **Date:** February 9, 2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies:

For the VOC analyses, the method blank for batch 90056-116 contained acetone at 33 ug/Kg. The method blank for batch 90056-117 contained acetone at 22 ug/Kg. The method blank for batch 90050-117 contained acetone at 22 ug/Kg. Positive results less than ten times the blank concentration were flagged "B,z" in the associated samples.

The associated equipment blank EQB3 submitted in sample delivery group 36440-3 displayed positive detections for acetone at 2.3 ug/L and methylene chloride at 0.67 ug/L. The associated trip blank displayed a positive detection for methylene chloride at 0.91 ug/L. The field blank detections for methylene chloride and acetone were previously qualified due to method blank detections. No further data qualifying action was required.

The continuing calibration analyzed on 10/16/03 at 1321 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for dichlorodifluoromethane at 38.0%, carbon disulfide at 22.3%, methyl acetate at 30.7%, and 2-hexanone at 20.1%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed percent differences greater than the control limit with a positive bias for methyl-tert-butyl ether at 25.2%, 1,1-dichloroethane at 20.4%, and bromochloromethane at 25.8%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/17/03 at 1235 displayed a percent difference greater than the control limit with a negative bias for methyl acetate at 28.7%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed a percent difference greater than the control limit with a positive bias for trans-1,3-dichloropropene at 23.1%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The laboratory control spike for batch 90056-116 displayed a recovery less than the laboratory generated lower control limit (i.e., 70%) but greater than the project QAPP lower limit (i.e., 50%) for dichlorodifluoromethane at 62%. The associated field sample results were non-detect and were previously flagged for a continuing calibration anomaly. No further data qualifying action was taken.

The matrix spike pair for sample 57SB2B displayed percent recoveries less than the laboratory generated lower control limits for carbon disulfide (33%/37%), chloroethane (74%), methyl acetate (47%/52%), and styrene (48%). The parent sample result for methyl acetate was previously qualified for a low bias displayed in the continuing calibration percent difference and no further data qualifying action was taken. Since one matrix spike recovery was acceptable and the other matrix spike recovery was only marginally low for chloroethane and styrene, no data qualifying action was taken. The parent sample result for carbon disulfide was non-detect and was flagged "UJ,m". This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for 1,1,1-trichloroethane at 26%, methyl ethyl ketone at 28%, chlorobenzene at 25%, chloroform at 24%, cis-1,3-dichloropropene at 28%, toluene at 25%, and trichloroethene at 25%. Since these relative percent differences were less than the project QAPP control limit (i.e., 50%), no data qualifying action was taken.

For the SVOC analyses, the method blank for extraction batch 90482-114 displayed positive detections for bis(2-ethylhexyl)phthalate at 26 ug/Kg and di-n-butylphthalate at 11 ug/Kg. Positive associated field sample results less than ten times the blank concentrations were flagged "B,z".

The associated equipment blank EQB3 submitted with sample delivery group 36440-3 contained 4-chloro-3-methylphenol at 0.14 ug/L, bis(2-ethylhexyl)phthalate at 1.4 ug/L, butyl benzyl phthalate at 1.0 ug/L, diethylphthalate at 0.11 ug/L, and two tentatively identified compounds (TICs). The equipment blank detections for bis(2-ethylhexyl) phthalate and butyl benzyl phthalate were previously flagged due to method blank detections and no further data qualifying action was taken. Positive results less than ten times the blank concentration for diethylphthalate or less than five times the blank concentration of the TICs or 4-chloro-3-methylphenol were flagged "B,x" in the associated samples.

The continuing calibration analyzed on 10/18/03 at 0632 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for benzaldehyde at 26.4% and 4-chloroaniline at 26.2% and with a positive bias for 2,4,5-trichlorophenol at 25.0%. The associated field sample results were non-detect for benzaldehyde and 4-chloroaniline and were flagged "UJ,c". The associated field sample results were non-detect for 2,4,5-trichlorophenol while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The continuing calibration analyzed on 11/01/03 at 0653 displayed a percent difference greater than the control limit with a negative bias for 4-chloroaniline at 21.7%. The associated field sample results were non-detect and were flagged "UJ,c".

The continuing calibration analyzed on 11/02/03 at 1249 displayed percent differences greater than the control limit with a negative bias for hexachlorocyclopentadiene at 28.0% and 2,4-dinitrophenol at 22.4%. The associated field sample results were non-detect and were flagged "UJ,c".

The laboratory control spike for batch 90482-114 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 128%, 2,6-dinitrotoluene at 123%, 2-nitroaniline at 127%, 3,3'-dichlorobenzidine at 117%, acenaphthylene at 118%, benzo(b)fluoranthene at 125%, benzo(g,h,i)perylene at 130%, carbazole at 127%, dibenzo(a,h)anthracene at 126%, diethylphthalate at 119%, dimethylphthalate at 118%,

fluorene at 121%, hexachlorocyclopentadiene at 115%, and indeno(1,2,3-cd)pyrene at 125%. The laboratory control spike for batch 90572-114 displayed a recovery greater than the laboratory generated upper control limit (i.e., 113%) for 3,3'-dichlorobenzidine at 120%. Positive associated field sample results were flagged "J,l", unless previously qualified for an equipment blank detection anomaly.

The matrix spike pair for sample 57SB2B displayed percent recoveries less than the laboratory generated lower control limits for 2,4-dinitrophenol (12%/11%), 4,6-dinitro-2-methylphenol (20%), 4-chloroaniline (24%/28%), and hexachlorocyclopentadiene (39%/37%). Since the matrix spike recoveries were greater than the project QAPP lower limit (i.e., 10%), no data qualifying action was taken based on these anomalies.

Sample 57SB2A displayed two acid fraction surrogate recoveries greater than the laboratory generated upper control limits for 2-fluorophenol at 119% and 2,4,5-tribromophenol at 117%. The associated acid fraction constituents were non-detect or previously flagged for an equipment blank detection anomaly. No data further data qualifying action was taken.

For the PAH analyses, the 2-fluorobiphenyl surrogate percent recoveries were less than the laboratory generated lower control limit (i.e., 49%) for 68SB3A at 39%, 68SB3B at 37%, 68SB3C at 34%, 57SB1A at 32%, 57SB1B at 46%, SBD6 at 30%, 57SB3B at 47%, 57SB2C at 48%, 69SB1A at 46%, 69SB1B at 42%, 69SB1C at 36%, SBD7 at 45%, and 69SB3B at 45%. Positive associated field sample results were flagged "L,s" while non-detects were flagged "UL,s", unless previously qualified for laboratory control spike anomalies.

The matrix spike pair for sample 57SB2B displayed percent recoveries less than the laboratory generated lower control limits for acenaphthylene (56%/56%), benzo(g,h,i)perylene (67%/68%), dibenzo(a,h)anthracene (67%/65%), fluoranthene (67%/66%), and naphthalene (55%/56%). Since most of the associated field sample results were qualified as biased low due to surrogate recovery anomalies, no further data qualifying action was taken.

For the explosive analyses, the continuing calibration analyzed on 10/22/03 at 1517 displayed a percent difference greater than the control limit (i.e., 15%) with a negative bias for 4-nitrotoluene at 15.2%. The continuing calibration analyzed on 10/22/03 at 2017 displayed a percent difference greater than the control limit with a negative bias for RDX at 16.5%. The continuing calibration analyzed on 10/23/03 at 0859 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 16.5%. The continuing calibration analyzed on 10/23/03 at 1358 displayed a percent difference greater than the control limit with a negative bias for RDX at 23.0%. The continuing calibration analyzed on 10/23/03 at 1426 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 15.1%. The continuing calibration analyzed on 10/27/03 at 1217 displayed a percent difference greater than the control limit with a negative bias for RDX at 16.9%. The continuing calibration analyzed on 10/27/03 at 1244 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 17.2%. The continuing calibration analyzed on 10/27/03 at 1810 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 15.4%. The continuing calibration analyzed on 10/27/03 at 2310 displayed percent differences greater than the control limit with a negative bias for RDX at 16.1% and 1,3,5-trinitrobenzene at 15.4%. The continuing calibration analyzed on 10/27/03 at 2337 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 15.2%. All associated sample results were non-detect and were flagged "UJ,c".

For the PCB analyses, the positive result reported in sample 57SB4A displayed a percent difference greater than the control limit (i.e., 40%) between the two analytical column concentrations for arochlor 1254 at 41.5%. This result was flagged "J,g".

For the herbicide analyses, the laboratory control spike for batch 90218-110 displayed a recovery less than the laboratory generated lower control limit (i.e., 50%) for dinoseb at 0% and a recovery greater than the laboratory generated upper control limit (i.e., 91%) for MCPP at 117%. The associated field sample result was non-detect for MCPP while the laboratory control spike displayed a positive bias, therefore, no data qualifying action was required. All dinoseb results from the original extraction were rejected and manually removed from the result forms by the reviewer. Only dinoseb results from the re-extraction should be used for data interpretation. The surrogate recoveries were greater than the upper laboratory generated control limit (i.e., 114%) for all samples of the re-extraction. Since the associated field sample results were non-detect, no data qualifying action was required.

The closing continuing calibration displayed a percent difference greater than the control limit (i.e., 15%) with a positive bias for dicamba at 29.6% on column one and silvex at 17.0% on column two. The associated field sample results were non-detect. No data qualifying action was required.

For the metal analyses by 6020, the method blank for batches 90105-113 and 90112-120 contained lead at 0.089 and 0.098 mg/Kg, respectively. The associated equipment blank EQB3 submitted with sample delivery group 36440-3 contained lead at 0.3 ug/L. The associated field sample results were positive and greater than five times the blank concentrations. Therefore, no data qualifying action was required.

The matrix spike duplicate performed on sample 57SB2B displayed a percent recovery less than the laboratory generated upper control limit (i.e., 87%) for thallium at 84%. Since this recovery was only marginally less than the control limit, greater than the project QAPP lower control limit (i.e., 75%), and the matrix spike displayed an acceptable recovery, no data qualifying action was taken based on this anomaly.

For the metal analyses by 6010B, the method blank for batch 89971-113 contained beryllium at 0.0495 mg/Kg and sodium at 19.8 mg/Kg. The method blank for batch 90177-120 contained cobalt at 0.374 mg/Kg and sodium at 8.95 mg/Kg. Positive associated field sample results less than five times the blank concentration were flagged "B,p". The associated equipment blank EQB3 submitted with sample delivery group 36440-3 contained iron at 4.8 ug/L and sodium at 160 ug/L. The equipment blank results for iron and sodium were previously qualified due to method blank detections. No further data qualifying action was taken based on equipment blank detections.

The matrix spike performed on sample 57SB2B displayed a percent recovery greater than the laboratory generated upper control limit (i.e., 111%) for magnesium at 121%. Since this recovery was only marginally greater than the control limit, less than the project QAPP upper control limit (i.e., 125%), and the matrix spike duplicate displayed an acceptable recovery, no data qualifying action was taken based on this anomaly. The serial dilution performed on sample 57SB2B displayed percent differences greater than the control limit (i.e., 10%) for beryllium at 18.2%, cobalt at 19.2%, and potassium at 13.1%. All associated field sample results were positive and were flagged "J,s". The field duplicate pair (57SB3A and SBD6) displayed relative percent differences greater than the control limit (i.e., 35%) for barium at 36%, cadmium at 41%, calcium at 45%, chromium at 52%, cobalt at 161%, and zinc at 42%.

The positive results were flagged "J,f" in these two samples, except cobalt results that were previously qualified due to a serial dilution anomaly. The field duplicate pair (69SB3A and SBD7) displayed relative percent differences greater than the control limit (i.e., 35%) for aluminum at 37.2% and iron at 36.8%. The positive results were flagged "J,f" in these two samples, except cobalt results that were previously qualified due to a serial dilution anomaly.

Sample 69SB3C displayed an internal standard recovery greater than the laboratory upper control limit (i.e., 120%) for yttrium at 148%. The sample was reanalyzed at a dilution factor of five that displays an acceptable internal standard recovery. The associated field sample result for beryllium was reported from this dilution and displays an elevated method detection limit. Since the reporting limit was greater than three times the elevated method detection limit, the reporting limit was not elevated based on this dilution factor.

For the cyanide analyses, the matrix spike duplicate performed on sample 57SB2B displayed a percent recovery less than the laboratory generated upper control limit (i.e., 80%) for thallium at 74%. Since this recovery was only marginally less than the control limit and the matrix spike displayed an acceptable recovery, no data qualifying action was taken based on this anomaly.

Correctable Anomalies: None.

Comments: Field coolers were received at the laboratory with internal temperatures less than the lower control limit (i.e., 2°C) at 0.9°C and 0.8 °C. Since the sample aliquots were not frozen and the containers were intact, no data qualifying action was taken. A cooler was received at the laboratory with an internal temperature greater than the upper control limit (i.e., 6°C) at 8.6 °C. Based on professional judgement no data qualifying action was required since this temperature did not exceed 10°C.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. The GIS-Key format is limited to 12 characters for a TIC CAS number. One or two SVOC TIC detections exceeded this limitation for 57SB3B and 69SB3B. The laboratory reported the CAS number without the dashes. The reviewer manually entered the dashes for evaluation purposes on the hardcopy result forms included in this report.

No anomalies were encountered if a given fraction was not mentioned. All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

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Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-4	345619	68SB3A	SO	10/07/03
36440-4	345620	68SB3B	SO	10/07/03
36440-4	345621	68SB3C	SO	10/07/03
36440-4	345622	57SB1A	SO	10/07/03
36440-4	345623	57SB1B	SO	10/07/03
36440-4	345624	57SB1C	SO	10/07/03
36440-4	345625	57SB3A	SO	10/07/03
36440-4	345626	SBD6	SO	10/07/03
36440-4	345627	57SB3B	SO	10/07/03
36440-4	345628	57SB3C	SO	10/07/03
36440-4	345629	57SB2A	SO	10/07/03
36440-4	345630	57SB2B	SO	10/07/03
36440-4	345631	57SB2C	SO	10/07/03
36440-4	345737	57SB4A	SO	10/08/03
36440-4	345738	69SB1A	SO	10/08/03
36440-4	345739	69SB1B	SO	10/08/03
36440-4	345740	69SB1C	SO	10/08/03
36440-4	345741	69SB3A	SO	10/08/03
36440-4	345742	SBD7	SO	10/08/03
36440-4	345743	69SB3B	SO	10/08/03
36440-4	345744	69SB3C	SO	10/08/03

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Duplicate Statistics

57SB3A and SBD6

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
Volatiles											
methyl ethyl ketone	ug/Kg	26	130	28		32		13.3%	4	104	Pass
acetone	ug/Kg	26	130	99	B	160		47.1%	61	104	Pass
ethylbenzene	ug/Kg	6.5	33	0.66	J	6.6	U	163.6%	5.94	26	N/A
methylene chloride	ug/Kg	26	130	6.5	J	4.3	J	40.7%	2.2	104	N/A
toluene	ug/Kg	6.5	33	1.3	J	2.6	J	66.7%	1.3	26	N/A
trichloroethene	ug/Kg	6.5	33	1.9	J	1.6	J	17.1%	0.3	26	N/A
Semi-Volatiles											
2-methylnaphthalene	ug/Kg	220	1100	6.0	J	12	J	66.7%	6	880	N/A
4-chloro-3-methylphenol	ug/Kg	220	1100	46	J	38	J	19.0%	8	880	N/A
acenaphthylene	ug/Kg	220	1100	4.0	J	9.0	J	76.9%	5	880	N/A
acetophenone	ug/Kg	220	1100	36	J	75	J	70.3%	39	880	N/A
anthracene	ug/Kg	220	1100	220	U	9.0	J	184.3%	211	880	N/A
benzo(a)pyrene	ug/Kg	220	1100	12	J	20	J	50.0%	8	880	N/A
benzo(b)fluoranthene	ug/Kg	220	1100	20	J	35	J	54.5%	15	880	N/A
benzo(g,h,i)perylene	ug/Kg	220	1100	220	U	15	J	174.5%	205	880	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	220	1100	480		62	J	154.2%	418	880	N/A
caprolactam	ug/Kg	430	2150	43	J	25	J	52.9%	18	1720	N/A
chrysene	ug/Kg	220	1100	23	J	22	J	4.4%	1	880	N/A
diethylphthalate	ug/Kg	220	1100	19	J	21	J	10.0%	2	880	N/A
di-n-butylphthalate	ug/Kg	220	1100	360		230		44.1%	130	880	Pass
fluoranthene	ug/Kg	220	1100	40	J	45	J	11.8%	5	880	N/A
fluorene	ug/Kg	220	1100	220	U	3.0	J	194.6%	217	880	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	220	1100	7.0	J	12	J	52.6%	5	880	N/A
naphthalene	ug/Kg	220	1100	4.0	J	6.0	J	40.0%	2	880	N/A
phenanthrene	ug/Kg	220	1100	27	J	50	J	59.7%	23	880	N/A
pyrene	ug/Kg	220	1100	40	J	44	J	9.5%	4	880	N/A
Polyaromatic Hydrocarbons											
anthracene	ug/Kg	24	120	1.6	J	3.0	J	60.9%	1.4	96	N/A
chrysene	ug/Kg	24	120	5.2	J	12	J	79.1%	6.8	96	N/A
fluoranthene	ug/Kg	24	120	46		84		58.5%	38	96	Pass
phenanthrene	ug/Kg	24	120	18	J	30		50.0%	12	96	N/A
pyrene	ug/Kg	24	120	31		54		54.1%	23	96	Pass
Explosives											
BDL											
Metals											
aluminum	mg/Kg	250	1250	28900		33000		13%	4100	1000	Pass
antimony	mg/Kg	0.5	3	102		104		1.9%	2	2	Pass
arsenic	mg/Kg	0.4	2	5.1		5.3		3.8%	0.2	1.6	Pass
barium	mg/Kg	5	25	107		154		**36%**	47	20	**Fail**
beryllium	mg/Kg	1	5	0.45	J	0.39	J	14%	0.06	4	N/A
cadmium	mg/Kg	1	5	27		41		**41%**	14	4	**Fail**
calcium	mg/Kg	250	1250	1750		2760		**45%**	1010	1000	**Fail**
chromium	mg/Kg	25	125	268		454		**52%**	186	100	**Fail**
cobalt	mg/Kg	1	5	75		8.0		**161%**	67	4	**Fail**
copper	mg/Kg	1	5	27		38		34%	11	4	Pass
iron	mg/Kg	1000	5000	47100		46500		1.3%	600	4000	Pass
lead	mg/Kg	50	250	175		268		42%	93	**200**	Pass
magnesium	mg/Kg	250	1250	1420		1990		33%	570	1000	Pass
manganese	mg/Kg	5	25	544		514		5.7%	30	20	Pass
mercury	mg/Kg	0.1	1	0.11		0.13		17%	0.02	0.4	N/A
nickel	mg/Kg	0.5	3	13		14		7.4%	1	2	Pass
potassium	mg/Kg	100	500	967		1060		9.2%	93	400	Pass
selenium	mg/Kg	1	5	0.57	J	0.64	J	12%	0.07	4	N/A
silver	mg/Kg	3	15	0.11	J	0.15	J	31%	0.04	12	N/A
sodium	mg/Kg	100	500	76	J	97	J	24%	21	400	N/A
thallium	mg/Kg	0.5	3	0.24	J	0.24	J	0.0%	0	2	N/A
vanadium	mg/Kg	1	5	69		67		2.9%	2	4	Pass
zinc	mg/Kg	100	500	895		1370		**42%**	475	400	**Fail**
Cyanide											
Total Cyanide	mg/Kg	0.50	2.5	0.17	J	0.16	J	6%	0.01	2	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

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Duplicate Statistics

69SB3A and SBD7

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
Volatiles											
methyl ethyl ketone	ug/Kg	12	60	41		35		15.8%	6	48	Pass
acetone	ug/Kg	12	60	160		180		11.8%	20	48	Pass
toluene	ug/Kg	6	30	6	U	1.7	J	112%	4.3	24	N/A
4-isopropyltoluene, TIC	ug/Kg	1	5	1	U	1.8		57.1%	0.8	4	N/A
hexanal, TIC	ug/Kg	1	5	1	U	17		178%	16	4	N/A
Semi-Volatiles											
4-chloro-3-methylphenol	ug/Kg	200	1000	23	J	21	J	9.1%	2	800	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	200	1000	19	J	19	J	0.0%	0	800	N/A
butyl benzyl phthalate	ug/Kg	200	1000	6.0	J	210	U	189%	204	800	N/A
caprolactam	ug/Kg	390	1950	14	J	210	U	175%	196	1560	N/A
diethylphthalate	ug/Kg	200	1000	8.0	J	5.0	J	46%	3	800	N/A
di-n-butylphthalate	ug/Kg	200	1000	61	J	63	J	3.2%	2	800	N/A
fluoranthene	ug/Kg	200	1000	27	J	6.0	J	127%	21	800	N/A
phenanthrene	ug/Kg	200	1000	5.0	J	7.0	J	33%	2	800	N/A
pyrene	ug/Kg	200	1000	14	J	7.0	J	67%	7	800	N/A
Polyaromatic Hydrocarbons											
fluoranthene	ug/Kg	25	125	3.8	J	25		147%	21.2	100	N/A
phenanthrene	ug/Kg	25	125	1.6	J	25		176%	23.4	100	N/A
pyrene	ug/Kg	25	125	2.9	J	25		158%	22.1	100	N/A
Explosives											
BDL											
Metals											
aluminum	mg/Kg	50	250	14000		20400		**37.2%**	6400	200	**Fail**
antimony	mg/Kg	0.50	2.5	19.00		14.00		30.3%	5	2	Pass
arsenic	mg/Kg	0.40	2.0	2.9		3.3		13%	0.4	1.6	Pass
barium	mg/Kg	5.0	25	71		90		24%	19	20	Pass
beryllium	mg/Kg	1.0	5.0	0.26	J	0.48	J	59%	0.22	4	N/A
cadmium	mg/Kg	1.0	5.0	2.10		2.5		17%	0.4	4	Pass
calcium	mg/Kg	250	1250	721		835		15%	114	1000	Pass
chromium	mg/Kg	5.0	25	22		38		53%	16	20	Pass
cobalt	mg/Kg	1.0	5.0	11		10		9.5%	1	4	Pass
copper	mg/Kg	1.0	5.0	9		12		31.9%	3.3	4	Pass
iron	mg/Kg	250	1250	17100		24800		**36.8%**	7700	1000	**Fail**
lead	mg/Kg	1.0	5.0	25		22		13%	3	4	Pass
magnesium	mg/Kg	250	1250	997		1040		4.2%	43	1000	Pass
manganese	mg/Kg	5.0	25	914		1010		10%	96	20	Pass
mercury	mg/Kg	0.10	0.50	0.041	J	0.078	J	62%	0.037	0.4	N/A
nickel	mg/Kg	0.50	2.5	9		11		26%	2.5	2	Pass
potassium	mg/Kg	100	500	813		879		7.8%	66	400	Pass
selenium	mg/Kg	1.0	5.0	0.40	J	0.60	J	40%	0.2	4	N/A
silver	mg/Kg	3.0	15	0.051	J	0.050	J	2.0%	0.001	12	N/A
sodium	mg/Kg	100	500	110		116		5.3%	6	400	Pass
thallium	mg/Kg	0.50	2.5	0.26	J	0.23	J	12%	0.03	2	N/A
vanadium	mg/Kg	1.0	5.0	35		49		33%	14	4	Pass
zinc	mg/Kg	4.0	20	45		61		30%	16	16	Pass
Cyanide											
Total Cyanide	mg/Kg	0.50	2.5	0.11	J	0.11	J	0%	0	2	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

URS
Measurement Systems DV Service

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3A**	QC Batch:	90056 -116
Sample #:	**345619**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	**Methyl Ethyl Ketone**	**33**		24	5.95
591-78-6	2-Hexanone	12 U	UJ,C	12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	***Acetone**	**150 B**	B,Z	24	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U	UJ,C	6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-4**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**68SB3A**
Sample #:	**345619**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/07/03 @ 08:10
Sampler:	B.F. & J.S.
Received:	10/08/03 @ 08:50
Prepared:	n/a
Prep. Method:	n/a
Analyzed:	10/16/03 by JDM
Anal. Method:	USEPA-8260B
QC Batch:	90056 -116
Anal. Batch:	208014
Percent Solids:	84
Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U	UJ, c	6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	24 U	UJ, c	24	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	Methylene Chloride	24 U		24	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	Toluene	6.0 U		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**	Prepared:	n/a
Submittal:	Delivery Order 0046	Prep. Method:	n/a
	RAAP	Analyzed:	10/16/03 JDM
Sample ID:	**68SB3A**	Anal. Method:	USEPA-8260B
Sample #:	**345619**	QC Batch:	90056 -116
Matrix:	Soil	Anal. Batch:	208014
		Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3B**	QC Batch:	90056 -116
Sample #:	**345620**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.7 U		6.7	0.567
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.7 U		6.7	1.01
79-34-5	1,1,2,2-Tetrachloroethane	6.7 U		6.7	0.868
79-00-5	1,1,2-Trichloroethane	6.7 U		6.7	0.789
75-34-3	1,1-Dichloroethane	6.7 U		6.7	0.963
75-35-4	1,1-Dichloroethylene	6.7 U		6.7	0.975
106-93-4	1,2-Dibromoethane	6.7 U		6.7	0.911
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.77
95-50-1	1,2-Dichlorobenzene	6.7 U		6.7	0.644
107-06-2	1,2-Dichloroethane	6.7 U		6.7	0.573
156-59-2	cis-1,2-Dichloroethene	6.7 U		6.7	0.944
156-60-5	trans-1,2-Dichloroethene	6.7 U		6.7	0.935
78-87-5	1,2-Dichloropropane	6.7 U		6.7	0.779
87-61-6	1,2,3-Trichlorobenzene	6.7 U		6.7	0.724
120-82-1	1,2,4-Trichlorobenzene	6.7 U		6.7	0.545
541-73-1	1,3-Dichlorobenzene	6.7 U		6.7	0.356
106-46-7	1,4-Dichlorobenzene	6.7 U		6.7	0.944
78-93-3	**Methyl Ethyl Ketone**	**22 J**		26	6.65
591-78-6	2-Hexanone	13 U	UJ,c	13	3.01
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.94
67-64-1	***Acetone**	**49 B**	B,Z	26	6.65
71-43-2	Benzene	6.7 U		6.7	0.701
74-97-5	Bromochloromethane	6.7 U		6.7	1.01
75-27-4	Dichlorobromomethane	6.7 U		6.7	0.666
75-25-2	Bromoform	6.7 U		6.7	0.769
74-83-9	Bromomethane	6.7 U		6.7	2.00
75-15-0	Carbon Disulfide	6.7 U	UJ,c	6.7	1.93
56-23-5	Carbon Tetrachloride	6.7 U		6.7	0.620
108-90-7	Chlorobenzene	6.7 U		6.7	0.879
75-00-3	Chloroethane	6.7 U		6.7	1.80
67-66-3	Chloroform	6.7 U		6.7	0.593

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3B**	QC Batch:	90056 -116
Sample #:	**345620**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.7 U		6.7	1.11
110-82-7	Cyclohexane	13 U		13	0.420
10061-01-5	cis-1,3-Dichloropropene	6.7 U		6.7	0.653
10061-02-6	trans-1,3-Dichloropropene	6.7 U		6.7	0.693
75-71-8	Dichlorodifluoromethane	6.7 U	UJ, C	6.7	0.888
124-48-1	Chlorodibromomethane	6.7 U		6.7	0.688
100-41-4	Ethylbenzene	6.7 U		6.7	0.563
98-82-8	Isopropylbenzene	6.7 U		6.7	0.726
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.62
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.7 U		6.7	0.853
75-09-2	Methylene Chloride	26 U		26	3.74
100-42-5	Styrene	6.7 U		6.7	0.588
127-18-4	Tetrachloroethene	6.7 U		6.7	0.815
108-88-3	Toluene	6.7 U		6.7	0.617
79-01-6	Trichloroethene	6.7 U		6.7	0.900
75-69-4	Trichlorofluoromethane	6.7 U		6.7	0.988
75-01-4	Vinyl Chloride	6.7 U		6.7	0.492
1330-20-7	Xylene (Total)	6.7 U		6.7	0.560

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3B**	QC Batch:	90056 -116
Sample #:	**345620**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**	Prepared:	n/a
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	n/a
		Analyzed:	10/16/03 by JDM
Sample ID:	**68SB3C**	Anal. Method:	USEPA-8260B
Sample #:	**345621**	QC Batch:	90056 -116
Matrix:	Soil	Anal. Batch:	208014
Unit:	ug/kg dry	Percent Solids:	73
		Dilution Factor:	1.37

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.584
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.04
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.895
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.812
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.992
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	1.00
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.938
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.85
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.663
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.590
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.973
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.963
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.803
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.745
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.562
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.367
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.973
78-93-3	**Methyl Ethyl Ketone**	**24 J**		28	6.85
591-78-6	2-Hexanone	14 U	UJ,c	14	3.10
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.00
67-64-1	***Acetone**	**50 B**	B,2	28	6.85
71-43-2	Benzene	6.8 U		6.8	0.722
74-97-5	Bromochloromethane	6.8 U		6.8	1.04
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.686
75-25-2	Bromoform	6.8 U		6.8	0.792
74-83-9	Bromomethane	6.8 U		6.8	2.06
75-15-0	Carbon Disulfide	6.8 U	UJ,c	6.8	1.99
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.638
108-90-7	Chlorobenzene	6.8 U		6.8	0.906
75-00-3	Chloroethane	6.8 U		6.8	1.85
67-66-3	Chloroform	6.8 U		6.8	0.611

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3C**	QC Batch:	90056 -116
Sample #:	**345621**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.37

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.14
110-82-7	Cyclohexane	14 U		14	0.433
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.673
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.714
75-71-8	Dichlorodifluoromethane	6.8 U	UJ, C	6.8	0.915
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.708
100-41-4	Ethylbenzene	6.8 U		6.8	0.580
98-82-8	Isopropylbenzene	6.8 U		6.8	0.748
79-20-9	Methyl Acetate	28 U	UJ,C	28	4.75
108-87-2	Methylcyclohexane	14 U		14	1.16
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.878
75-09-2	**Methylene Chloride**	**5.0 J**		28	3.85
100-42-5	Styrene	6.8 U		6.8	0.606
127-18-4	Tetrachloroethene	6.8 U		6.8	0.840
108-88-3	Toluene	6.8 U		6.8	0.636
79-01-6	Trichloroethene	6.8 U		6.8	0.927
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.02
75-01-4	Vinyl Chloride	6.8 U		6.8	0.507
1330-20-7	Xylene (Total)	6.8 U		6.8	0.577

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3C**	QC Batch:	90056 -116
Sample #:	**345621**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB1A**	QC Batch:	90056 -116
Sample #:	**345622**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.8 U		5.8	0.494
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.8 U		5.8	0.880
79-34-5	1,1,2,2-Tetrachloroethane	5.8 U		5.8	0.757
79-00-5	1,1,2-Trichloroethane	5.8 U		5.8	0.688
75-34-3	1,1-Dichloroethane	5.8 U		5.8	0.840
75-35-4	1,1-Dichloroethylene	5.8 U		5.8	0.850
106-93-4	1,2-Dibromoethane	5.8 U		5.8	0.795
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.41
95-50-1	1,2-Dichlorobenzene	5.8 U		5.8	0.561
107-06-2	1,2-Dichloroethane	5.8 U		5.8	0.500
156-59-2	cis-1,2-Dichloroethene	5.8 U		5.8	0.824
156-60-5	trans-1,2-Dichloroethene	5.8 U		5.8	0.815
78-87-5	1,2-Dichloropropane	5.8 U		5.8	0.680
87-61-6	1,2,3-Trichlorobenzene	5.8 U		5.8	0.631
120-82-1	1,2,4-Trichlorobenzene	5.8 U		5.8	0.476
541-73-1	1,3-Dichlorobenzene	5.8 U		5.8	0.311
106-46-7	1,4-Dichlorobenzene	5.8 U		5.8	0.824
78-93-3	**Methyl Ethyl Ketone**	**29**		24	5.80
591-78-6	2-Hexanone	12 U	VJ,c	12	2.62
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.69
67-64-1	***Acetone**	**100 B**	Bz	24	5.80
71-43-2	Benzene	5.8 U		5.8	0.611
74-97-5	Bromochloromethane	5.8 U		5.8	0.883
75-27-4	Dichlorobromomethane	5.8 U		5.8	0.581
75-25-2	Bromoform	5.8 U		5.8	0.670
74-83-9	Bromomethane	5.8 U		5.8	1.74
75-15-0	Carbon Disulfide	5.8 U	VJ,c	5.8	1.68
56-23-5	Carbon Tetrachloride	5.8 U		5.8	0.541
108-90-7	Chlorobenzene	5.8 U		5.8	0.767
75-00-3	Chloroethane	5.8 U		5.8	1.57
67-66-3	Chloroform	5.8 U		5.8	0.517

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1A**	QC Batch:	90056 -116
Sample #:	**345622**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.8 U		5.8	0.967
110-82-7	Cyclohexane	12 U		12	0.367
10061-01-5	cis-1,3-Dichloropropene	5.8 U		5.8	0.570
10061-02-6	trans-1,3-Dichloropropene	5.8 U		5.8	0.604
75-71-8	Dichlorodifluoromethane	5.8 U	UJ, c	5.8	0.775
124-48-1	Chlorodibromomethane	5.8 U		5.8	0.600
100-41-4	Ethylbenzene	5.8 U		5.8	0.491
98-82-8	Isopropylbenzene	5.8 U		5.8	0.633
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.03
108-87-2	Methylcyclohexane	12 U		12	0.980
1634-04-4	Methyl(tert)butyl Ether	5.8 U		5.8	0.744
75-09-2	**Methylene Chloride**	**3.6 J**		24	3.26
100-42-5	Styrene	5.8 U		5.8	0.513
127-18-4	Tetrachloroethene	5.8 U		5.8	0.711
108-88-3	Toluene	5.8 U		5.8	0.538
79-01-6	Trichloroethene	5.8 U		5.8	0.785
75-69-4	Trichlorofluoromethane	5.8 U		5.8	0.862
75-01-4	Vinyl Chloride	5.8 U		5.8	0.429
1330-20-7	Xylene (Total)	5.8 U		5.8	0.488

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1A**	QC Batch:	90056 -116
Sample #:	**345622**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Hexanal	66-25-1	7.0	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1B**	QC Batch:	90056 -116
Sample #:	**345623**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.7 U		6.7	0.567
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.7 U		6.7	1.01
79-34-5	1,1,2,2-Tetrachloroethane	6.7 U		6.7	0.868
79-00-5	1,1,2-Trichloroethane	6.7 U		6.7	0.789
75-34-3	1,1-Dichloroethane	6.7 U		6.7	0.963
75-35-4	1,1-Dichloroethylene	6.7 U		6.7	0.975
106-93-4	1,2-Dibromoethane	6.7 U		6.7	0.911
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.77
95-50-1	1,2-Dichlorobenzene	6.7 U		6.7	0.644
107-06-2	1,2-Dichloroethane	6.7 U		6.7	0.573
156-59-2	cis-1,2-Dichloroethene	6.7 U		6.7	0.944
156-60-5	trans-1,2-Dichloroethene	6.7 U		6.7	0.935
78-87-5	1,2-Dichloropropane	6.7 U		6.7	0.779
87-61-6	1,2,3-Trichlorobenzene	6.7 U		6.7	0.724
120-82-1	1,2,4-Trichlorobenzene	6.7 U		6.7	0.545
541-73-1	1,3-Dichlorobenzene	6.7 U		6.7	0.356
106-46-7	1,4-Dichlorobenzene	6.7 U		6.7	0.944
78-93-3	**Methyl Ethyl Ketone**	**24 J**		26	6.65
591-78-6	2-Hexanone	13 U	UJ,c	13	3.01
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.94
67-64-1	***Acetone**	**50 B**	B,2	26	6.65
71-43-2	Benzene	6.7 U		6.7	0.701
74-97-5	Bromochloromethane	6.7 U		6.7	1.01
75-27-4	Dichlorobromomethane	6.7 U		6.7	0.666
75-25-2	Bromoform	6.7 U		6.7	0.769
74-83-9	Bromomethane	6.7 U		6.7	2.00
75-15-0	Carbon Disulfide	6.7 U	UJ,c	6.7	1.93
56-23-5	Carbon Tetrachloride	6.7 U		6.7	0.620
108-90-7	Chlorobenzene	6.7 U		6.7	0.879
75-00-3	Chloroethane	6.7 U		6.7	1.80
67-66-3	**Chloroform**	**17**		6.7	0.593

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1B**	QC Batch:	90056 -116
Sample #:	**345623**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.7 U		6.7	1.11
110-82-7	Cyclohexane	13 U		13	0.420
10061-01-5	cis-1,3-Dichloropropene	6.7 U		6.7	0.653
10061-02-6	trans-1,3-Dichloropropene	6.7 U		6.7	0.693
75-71-8	Dichlorodifluoromethane	6.7 U	UJ, c	6.7	0.888
124-48-1	Chlorodibromomethane	6.7 U		6.7	0.688
100-41-4	Ethylbenzene	6.7 U		6.7	0.563
98-82-8	Isopropylbenzene	6.7 U		6.7	0.726
79-20-9	Methyl Acetate	26 U	UJ, c	26	4.62
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.7 U		6.7	0.853
75-09-2	**Methylene Chloride**	**5.3 J**		26	3.74
100-42-5	Styrene	6.7 U		6.7	0.588
127-18-4	Tetrachloroethene	6.7 U		6.7	0.815
108-88-3	Toluene	6.7 U		6.7	0.617
79-01-6	Trichloroethene	6.7 U		6.7	0.900
75-69-4	Trichlorofluoromethane	6.7 U		6.7	0.988
75-01-4	Vinyl Chloride	6.7 U		6.7	0.492
1330-20-7	Xylene (Total)	6.7 U		6.7	0.560

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB1B**	QC Batch:	90056 -116
Sample #:	**345623**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB1C**	QC Batch:	90056 -116
Sample #:	**345624**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.5 U		7.5	0.635
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.5 U		7.5	1.13
79-34-5	1,1,2,2-Tetrachloroethane	7.5 U		7.5	0.973
79-00-5	1,1,2-Trichloroethane	7.5 U		7.5	0.884
75-34-3	1,1-Dichloroethane	7.5 U		7.5	1.08
75-35-4	1,1-Dichloroethylene	7.5 U		7.5	1.09
106-93-4	1,2-Dibromoethane	7.5 U		7.5	1.02
96-12-8	1,2-Dibromo-3-chloropropane	15 U		15	3.10
95-50-1	1,2-Dichlorobenzene	7.5 U		7.5	0.721
107-06-2	1,2-Dichloroethane	7.5 U		7.5	0.642
156-59-2	cis-1,2-Dichloroethene	7.5 U		7.5	1.06
156-60-5	trans-1,2-Dichloroethene	7.5 U		7.5	1.05
78-87-5	1,2-Dichloropropane	7.5 U		7.5	0.873
87-61-6	1,2,3-Trichlorobenzene	7.5 U		7.5	0.811
120-82-1	1,2,4-Trichlorobenzene	7.5 U		7.5	0.611
541-73-1	1,3-Dichlorobenzene	7.5 U		7.5	0.399
106-46-7	1,4-Dichlorobenzene	7.5 U		7.5	1.06
78-93-3	**Methyl Ethyl Ketone**	**26 J**		30	7.45
591-78-6	2-Hexanone	15 U	VS,C	15	3.37
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.18
67-64-1	***Acetone**	**54 B**	B,Z	30	7.45
71-43-2	Benzene	7.5 U		7.5	0.785
74-97-5	Bromochloromethane	7.5 U		7.5	1.13
75-27-4	Dichlorobromomethane	7.5 U		7.5	0.746
75-25-2	Bromoform	7.5 U		7.5	0.861
74-83-9	Bromomethane	7.5 U		7.5	2.24
75-15-0	Carbon Disulfide	7.5 U	VS,C	7.5	2.16
56-23-5	Carbon Tetrachloride	7.5 U		7.5	0.694
108-90-7	Chlorobenzene	7.5 U		7.5	0.985
75-00-3	Chloroethane	7.5 U		7.5	2.01
67-66-3	**Chloroform**	**24**		7.5	0.665

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1C**	QC Batch:	90056 -116
Sample #:	**345624**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.5 U		7.5	1.24
110-82-7	Cyclohexane	15 U		15	0.471
10061-01-5	cis-1,3-Dichloropropene	7.5 U		7.5	0.732
10061-02-6	trans-1,3-Dichloropropene	7.5 U		7.5	0.776
75-71-8	Dichlorodifluoromethane	7.5 U	VJ,c	7.5	0.995
124-48-1	Chlorodibromomethane	7.5 U		7.5	0.770
100-41-4	Ethylbenzene	7.5 U		7.5	0.630
98-82-8	Isopropylbenzene	7.5 U		7.5	0.814
79-20-9	Methyl Acetate	30 U	VJ,c	30	5.17
108-87-2	Methylcyclohexane	15 U		15	1.26
1634-04-4	Methyl(tert)butyl Ether	7.5 U		7.5	0.955
75-09-2	**Methylene Chloride**	**6.4 J**		30	4.19
100-42-5	Styrene	7.5 U		7.5	0.659
127-18-4	Tetrachloroethene	7.5 U		7.5	0.913
108-88-3	Toluene	7.5 U		7.5	0.691
79-01-6	Trichloroethene	7.5 U		7.5	1.01
75-69-4	Trichlorofluoromethane	7.5 U		7.5	1.11
75-01-4	Vinyl Chloride	7.5 U		7.5	0.551
1330-20-7	Xylene (Total)	7.5 U		7.5	0.627

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1C**	QC Batch:	90056 -116
Sample #:	**345624**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3A**	QC Batch:	90056 -117
Sample #:	**345625**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U		6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U		6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U		6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U		6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**28**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	***Acetone**	**99 B**	Bz	26	6.50
71-43-2	Benzene	6.5 U		6.5	0.685
74-97-5	Bromochloromethane	6.5 U		6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.651
75-25-2	Bromoform	6.5 U		6.5	0.751
74-83-9	Bromomethane	6.5 U		6.5	1.95
75-15-0	Carbon Disulfide	6.5 U		6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U		6.5	0.606
108-90-7	Chlorobenzene	6.5 U		6.5	0.859
75-00-3	Chloroethane	6.5 U		6.5	1.76
67-66-3	Chloroform	6.5 U		6.5	0.580

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB3A**	QC Batch:	90056 -117
Sample #:	**345625**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.672
100-41-4	**Ethylbenzene**	**0.66 J**		6.5	0.550
98-82-8	Isopropylbenzene	6.5 U		6.5	0.710
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	0.833
75-09-2	**Methylene Chloride**	**6.5 J**		26	3.65
100-42-5	Styrene	6.5 U		6.5	0.575
127-18-4	Tetrachloroethene	6.5 U		6.5	0.797
108-88-3	**Toluene**	**1.3 J**		6.5	0.603
79-01-6	**Trichloroethene**	**1.9 J**		6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.966
75-01-4	Vinyl Chloride	6.5 U		6.5	0.481
1330-20-7	Xylene (Total)	6.5 U		6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3A**	QC Batch:	90056 -117
Sample #:	**345625**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD6**	QC Batch:	90056 -117
Sample #:	**345626**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**32**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	**Acetone**	**160**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U		6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD6**	QC Batch:	90056 -117
Sample #:	**345626**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,e	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**4.3 J**		26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	**Toluene**	**2.6 J**		6.6	0.612
79-01-6	**Trichloroethene**	**1.6 J**		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD6**	QC Batch:	90056 -117
Sample #:	**345626**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3B**	QC Batch:	90056 -117
Sample #:	**345627**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.59

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.9 U		7.9	0.677
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.9 U		7.9	1.21
79-34-5	1,1,2,2-Tetrachloroethane	7.9 U		7.9	1.04
79-00-5	1,1,2-Trichloroethane	7.9 U		7.9	0.943
75-34-3	1,1-Dichloroethane	7.9 U		7.9	1.15
75-35-4	1,1-Dichloroethylene	7.9 U		7.9	1.17
106-93-4	1,2-Dibromoethane	7.9 U		7.9	1.09
96-12-8	1,2-Dibromo-3-chloropropane	16 U		16	3.31
95-50-1	1,2-Dichlorobenzene	7.9 U		7.9	0.770
107-06-2	1,2-Dichloroethane	7.9 U		7.9	0.685
156-59-2	cis-1,2-Dichloroethene	7.9 U		7.9	1.13
156-60-5	trans-1,2-Dichloroethene	7.9 U		7.9	1.12
78-87-5	1,2-Dichloropropane	7.9 U		7.9	0.932
87-61-6	1,2,3-Trichlorobenzene	7.9 U		7.9	0.865
120-82-1	1,2,4-Trichlorobenzene	7.9 U		7.9	0.652
541-73-1	1,3-Dichlorobenzene	7.9 U		7.9	0.426
106-46-7	1,4-Dichlorobenzene	7.9 U		7.9	1.13
78-93-3	**Methyl Ethyl Ketone**	**29 J**		32	7.95
591-78-6	2-Hexanone	16 U		16	3.59
108-10-1	4-Methyl-2-Pentanone	16 U		16	2.32
67-64-1	***Acetone**	**77 B**	B,Z	32	7.95
71-43-2	Benzene	7.9 U		7.9	0.838
74-97-5	Bromochloromethane	7.9 U		7.9	1.21
75-27-4	Dichlorobromomethane	7.9 U		7.9	0.797
75-25-2	Bromoform	7.9 U		7.9	0.919
74-83-9	Bromomethane	7.9 U		7.9	2.39
75-15-0	Carbon Disulfide	7.9 U		7.9	2.31
56-23-5	Carbon Tetrachloride	7.9 U		7.9	0.741
108-90-7	Chlorobenzene	7.9 U		7.9	1.05
75-00-3	Chloroethane	7.9 U		7.9	2.15
67-66-3	Chloroform	7.9 U		7.9	0.709

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3B**	QC Batch:	90056 -117
Sample #:	**345627**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.59

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.9 U		7.9	1.33
110-82-7	Cyclohexane	16 U		16	0.502
10061-01-5	cis-1,3-Dichloropropene	7.9 U		7.9	0.781
10061-02-6	trans-1,3-Dichloropropene	7.9 U		7.9	0.828
75-71-8	Dichlorodifluoromethane	7.9 U		7.9	1.06
124-48-1	Chlorodibromomethane	7.9 U		7.9	0.822
100-41-4	Ethylbenzene	7.9 U		7.9	0.673
98-82-8	Isopropylbenzene	7.9 U		7.9	0.868
79-20-9	Methyl Acetate	32 U	UJ,c	32	5.52
108-87-2	Methylcyclohexane	16 U		16	1.34
1634-04-4	Methyl(tert)butyl Ether	7.9 U		7.9	1.02
75-09-2	**Methylene Chloride**	**6.8 J**		32	4.47
100-42-5	Styrene	7.9 U		7.9	0.703
127-18-4	Tetrachloroethene	7.9 U		7.9	0.975
108-88-3	Toluene	7.9 U		7.9	0.738
79-01-6	Trichloroethene	7.9 U		7.9	1.08
75-69-4	Trichlorofluoromethane	7.9 U		7.9	1.18
75-01-4	Vinyl Chloride	7.9 U		7.9	0.588
1330-20-7	Xylene (Total)	7.9 U		7.9	0.669

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB3B**	QC Batch:	90056 -117
Sample #:	**345627**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB3C**	QC Batch:	90056 -117
Sample #:	**345628**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.7 U		6.7	0.567
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.7 U		6.7	1.01
79-34-5	1,1,2,2-Tetrachloroethane	6.7 U		6.7	0.868
79-00-5	1,1,2-Trichloroethane	6.7 U		6.7	0.789
75-34-3	1,1-Dichloroethane	6.7 U		6.7	0.963
75-35-4	1,1-Dichloroethylene	6.7 U		6.7	0.975
106-93-4	1,2-Dibromoethane	6.7 U		6.7	0.911
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.77
95-50-1	1,2-Dichlorobenzene	6.7 U		6.7	0.644
107-06-2	1,2-Dichloroethane	6.7 U		6.7	0.573
156-59-2	cis-1,2-Dichloroethene	6.7 U		6.7	0.944
156-60-5	trans-1,2-Dichloroethene	6.7 U		6.7	0.935
78-87-5	1,2-Dichloropropane	6.7 U		6.7	0.779
87-61-6	1,2,3-Trichlorobenzene	6.7 U		6.7	0.724
120-82-1	1,2,4-Trichlorobenzene	6.7 U		6.7	0.545
541-73-1	1,3-Dichlorobenzene	6.7 U		6.7	0.356
106-46-7	1,4-Dichlorobenzene	6.7 U		6.7	0.944
78-93-3	**Methyl Ethyl Ketone**	**25 J**		26	6.65
591-78-6	2-Hexanone	13 U		13	3.01
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.94
67-64-1	***Acetone**	**55 B**	B,Z	26	6.65
71-43-2	Benzene	6.7 U		6.7	0.701
74-97-5	Bromochloromethane	6.7 U		6.7	1.01
75-27-4	Dichlorobromomethane	6.7 U		6.7	0.666
75-25-2	Bromoform	6.7 U		6.7	0.769
74-83-9	Bromomethane	6.7 U		6.7	2.00
75-15-0	Carbon Disulfide	6.7 U		6.7	1.93
56-23-5	Carbon Tetrachloride	6.7 U		6.7	0.620
108-90-7	Chlorobenzene	6.7 U		6.7	0.879
75-00-3	Chloroethane	6.7 U		6.7	1.80
67-66-3	**Chloroform**	**1.1 J**		6.7	0.593

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB3C**	QC Batch:	90056 -117
Sample #:	**345628**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.7 U		6.7	1.11
110-82-7	Cyclohexane	13 U		13	0.420
10061-01-5	cis-1,3-Dichloropropene	6.7 U		6.7	0.653
10061-02-6	trans-1,3-Dichloropropene	6.7 U		6.7	0.693
75-71-8	Dichlorodifluoromethane	6.7 U		6.7	0.888
124-48-1	Chlorodibromomethane	6.7 U		6.7	0.688
100-41-4	Ethylbenzene	6.7 U		6.7	0.563
98-82-8	Isopropylbenzene	6.7 U		6.7	0.726
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.62
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.7 U		6.7	0.853
75-09-2	**Methylene Chloride**	**5.4 J**		26	3.74
100-42-5	Styrene	6.7 U		6.7	0.588
127-18-4	Tetrachloroethene	6.7 U		6.7	0.815
108-88-3	Toluene	6.7 U		6.7	0.617
79-01-6	Trichloroethene	6.7 U		6.7	0.900
75-69-4	Trichlorofluoromethane	6.7 U		6.7	0.988
75-01-4	Vinyl Chloride	6.7 U		6.7	0.492
1330-20-7	Xylene (Total)	6.7 U		6.7	0.560

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3C**	QC Batch:	90056 -117
Sample #:	**345628**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB2A**	QC Batch:	90056 -117
Sample #:	**345629**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**30**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	***Acetone**	**100 B**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U		6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

* See attached Statement of Data Qualifications.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2A**	QC Batch:	90056 -117
Sample #:	**345629**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,c	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**6.0 J**		26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2A**	QC Batch:	90056 -117
Sample #:	**345629**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	28	E

NJ, I

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2B**	QC Batch:	90056 -117
Sample #:	**345630**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**23 J**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	***Acetone**	**51 B**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	*Carbon Disulfide	6.6 U	UJ,M	6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	*Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2B**	QC Batch:	90056 -117
Sample #:	**345630**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	*Methyl Acetate	26 U	UJ,C	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**4.9 J**		26	3.71
100-42-5	*Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2B**	QC Batch:	90056 -117
Sample #:	**345630**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2C**	QC Batch:	90056 -117
Sample #:	**345631**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**21 J**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	***Acetone**	**37 B**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	**Dichlorobromomethane**	**1.2 J**		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U		6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	**Chloroform**	**15**		6.6	0.589

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2C**	QC Batch:	90056 -117
Sample #:	**345631**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,c	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**4.8 J**		26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB2C**	QC Batch:	90056 -117
Sample #:	**345631**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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Individual sample results relate only to the sample tested.
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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4A**	QC Batch:	90056 -117
Sample #:	**345737**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U		7.0	0.601
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U		7.0	1.07
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U		7.0	0.921
79-00-5	1,1,2-Trichloroethane	7.0 U		7.0	0.836
75-34-3	1,1-Dichloroethane	7.0 U		7.0	1.02
75-35-4	1,1-Dichloroethylene	7.0 U		7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U		7.0	0.966
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.93
95-50-1	1,2-Dichlorobenzene	7.0 U		7.0	0.682
107-06-2	1,2-Dichloroethane	7.0 U		7.0	0.608
156-59-2	cis-1,2-Dichloroethene	7.0 U		7.0	1.00
156-60-5	trans-1,2-Dichloroethene	7.0 U		7.0	0.991
78-87-5	1,2-Dichloropropane	7.0 U		7.0	0.826
87-61-6	1,2,3-Trichlorobenzene	7.0 U		7.0	0.767
120-82-1	1,2,4-Trichlorobenzene	7.0 U		7.0	0.578
541-73-1	1,3-Dichlorobenzene	7.0 U		7.0	0.378
106-46-7	1,4-Dichlorobenzene	7.0 U		7.0	1.00
78-93-3	**Methyl Ethyl Ketone**	**30**		14	7.05
591-78-6	2-Hexanone	14 U		14	3.19
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.06
67-64-1	***Acetone**	**55 B**	B,Z	14	7.05
71-43-2	Benzene	7.0 U		7.0	0.743
74-97-5	Bromochloromethane	7.0 U		7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U		7.0	0.706
75-25-2	Bromoform	7.0 U		7.0	0.815
74-83-9	Bromomethane	7.0 U		7.0	2.12
75-15-0	Carbon Disulfide	7.0 U		7.0	2.04
56-23-5	Carbon Tetrachloride	7.0 U		7.0	0.657
108-90-7	Chlorobenzene	7.0 U		7.0	0.932
75-00-3	Chloroethane	7.0 U		7.0	1.90
67-66-3	Chloroform	7.0 U		7.0	0.629

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4A**	QC Batch:	90056 -117
Sample #:	**345737**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.18
110-82-7	Cyclohexane	14 U		14	0.446
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.692
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.735
75-71-8	Dichlorodifluoromethane	7.0 U		7.0	0.942
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.729
100-41-4	Ethylbenzene	7.0 U		7.0	0.596
98-82-8	Isopropylbenzene	7.0 U		7.0	0.770
79-20-9	Methyl Acetate	14 U	UJc	14	4.89
108-87-2	Methylcyclohexane	14 U		14	1.19
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.904
75-09-2	Methylene Chloride	7.0 U		7.0	3.96
100-42-5	Styrene	7.0 U		7.0	0.623
127-18-4	Tetrachloroethene	7.0 U		7.0	0.864
108-88-3	Toluene	7.0 U		7.0	0.654
79-01-6	Trichloroethene	7.0 U		7.0	0.955
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.05
75-01-4	Vinyl Chloride	7.0 U		7.0	0.522
1330-20-7	Xylene (Total)	7.0 U		7.0	0.594

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4A**	QC Batch:	90056 -117
Sample #:	**345737**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1A**	QC Batch:	90056 -117
Sample #:	**345738**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.545
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.972
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.836
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.759
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.927
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.938
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.877
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.66
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.620
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.552
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.909
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.900
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.750
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.696
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.525
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.343
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.909
78-93-3	**Methyl Ethyl Ketone**	**31**		13	6.40
591-78-6	2-Hexanone	13 U		13	2.89
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.87
67-64-1	***Acetone**	**100 B**	B,Z	13	6.40
71-43-2	Benzene	6.4 U		6.4	0.675
74-97-5	Bromochloromethane	6.4 U		6.4	0.974
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.641
75-25-2	Bromoform	6.4 U		6.4	0.740
74-83-9	Bromomethane	6.4 U		6.4	1.92
75-15-0	Carbon Disulfide	6.4 U		6.4	1.86
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.596
108-90-7	Chlorobenzene	6.4 U		6.4	0.846
75-00-3	Chloroethane	6.4 U		6.4	1.73
67-66-3	Chloroform	6.4 U		6.4	0.571

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1A**	QC Batch:	90056 -117
Sample #:	**345738**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.07
110-82-7	Cyclohexane	13 U		13	0.404
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.628
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.667
75-71-8	Dichlorodifluoromethane	6.4 U		6.4	0.855
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.662
100-41-4	Ethylbenzene	6.4 U		6.4	0.541
98-82-8	Isopropylbenzene	6.4 U		6.4	0.699
79-20-9	Methyl Acetate	13 U	VJ,C	13	4.44
108-87-2	Methylcyclohexane	13 U		13	1.08
1634-04-4	Methyl(tert)butyl Ether	6.4 U		6.4	0.820
75-09-2	Methylene Chloride	6.4 U		6.4	3.60
100-42-5	Styrene	6.4 U		6.4	0.566
127-18-4	Tetrachloroethene	6.4 U		6.4	0.785
108-88-3	Toluene	6.4 U		6.4	0.594
79-01-6	Trichloroethene	6.4 U		6.4	0.867
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.951
75-01-4	Vinyl Chloride	6.4 U		6.4	0.474
1330-20-7	Xylene (Total)	6.4 U		6.4	0.539

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB1A**	QC Batch:	90056 -117
Sample #:	**345738**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB1B**	QC Batch:	90056 -117
Sample #:	**345739**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U		6.1	0.520
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U		6.1	0.926
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U		6.1	0.797
79-00-5	1,1,2-Trichloroethane	6.1 U		6.1	0.723
75-34-3	1,1-Dichloroethane	6.1 U		6.1	0.883
75-35-4	1,1-Dichloroethylene	6.1 U		6.1	0.894
106-93-4	1,2-Dibromoethane	6.1 U		6.1	0.836
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.54
95-50-1	1,2-Dichlorobenzene	6.1 U		6.1	0.590
107-06-2	1,2-Dichloroethane	6.1 U		6.1	0.526
156-59-2	cis-1,2-Dichloroethene	6.1 U		6.1	0.866
156-60-5	trans-1,2-Dichloroethene	6.1 U		6.1	0.858
78-87-5	1,2-Dichloropropane	6.1 U		6.1	0.715
87-61-6	1,2,3-Trichlorobenzene	6.1 U		6.1	0.664
120-82-1	1,2,4-Trichlorobenzene	6.1 U		6.1	0.500
541-73-1	1,3-Dichlorobenzene	6.1 U		6.1	0.327
106-46-7	1,4-Dichlorobenzene	6.1 U		6.1	0.866
78-93-3	**Methyl Ethyl Ketone**	**22**		12	6.10
591-78-6	2-Hexanone	12 U		12	2.76
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.78
67-64-1	***Acetone**	**44 B**	QZ	12	6.10
71-43-2	Benzene	6.1 U		6.1	0.643
74-97-5	Bromochloromethane	6.1 U		6.1	0.928
75-27-4	Dichlorobromomethane	6.1 U		6.1	0.611
75-25-2	Bromoform	6.1 U		6.1	0.705
74-83-9	Bromomethane	6.1 U		6.1	1.83
75-15-0	Carbon Disulfide	6.1 U		6.1	1.77
56-23-5	Carbon Tetrachloride	6.1 U		6.1	0.569
108-90-7	Chlorobenzene	6.1 U		6.1	0.806
75-00-3	Chloroethane	6.1 U		6.1	1.65
67-66-3	Chloroform	6.1 U		6.1	0.544

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1B**	QC Batch:	90056 -117
Sample #:	**345739**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.02
110-82-7	Cyclohexane	12 U		12	0.386
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.599
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.636
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.815
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.631
100-41-4	Ethylbenzene	6.1 U		6.1	0.516
98-82-8	Isopropylbenzene	6.1 U		6.1	0.666
79-20-9	Methyl Acetate	12 U	UJ,C	12	4.23
108-87-2	Methylcyclohexane	12 U		12	1.03
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.782
75-09-2	Methylene Chloride	6.1 U		6.1	3.43
100-42-5	Styrene	6.1 U		6.1	0.539
127-18-4	Tetrachloroethene	6.1 U		6.1	0.748
108-88-3	Toluene	6.1 U		6.1	0.566
79-01-6	Trichloroethene	6.1 U		6.1	0.826
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.906
75-01-4	Vinyl Chloride	6.1 U		6.1	0.451
1330-20-7	Xylene (Total)	6.1 U		6.1	0.514

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB1B**	QC Batch:	90056 -117
Sample #:	**345739**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB1C**	QC Batch:	90056 -117
Sample #:	**345740**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.575
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.02
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.882
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.801
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.977
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	0.990
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.925
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.81
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.653
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.582
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.959
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.949
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.791
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.734
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.554
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.362
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.959
78-93-3	**Methyl Ethyl Ketone**	**26**		14	6.75
591-78-6	2-Hexanone	14 U		14	3.05
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.97
67-64-1	***Acetone**	**70 B**	B,Z	14	6.75
71-43-2	Benzene	6.8 U		6.8	0.711
74-97-5	Bromochloromethane	6.8 U		6.8	1.03
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.676
75-25-2	Bromoform	6.8 U		6.8	0.780
74-83-9	Bromomethane	6.8 U		6.8	2.03
75-15-0	Carbon Disulfide	6.8 U		6.8	1.96
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.629
108-90-7	Chlorobenzene	6.8 U		6.8	0.892
75-00-3	Chloroethane	6.8 U		6.8	1.82
67-66-3	Chloroform	6.8 U		6.8	0.602

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1C**	QC Batch:	90056 -117
Sample #:	**345740**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U	6.8	1.13
110-82-7	Cyclohexane	14 U	14	0.427
10061-01-5	cis-1,3-Dichloropropene	6.8 U	6.8	0.663
10061-02-6	trans-1,3-Dichloropropene	6.8 U	6.8	0.703
75-71-8	Dichlorodifluoromethane	6.8 U	6.8	0.902
124-48-1	Chlorodibromomethane	6.8 U	6.8	0.698
100-41-4	Ethylbenzene	6.8 U	6.8	0.571
98-82-8	Isopropylbenzene	6.8 U	6.8	0.737
79-20-9	Methyl Acetate	14 U	UJ,C 14	4.68
108-87-2	Methylcyclohexane	14 U	14	1.14
1634-04-4	Methyl(tert)butyl Ether	6.8 U	6.8	0.865
75-09-2	Methylene Chloride	6.8 U	6.8	3.79
100-42-5	Styrene	6.8 U	6.8	0.597
127-18-4	Tetrachloroethene	6.8 U	6.8	0.828
108-88-3	**Toluene**	**0.89 J**	6.8	0.626
79-01-6	Trichloroethene	6.8 U	6.8	0.914
75-69-4	Trichlorofluoromethane	6.8 U	6.8	1.00
75-01-4	Vinyl Chloride	6.8 U	6.8	0.500
1330-20-7	Xylene (Total)	6.8 U	6.8	0.568

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1C**	QC Batch:	90056 -117
Sample #:	**345740**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3A**	QC Batch:	90056 -117
Sample #:	**345741**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	**Methyl Ethyl Ketone**	**41**		12	5.95
591-78-6	2-Hexanone	12 U		12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	**Acetone**	**160**	B,2	12	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U		6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB3A**	QC Batch:	90056 -117
Sample #:	**345741**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	12 U	UJ,C	12	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	Methylene Chloride	6.0 U		6.0	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	Toluene	6.0 U		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**	Prepared:	n/a
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	n/a
		Analyzed:	10/17/03 JDM
Sample ID:	**69SB3A**	Anal. Method:	USEPA-8260B
Sample #:	**345741**	QC Batch:	90056 -117
Matrix:	Soil	Anal. Batch:	208019
		Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD7**	QC Batch:	90056 -117
Sample #:	**345742**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	**Methyl Ethyl Ketone**	**35**		12	5.95
591-78-6	2-Hexanone	12 U		12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	**Acetone**	**180**	B,Z	12	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U		6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD7**	QC Batch:	90056 -117
Sample #:	**345742**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	12 U	UJ,C	12	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	Methylene Chloride	6.0 U		6.0	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	**Toluene**	**1.7 J**		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD7**	QC Batch:	90056 -117
Sample #:	**345742**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
4-Isopropyltoluene	99-87-6	1.8	Q	NJ,+
Hexanal	66-25-1	17	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB3B**	QC Batch:	90056 -117
Sample #:	**345743**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U	6.1	0.520
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U	6.1	0.926
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U	6.1	0.797
79-00-5	1,1,2-Trichloroethane	6.1 U	6.1	0.723
75-34-3	1,1-Dichloroethane	6.1 U	6.1	0.883
75-35-4	1,1-Dichloroethylene	6.1 U	6.1	0.894
106-93-4	1,2-Dibromoethane	6.1 U	6.1	0.836
96-12-8	1,2-Dibromo-3-chloropropane	12 U	12	2.54
95-50-1	1,2-Dichlorobenzene	6.1 U	6.1	0.590
107-06-2	1,2-Dichloroethane	6.1 U	6.1	0.526
156-59-2	cis-1,2-Dichloroethene	6.1 U	6.1	0.866
156-60-5	trans-1,2-Dichloroethene	6.1 U	6.1	0.858
78-87-5	1,2-Dichloropropane	6.1 U	6.1	0.715
87-61-6	1,2,3-Trichlorobenzene	6.1 U	6.1	0.664
120-82-1	1,2,4-Trichlorobenzene	6.1 U	6.1	0.500
541-73-1	1,3-Dichlorobenzene	6.1 U	6.1	0.327
106-46-7	1,4-Dichlorobenzene	6.1 U	6.1	0.866
78-93-3	**Methyl Ethyl Ketone**	**22**	12	6.10
591-78-6	2-Hexanone	12 U	12	2.76
108-10-1	4-Methyl-2-Pentanone	12 U	12	1.78
67-64-1	***Acetone**	**63 B**	12	6.10
71-43-2	Benzene	6.1 U	6.1	0.643
74-97-5	Bromochloromethane	6.1 U	6.1	0.928
75-27-4	Dichlorobromomethane	6.1 U	6.1	0.611
75-25-2	Bromoform	6.1 U	6.1	0.705
74-83-9	Bromomethane	6.1 U	6.1	1.83
75-15-0	Carbon Disulfide	6.1 U	6.1	1.77
56-23-5	Carbon Tetrachloride	6.1 U	6.1	0.569
108-90-7	Chlorobenzene	6.1 U	6.1	0.806
75-00-3	Chloroethane	6.1 U	6.1	1.65
67-66-3	Chloroform	6.1 U	6.1	0.544

Bz

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3B**	QC Batch:	90056 -117
Sample #:	**345743**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.02
110-82-7	Cyclohexane	12 U		12	0.386
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.599
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.636
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.815
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.631
100-41-4	Ethylbenzene	6.1 U		6.1	0.516
98-82-8	Isopropylbenzene	6.1 U		6.1	0.666
79-20-9	Methyl Acetate	12 U	UJ,c	12	4.23
108-87-2	Methylcyclohexane	12 U		12	1.03
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.782
75-09-2	Methylene Chloride	6.1 U		6.1	3.43
100-42-5	Styrene	6.1 U		6.1	0.539
127-18-4	Tetrachloroethene	6.1 U		6.1	0.748
108-88-3	Toluene	6.1 U		6.1	0.566
79-01-6	Trichloroethene	6.1 U		6.1	0.826
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.906
75-01-4	Vinyl Chloride	6.1 U		6.1	0.451
1330-20-7	Xylene (Total)	6.1 U		6.1	0.514

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3B**	QC Batch:	90056 -117
Sample #:	**345743**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3C**	QC Batch:	90050 -117
Sample #:	**345744**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.575
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.02
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.882
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.801
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.977
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	0.990
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.925
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.81
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.653
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.582
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.959
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.949
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.791
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.734
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.554
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.362
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.959
78-93-3	**Methyl Ethyl Ketone**	**30**		14	6.75
591-78-6	2-Hexanone	14 U		14	3.05
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.97
67-64-1	***Acetone**	**74 B**	B,2	14	6.75
71-43-2	Benzene	6.8 U		6.8	0.711
74-97-5	Bromochloromethane	6.8 U		6.8	1.03
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.676
75-25-2	Bromoform	6.8 U		6.8	0.780
74-83-9	Bromomethane	6.8 U		6.8	2.03
75-15-0	Carbon Disulfide	6.8 U		6.8	1.96
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.629
108-90-7	Chlorobenzene	6.8 U		6.8	0.892
75-00-3	Chloroethane	6.8 U		6.8	1.82
67-66-3	Chloroform	6.8 U		6.8	0.602

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB3C**	QC Batch:	90050 -117
Sample #:	**345744**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U	6.8	1.13
110-82-7	Cyclohexane	14 U	14	0.427
10061-01-5	cis-1,3-Dichloropropene	6.8 U	6.8	0.663
10061-02-6	trans-1,3-Dichloropropene	6.8 U	6.8	0.703
75-71-8	Dichlorodifluoromethane	6.8 U	6.8	0.902
124-48-1	Chlorodibromomethane	6.8 U	6.8	0.698
100-41-4	Ethylbenzene	6.8 U	6.8	0.571
98-82-8	Isopropylbenzene	6.8 U	6.8	0.737
79-20-9	Methyl Acetate	14 U	UJ,C 14	4.68
108-87-2	Methylcyclohexane	14 U	14	1.14
1634-04-4	Methyl(tert)butyl Ether	6.8 U	6.8	0.865
75-09-2	Methylene Chloride	6.8 U	6.8	3.79
100-42-5	Styrene	6.8 U	6.8	0.597
127-18-4	Tetrachloroethene	6.8 U	6.8	0.828
108-88-3	Toluene	6.8 U	6.8	0.626
79-01-6	Trichloroethene	6.8 U	6.8	0.914
75-69-4	Trichlorofluoromethane	6.8 U	6.8	1.00
75-01-4	Vinyl Chloride	6.8 U	6.8	0.500
1330-20-7	Xylene (Total)	6.8 U	6.8	0.568

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3C**	QC Batch:	90050 -117
Sample #:	**345744**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3A**	QC Batch:	90210 -110
Sample #:	**345619**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	400 U	400	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	66.5
99-09-2	3-Nitroaniline	200 U	200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**35 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	400 U	400	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/31/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3A**	QC Batch:	90210 -110
Sample #:	**345619**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	**Benzo (a) Pyrene**	**11 J**		200	6.85
205-99-2	**Benzo (b) Fluoranthene**	**23 J**		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**49 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	**Caprolactam**	**94 J**		400	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	**Chrysene**	**15 J**		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**13 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**190 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	**Fluoranthene**	**23 J**		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**9.0 J**		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3A**	QC Batch:	90210 -110
Sample #:	**345619**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**12 J**	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**23 J**	200	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3A**	QC Batch:	90210 -110
Sample #:	**345619**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	320	E	NJ,+
1-Hexadecanol	36653-82-4	120	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	140	E	NJ,+
3-Eicosene, (E)-	74685-33-9	140	E	NJ,+
Eicosane	112-95-8	100	E	NJ,+
Octadecanal	638-66-4	79	E	NJ,+
Phsophoric acid, tris(3-methylphenyl) ester	563-04-2	200	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3B**	QC Batch:	90210 -110
Sample #:	**345620**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**31 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3B**	QC Batch:	90210 -110
Sample #:	**345620**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**20 J**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**11 J**		220	5.82
105-60-2	**Caprolactam**	**21 J**		400	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**10 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**210 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3B**	QC Batch:	90210 -110
Sample #:	**345620**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3B**	QC Batch:	90210 -110
Sample #:	**345620**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	48	E	NJ,†
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	320	E	NJ,†
1-Heptadecanol	1454-85-9	42	E	NJ,†
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	120	E	NJ,†
2-Ethyl-1-Hexanol	104-76-7	36	E	NJ,†
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~360~~	~~E~~	
Stearic Acid	57-11-4	45	E	NJ,†

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3C**	QC Batch:	90210 -110
Sample #:	**345621**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U	240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U	240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U	240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U	240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U	240	3.67
120-83-2	2,4-Dichlorophenol	240 U	240	4.93
105-67-9	2,4-Dimethylphenol	240 U	240	11.1
51-28-5	2,4-Dinitrophenol	460 U	460	4.48
121-14-2	2,4-Dinitrotoluene	240 U	240	4.41
606-20-2	2,6-Dinitrotoluene	240 U	240	38.8
91-58-7	2-Chloronaphthalene	240 U	240	3.22
95-57-8	2-Chlorophenol	240 U	240	2.81
91-57-6	2-Methylnaphthalene	240 U	240	3.84
95-48-7	2-Methylphenol	240 U	240	6.78
88-74-4	2-Nitroaniline	240 U	240	6.44
88-75-5	2-Nitrophenol	240 U	240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U	240	77.6
99-09-2	3-Nitroaniline	240 U	240	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U	240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U	240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**30 J**	240	7.29
106-47-8	4-Chloroaniline	240 U	240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U	240	4.58
106-44-5	4-Methylphenol	240 U	240	8.92
100-01-6	4-Nitroaniline	240 U	240	10.2
100-02-7	4-Nitrophenol	460 U	460	3.96
83-32-9	Acenaphthene	240 U	240	2.41
208-96-8	Acenaphthylene	240 U	240	2.10
98-86-2	Acetophenone	240 U	240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3C**	QC Batch:	90210 -110
Sample #:	**345621**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U		240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**24 J**		240	2.90
85-68-7	**Butyl Benzyl Phthalate**	**14 J**		240	6.27
105-60-2	**Caprolactam**	**18 J**		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**11 J**	B,X	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**380**		240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	Fluoranthene	240 U		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3C**	QC Batch:	90210 -110
Sample #:	**345621**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3C**	QC Batch:	90210 -110
Sample #:	**345621**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	41	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	530	E	NJ,+
1-Heptadecanol	1454-85-9	30	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	120	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	39	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~600~~	~~E~~	
Stearic Acid	57-11-4	50	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1A**	QC Batch:	90210 -110
Sample #:	**345622**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	400 U		400	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	66.5
99-09-2	3-Nitroaniline	200 U		200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**23 J**	B,X	200	6.25
106-47-8	4-Chloroaniline	200 U		200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1A**	QC Batch:	90210 -110
Sample #:	**345622**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	**Benzo (a) Pyrene**	**12 J**		200	6.85
205-99-2	**Benzo (b) Fluoranthene**	**23 J**		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**27 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	**Caprolactam**	**15 J**		400	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	**Chrysene**	**17 J**		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**8.0 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**330**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	**Fluoranthene**	**30 J**		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**7.0 J**		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1A**	QC Batch:	90210 -110
Sample #:	**345622**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**13 J**	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**29 J**	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1A**	QC Batch:	90210 -110
Sample #:	**345622**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	440	E	NJ+
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	260	E	NJ+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	94	E	NJ+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1100~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1B**	QC Batch:	90210 -110
Sample #:	**345623**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**29 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1B**	QC Batch:	90210 -110
Sample #:	**345623**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**22 J**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**10 J**		220	5.82
105-60-2	**Caprolactam**	**11 J**		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**10 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**430**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1B**	QC Batch:	90210 -110
Sample #:	**345623**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1B**	QC Batch:	90210 -110
Sample #:	**345623**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	810	E	NJ,T
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	540	E	NJ,T
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	130	E	NJ,T
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1700~~	~~E~~	
Stearic Acid	57-11-4	64	E	NJ,T

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1C**	QC Batch:	90210 -110
Sample #:	**345624**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	260 U	260	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	260 U	260	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	260 U	260	1.98
95-95-4	2,4,5-Trichlorophenol	260 U	260	5.01
88-06-2	2,4,6-Trichlorophenol	260 U	260	3.93
120-83-2	2,4-Dichlorophenol	260 U	260	5.28
105-67-9	2,4-Dimethylphenol	260 U	260	11.9
51-28-5	2,4-Dinitrophenol	500 U	500	4.80
121-14-2	2,4-Dinitrotoluene	260 U	260	4.73
606-20-2	2,6-Dinitrotoluene	260 U	260	41.6
91-58-7	2-Chloronaphthalene	260 U	260	3.45
95-57-8	2-Chlorophenol	260 U	260	3.02
91-57-6	2-Methylnaphthalene	260 U	260	4.11
95-48-7	2-Methylphenol	260 U	260	7.26
88-74-4	2-Nitroaniline	260 U	260	6.90
88-75-5	2-Nitrophenol	260 U	260	2.55
91-94-1	3,3'-Dichlorobenzidine	260 U	260	83.1
99-09-2	3-Nitroaniline	260 U	260	27.5
534-52-1	4,6-Dinitro-2-Methylphenol	260 U	260	6.77
101-55-3	4-Bromophenyl Phenylether	260 U	260	5.07
59-50-7	**4-Chloro-3-Methylphenol**	**44 J**	260	7.82
106-47-8	4-Chloroaniline	260 U	260	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	260 U	260	4.91
106-44-5	4-Methylphenol	260 U	260	9.56
100-01-6	4-Nitroaniline	260 U	260	10.9
100-02-7	4-Nitrophenol	500 U	500	4.25
83-32-9	Acenaphthene	260 U	260	2.58
208-96-8	Acenaphthylene	260 U	260	2.25
98-86-2	Acetophenone	260 U	260	2.85

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1C**	QC Batch:	90210 -110
Sample #:	**345624**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	260 U		260	6.93
1912-24-9	Atrazine	260 U		260	10.3
100-52-7	Benzaldehyde	260 U		260	6.08
56-55-3	Benzo (a) Anthracene	260 U		260	20.0
50-32-8	Benzo (a) Pyrene	260 U		260	8.57
205-99-2	Benzo (b) Fluoranthene	260 U		260	14.6
191-24-2	Benzo (g,h,i,) Perylene	260 U		260	13.1
207-08-9	Benzo (k) Fluoranthene	260 U		260	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	260 U		260	4.71
111-44-4	Bis (2-Chloroethyl) Ether	260 U		260	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**63 J**		260	3.11
85-68-7	**Butyl Benzyl Phthalate**	**30 J**		260	6.72
105-60-2	**Caprolactam**	**36 J**		500	9.57
86-74-8	Carbazole	260 U		260	9.15
218-01-9	Chrysene	260 U		260	15.3
53-70-3	Dibenzo (a,h) Anthracene	260 U		260	8.85
132-64-9	Dibenzofuran	260 U		260	4.74
84-66-2	**Diethylphthalate**	**12 J**	B,X	260	2.85
131-11-3	Dimethylphthalate	260 U		260	4.97
84-74-2	**Di-n-Butylphthalate**	**410**		260	5.73
117-84-0	Di-n-Octylphthalate	260 U		260	4.65
206-44-0	Fluoranthene	260 U		260	3.53
86-73-7	Fluorene	260 U		260	2.52
118-74-1	Hexachlorobenzene	260 U		260	3.77
87-68-3	Hexachlorobutadiene	260 U		260	5.81
77-47-4	Hexachlorocyclopentadiene	260 U		260	2.97
67-72-1	Hexachloroethane	260 U		260	3.50
193-39-5	Indeno (1,2,3-cd) Pyrene	260 U		260	5.88
78-59-1	Isophorone	260 U		260	2.60
91-20-3	Naphthalene	260 U		260	4.13
98-95-3	Nitrobenzene	260 U		260	4.80

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1C**	QC Batch:	90210 -110
Sample #:	**345624**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	260 U	260	4.94
86-30-6	N-Nitroso-di-Phenylamine	260 U	260	7.13
87-86-5	Pentachlorophenol	500 U	500	6.59
85-01-8	Phenanthrene	260 U	260	3.45
108-95-2	Phenol	260 U	260	5.94
129-00-0	Pyrene	260 U	260	2.22

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1C**	QC Batch:	90210 -110
Sample #:	**345624**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	79	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl cyclohexyl ester	84-64-0	470	E	NJ,+
Bis(2-ethylhexyl)maleate	142-16-5	120	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~2800~~	~~E~~	
Stearic Acid	57-11-4	110	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3A**	QC Batch:	90210 -110
Sample #:	**345625**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	**2-Methylnaphthalene**	**6.0 J**	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**46 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	**Acenaphthylene**	**4.0 J**	220	1.95
98-86-2	**Acetophenone**	**36 J**	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3A**	QC Batch:	90210 -110
Sample #:	**345625**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**12 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**20 J**		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**480**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	**Caprolactam**	**43 J**		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**23 J**		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**19 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**360**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**40 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**7.0 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	**Naphthalene**	**4.0 J**		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3A**	QC Batch:	90210 -110
Sample #:	**345625**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**27 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**40 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3A**	QC Batch:	90210 -110
Sample #:	**345625**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	1300	E	NJ,t
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	390	E	NJ,t
1,2-Benzenedicarboxylic acid, butyl cyclohexyl ester	84-64-0	330	E	NJ,t
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~4000~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SBD6**	QC Batch:	90210 -110
Sample #:	**345626**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	**2-Methylnaphthalene**	**12 J**		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**38 J**		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	**Acenaphthylene**	**9.0 J**		220	1.95
98-86-2	**Acetophenone**	**75 J**		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD6**	QC Batch:	90210 -110
Sample #:	**345626**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**9.0 J**		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**20 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**35 J**		220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**15 J**		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**62 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	**Caprolactam**	**25 J**		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**22 J**		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**21 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**230**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**45 J**		220	3.06
86-73-7	**Fluorene**	**3.0 J**		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**12 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	**Naphthalene**	**6.0 J**		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD6**	QC Batch:	90210 -110
Sample #:	**345626**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**50 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**44 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD6**	QC Batch:	90210 -110
Sample #:	**345626**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	760	E	NJ1+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	530	E	NJ1+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~590~~	~~E~~	
Phosphoric acid, tris (3-methylphenyl) ester	78-30-8	1400	E	NJ1+
Phsophoric acid, tris(3-methylphenyl) ester	563-04-2	560	E	NJ1+
~~Total PCB's~~	~~XXX PCB~~	~~1100~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3B**	QC Batch:	90482 -114
Sample #:	**345627**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	270 U		270	3.94
95-94-3	1,2,4,5-Tetrachloro-benzene	270 U		270	45.9
108-60-1	Bis (2-Chloroisopropyl)-Ether	270 U		270	2.11
95-95-4	2,4,5-Trichlorophenol	270 U		270	5.34
88-06-2	2,4,6-Trichlorophenol	270 U		270	4.19
120-83-2	2,4-Dichlorophenol	270 U		270	5.63
105-67-9	2,4-Dimethylphenol	270 U		270	12.7
51-28-5	2,4-Dinitrophenol	530 U		530	5.12
121-14-2	2,4-Dinitrotoluene	270 U		270	5.04
606-20-2	2,6-Dinitrotoluene	270 U		270	44.3
91-58-7	2-Chloronaphthalene	270 U		270	3.68
95-57-8	2-Chlorophenol	270 U		270	3.22
91-57-6	2-Methylnaphthalene	270 U		270	4.38
95-48-7	2-Methylphenol	270 U		270	7.74
88-74-4	2-Nitroaniline	270 U		270	7.36
88-75-5	2-Nitrophenol	270 U		270	2.72
91-94-1	3,3'-Dichlorobenzidine	270 U		270	107
99-09-2	3-Nitroaniline	270 U		270	53.3
534-52-1	4,6-Dinitro-2-Methylphenol	270 U		270	7.22
101-55-3	4-Bromophenyl Phenylether	270 U		270	5.41
59-50-7	**4-Chloro-3-Methylphenol**	**16 J**	B,X	270	8.34
106-47-8	4-Chloroaniline	270 U	JJC	270	2.02
7005-72-3	4-Chlorophenylphenyl-Ether	270 U		270	5.23
106-44-5	4-Methylphenol	270 U		270	10.2
100-01-6	4-Nitroaniline	270 U		270	11.6
100-02-7	4-Nitrophenol	530 U		530	4.53
83-32-9	Acenaphthene	270 U		270	2.75
208-96-8	Acenaphthylene	270 U		270	2.40
98-86-2	Acetophenone	270 U		270	3.04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3B**	QC Batch:	90482 -114
Sample #:	**345627**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	270 U		270	7.39
1912-24-9	Atrazine	270 U		270	11.0
100-52-7	Benzaldehyde	270 U	U,J,C	270	6.48
56-55-3	Benzo (a) Anthracene	270 U		270	21.3
50-32-8	Benzo (a) Pyrene	270 U		270	9.14
205-99-2	Benzo (b) Fluoranthene	270 U		270	15.6
191-24-2	Benzo (g,h,i,) Perylene	270 U		270	14.0
207-08-9	Benzo (k) Fluoranthene	270 U		270	21.4
111-91-1	Bis (2-Chloroethoxy)-Methane	270 U		270	5.02
111-44-4	Bis (2-Chloroethyl) Ether	270 U		270	2.77
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**60 J**	B,Z	270	3.31
85-68-7	Butyl Benzyl Phthalate	270 U		270	7.17
105-60-2	Caprolactam	530 U		530	10.2
86-74-8	Carbazole	270 U		270	9.76
218-01-9	Chrysene	270 U		270	16.3
53-70-3	Dibenzo (a,h) Anthracene	270 U		270	9.44
132-64-9	Dibenzofuran	270 U		270	5.06
84-66-2	Diethylphthalate	270 U		270	3.04
131-11-3	Dimethylphthalate	270 U		270	5.30
84-74-2	**Di-n-Butylphthalate**	**55 J**	B,Z	270	6.11
117-84-0	Di-n-Octylphthalate	270 U		270	4.96
206-44-0	Fluoranthene	270 U		270	3.76
86-73-7	Fluorene	270 U		270	2.69
118-74-1	Hexachlorobenzene	270 U		270	4.02
87-68-3	Hexachlorobutadiene	270 U		270	6.19
77-47-4	Hexachlorocyclopentadiene	270 U		270	3.17
67-72-1	Hexachloroethane	270 U		270	3.73
193-39-5	Indeno (1,2,3-cd) Pyrene	270 U		270	6.27
78-59-1	Isophorone	270 U		270	2.77
91-20-3	Naphthalene	270 U		270	4.40
98-95-3	Nitrobenzene	270 U		270	5.12

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3B**	QC Batch:	90482 -114
Sample #:	**345627**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	270 U	270	5.26
86-30-6	N-Nitroso-di-Phenylamine	270 U	270	7.60
87-86-5	Pentachlorophenol	530 U	530	7.02
85-01-8	Phenanthrene	270 U	270	3.68
108-95-2	Phenol	270 U	270	6.34
129-00-0	Pyrene	270 U	270	2.37

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3B**	QC Batch:	90482 -114
Sample #:	**345627**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	56	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	110	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 100014-39-24	28	E	NJ,+
Erucylamide	112-84-5	630	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~220~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3C**	QC Batch:	90482 -114
Sample #:	**345628**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3C**	QC Batch:	90482 -114
Sample #:	**345628**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJC	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**52 J**	B,Z	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**7.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**38 J**	B,Z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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Individual sample results relate only to the sample tested.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3C**	QC Batch:	90482 -114
Sample #:	**345628**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3C**	QC Batch:	90482 -114
Sample #:	**345628**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	60	E	NJ,t
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	32	E	NJ,t
1-Heptadecanol	1454-85-9	37	E	NJ,t
Erucylamide	112-84-5	340	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~250~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2A**	QC Batch:	90482 -114
Sample #:	**345629**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	BX	220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	**Acenaphthylene**	**2.0 J**	J,1	220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2A**	QC Batch:	90482 -114
Sample #:	**345629**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,C	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**30 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**55 J**	J,1	220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**62 J**	B,Z	220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**44 J**		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**7.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**55 J**	B,Z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**26 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**42 J**	J,1	220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2A**	QC Batch:	90482 -114
Sample #:	**345629**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**18 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**38 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2A**	QC Batch:	90482 -114
Sample #:	**345629**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	51	E	NJ+
Erucylamide	112-84-5	600	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~460~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB2B**	QC Batch:	90572 -114
Sample #:	**345630**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**16 J**	BX	220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,C	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2B**	QC Batch:	90572 -114
Sample #:	**345630**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**20 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**12 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**44 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2B**	QC Batch:	90572 -114
Sample #:	**345630**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB2B**	QC Batch:	90572 -114
Sample #:	**345630**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	38	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	68	E	NJ+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~290~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2C**	QC Batch:	90482 -114
Sample #:	**345631**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB2C**	QC Batch:	90482 -114
Sample #:	**345631**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,c	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**48 J**	B,z	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**5.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**38 J**	B,z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2C**	QC Batch:	90482 -114
Sample #:	**345631**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2C**	QC Batch:	90482 -114
Sample #:	**345631**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	80	E	NJ,t
1,2-Benzenedicarboxylic acid, butyl 8-methylnonyl ester	89-18-9	34	E	NJ,t
1-Hexadecanol	36653-82-4	31	E	NJ,t
1-Pentadecanol	629-76-5	52	E	NJ,t
Erucylamide	112-84-5	330	E	B,x
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~210~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB4A**	QC Batch:	90482 -114
Sample #:	**345737**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U		460	4.48
121-14-2	2,4-Dinitrotoluene	240 U		240	4.41
606-20-2	2,6-Dinitrotoluene	240 U		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	2-Methylnaphthalene	240 U		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	77.6
99-09-2	3-Nitroaniline	240 U		240	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**17 J**	B,X	240	7.29
106-47-8	4-Chloroaniline	240 U	UJ,C	240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	Acenaphthene	240 U		240	2.41
208-96-8	Acenaphthylene	240 U		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB4A**	QC Batch:	90482 -114
Sample #:	**345737**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U		240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**21 J**	B/Z	240	2.90
85-68-7	Butyl Benzyl Phthalate	240 U		240	6.27
105-60-2	Caprolactam	460 U		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**11 J**	B/X	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**41 J**	B/Z	240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	Fluoranthene	240 U		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB4A**	QC Batch:	90482 -114
Sample #:	**345737**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB4A**	QC Batch:	90482 -114
Sample #:	**345737**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	41	E	B,X
1-Octadecanol	112-92-5	31	E	NJ,t
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	65	E	NJ,t
Erucylamide	112-84-5	320	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~400~~	~~E~~	
Oxirane, hexadecyl-	7390-81-0	58	E	NJ,t
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	29	E	NJ,t
Stearic Acid	57-11-4	40	E	NJ,t

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1A**	QC Batch:	90482 -114
Sample #:	**345738**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	420 U	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**10 J** B,X	220	6.77
106-47-8	4-Chloroaniline	220 U UJ,C	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	420 U	420	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1A**	QC Batch:	90482 -114
Sample #:	**345738**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**21 J**	B/2	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**8.0 J**	B/X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**300**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1A**	QC Batch:	90482 -114
Sample #:	**345738**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1A**	QC Batch:	90482 -114
Sample #:	**345738**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	28	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	43	E	NJ,I
Erucylamide	112-84-5	190	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~300~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1B**	QC Batch:	90482 -114
Sample #:	**345739**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U		400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**27 J**		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,c	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1B**	QC Batch:	90482 -114
Sample #:	**345739**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**19 J**	B,Z	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**8.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**63 J**	B,Z	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1B**	QC Batch:	90482 -114
Sample #:	**345739**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1B**	QC Batch:	90482 -114
Sample #:	**345739**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,1'-Biphenyl, bis(1-methylethyl)-	69009-90-1	65	E	NJ+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	52	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	74	E	NJ+
Erucylamide	112-84-5	410	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~370~~	~~E~~	
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	380	E	NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1C**	QC Batch:	90482 -114
Sample #:	**345740**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	440 U		440	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U		230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,c	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	**4-Methylphenol**	**10 J**		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	440 U		440	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1C**	QC Batch:	90482 -114
Sample #:	**345740**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	Benzo (a) Anthracene	230 U		230	18.6
50-32-8	Benzo (a) Pyrene	230 U		230	7.99
205-99-2	Benzo (b) Fluoranthene	230 U		230	13.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**15 J**	B,2	230	2.90
85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
105-60-2	Caprolactam	440 U		440	8.93
86-74-8	Carbazole	230 U		230	8.54
218-01-9	Chrysene	230 U		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**9.0 J**	B,X	230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**38 J**	B,2	230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	Fluoranthene	230 U		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U		230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1C**	QC Batch:	90482 -114
Sample #:	**345740**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	440 U	440	6.15
85-01-8	Phenanthrene	230 U	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	Pyrene	230 U	230	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1C**	QC Batch:	90482 -114
Sample #:	**345740**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	200	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	38	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	45	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~560~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3A**	QC Batch:	90482 -114
Sample #:	**345741**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	66.5
99-09-2	3-Nitroaniline	200 U		200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**23 J**	B,X	200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,C	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3A**	QC Batch:	90482 -114
Sample #:	**345741**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**19 J**	B,Z	200	2.48
85-68-7	**Butyl Benzyl Phthalate**	**6.0 J**		200	5.38
105-60-2	**Caprolactam**	**14 J**		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**8.0 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**61 J**	B,Z	200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	**Fluoranthene**	**27 J**		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3A**	QC Batch:	90482 -114
Sample #:	**345741**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	**Phenanthrene**	**5.0 J**	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**14 J**	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3A**	QC Batch:	90482 -114
Sample #:	**345741**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	48	E	B/X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	59	E	NJ,+
3-Carene	13466-78-9	48	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~770~~	~~E~~	
Phenol, 2,6-dimethoxy-4-(2-propenyl)-	6627-88-9	58	E	NJ,+
beta-Pinene	127-91-3	120	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SBD7**	QC Batch:	90482 -114
Sample #:	**345742**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U	UJ,C	400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**21 J**	B,X	210	6.25
106-47-8	4-Chloroaniline	210 U		210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD7**	QC Batch:	90482 -114
Sample #:	**345742**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**19 J**	B,Z	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**5.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**63 J**	B,Z	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**6.0 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U	UJ,C	210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD7**	QC Batch:	90482 -114
Sample #:	**345742**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**7.0 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**7.0 J**	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD7**	QC Batch:	90482 -114
Sample #:	**345742**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	48	E	B,X
2,4-bis(1,1-Dimethylethy-1)-phenol	96-76-4	20	E	NJ,T
Erucylamide	112-84-5	460	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~260~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3B**	QC Batch:	90482 -114
Sample #:	**345743**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U		400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**28 J**		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ/c	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3B**	QC Batch:	90482 -114
Sample #:	**345743**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**20 J**	B,Z	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**6.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**65 J**	B,Z	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3B**	QC Batch:	90482 -114
Sample #:	**345743**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3B**	QC Batch:	90482 -114
Sample #:	**345743**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	620	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	63	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	78	E	NJ,+
2,4-bis(1,1-Dimethylethy-1)-phenol	96-76-4	24	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 100014-39-24	21	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3C**	QC Batch:	90482 -114
Sample #:	**345744**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	440 U		440	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**11 J**	B/X	230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	440 U		440	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3C**	QC Batch:	90482 -114
Sample #:	**345744**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	Benzo (a) Anthracene	230 U		230	18.6
50-32-8	Benzo (a) Pyrene	230 U		230	7.99
205-99-2	Benzo (b) Fluoranthene	230 U		230	13.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**17 J**	B,Z	230	2.90
85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
105-60-2	Caprolactam	440 U		440	8.93
86-74-8	Carbazole	230 U		230	8.54
218-01-9	Chrysene	230 U		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**6.0 J**	B,X	230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**80 J**	B,Z	230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	Fluoranthene	230 U		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U		230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3C**	QC Batch:	90482 -114
Sample #:	**345744**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	440 U	440	6.15
85-01-8	Phenanthrene	230 U	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	Pyrene	230 U	230	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3C**	QC Batch:	90482 -114
Sample #:	**345744**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	63	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	48	E	B,X
1-Decanol, 2-hexyl-	2425-77-6	39	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	46	E	NJ,+
Squalene	7683-64-9	61	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB3A**	QC Batch:	90709 -114
Sample #:	**345619**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	UL,S	120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	**Chrysene**	**2.0 J**	L,S	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	UL,S	25	1.68
206-44-0	**Fluoranthene**	**5.2 J**	L,S	25	2.04
86-73-7	Fluorene	25 U	UL,S	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	**Pyrene**	**5.8 J**	L,S	25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB3B**	QC Batch:	90709 -114
Sample #:	**345620**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	VL,S	130	12.2
208-96-8	Acenaphthylene	280 U		280	15.1
120-12-7	Anthracene	28 U		28	0.910
56-55-3	Benzo (a) Anthracene	28 U		28	1.04
50-32-8	Benzo (a) Pyrene	28 U		28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.30
218-01-9	Chrysene	28 U		28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.82
206-44-0	Fluoranthene	28 U		28	2.21
86-73-7	Fluorene	28 U		28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	28 U		28	0.780
129-00-0	Pyrene	28 U		28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB3C**	QC Batch:	90709 -114
Sample #:	**345621**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	VL,S	130	12.2
208-96-8	Acenaphthylene	270 U		270	15.1
120-12-7	Anthracene	27 U		27	0.910
56-55-3	Benzo (a) Anthracene	27 U		27	1.04
50-32-8	Benzo (a) Pyrene	27 U		27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U		27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U		27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U		27	1.30
218-01-9	Chrysene	27 U		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U		27	1.82
206-44-0	Fluoranthene	27 U		27	2.21
86-73-7	Fluorene	27 U		27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U		27	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	27 U		27	0.780
129-00-0	Pyrene	27 U		27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB1A**	QC Batch:	90709 -114
Sample #:	**345622**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	VL,S	120	11.3
208-96-8	Acenaphthylene	240 U	⊥	240	13.9
120-12-7	**Anthracene**	**1.9 J**	L,S	24	0.840
56-55-3	Benzo (a) Anthracene	24 U	VL,S	24	0.960
50-32-8	**Benzo (a) Pyrene**	**18 J**	L,S	24	1.20
205-99-2	**Benzo (b) Fluoranthene**	**14 J**	L,S	24	1.56
191-24-2	**Benzo (g,h,i,) Perylene**	**27**	L,S	24	15.0
207-08-9	**Benzo (k) Fluoranthene**	**8.5 J**	L,S	24	1.20
218-01-9	**Chrysene**	**11 J**	L,S	24	1.44
53-70-3	Dibenzo (a,h) Anthracene	24 U	VL,S	24	1.68
206-44-0	**Fluoranthene**	**57**	L,S	24	2.04
86-73-7	Fluorene	24 U	VL,S	24	1.56
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**11 J**	L,S	24	0.840
91-20-3	Naphthalene	120 U	VL,S	120	9.48
85-01-8	**Phenanthrene**	**24**	L,S	24	0.720
129-00-0	**Pyrene**	**82**	L,S	24	1.08

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB1B**	QC Batch:	90709 -114
Sample #:	**345623**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.2
208-96-8	Acenaphthylene	280 U		280	15.1
120-12-7	Anthracene	28 U		28	0.910
56-55-3	Benzo (a) Anthracene	28 U		28	1.04
50-32-8	Benzo (a) Pyrene	28 U		28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.30
218-01-9	Chrysene	28 U		28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.82
206-44-0	Fluoranthene	28 U		28	2.21
86-73-7	Fluorene	28 U		28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	28 U		28	0.780
129-00-0	Pyrene	28 U		28	1.17

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/30/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**57SB1C**	QC Batch:	90709 -114
Sample #:	**345624**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	14.1
208-96-8	Acenaphthylene	310 U	310	17.4
120-12-7	Anthracene	31 U	31	1.05
56-55-3	Benzo (a) Anthracene	31 U	31	1.20
50-32-8	Benzo (a) Pyrene	31 U	31	1.50
205-99-2	Benzo (b) Fluoranthene	31 U	31	1.95
191-24-2	Benzo (g,h,i,) Perylene	31 U	31	18.8
207-08-9	Benzo (k) Fluoranthene	31 U	31	1.50
218-01-9	Chrysene	31 U	31	1.80
53-70-3	Dibenzo (a,h) Anthracene	31 U	31	2.10
206-44-0	Fluoranthene	31 U	31	2.55
86-73-7	Fluorene	31 U	31	1.95
193-39-5	Indeno (1,2,3-cd) Pyrene	31 U	31	1.05
91-20-3	Naphthalene	150 U	150	11.9
85-01-8	Phenanthrene	31 U	31	0.900
129-00-0	Pyrene	31 U	31	1.35

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/19/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**57SB3A**	QC Batch:	90709 -114
Sample #:	**345625**	Anal. Batch:	209783
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	110 U	110	10.3
208-96-8	Acenaphthylene	240 U	240	12.8
120-12-7	**Anthracene**	**1.6 J**	24	0.770
56-55-3	Benzo (a) Anthracene	24 U	24	0.880
50-32-8	Benzo (a) Pyrene	24 U	24	1.10
205-99-2	Benzo (b) Fluoranthene	24 U	24	1.43
191-24-2	Benzo (g,h,i,) Perylene	24 U	24	13.8
207-08-9	Benzo (k) Fluoranthene	24 U	24	1.10
218-01-9	**Chrysene**	**5.2 J**	24	1.32
53-70-3	Dibenzo (a,h) Anthracene	24 U	24	1.54
206-44-0	**Fluoranthene**	**46**	24	1.87
86-73-7	Fluorene	24 U	24	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U	24	0.770
91-20-3	Naphthalene	110 U	110	8.69
85-01-8	**Phenanthrene**	**18 J**	24	0.660
129-00-0	**Pyrene**	**31**	24	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD6**	QC Batch:	90709 -114
Sample #:	**345626**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.2
208-96-8	Acenaphthylene	280 U	〃	280	15.1
120-12-7	**Anthracene**	**3.0 J**	L,S	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	UL,S	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	|	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	|	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	|	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	〃	28	1.30
218-01-9	**Chrysene**	**12 J**	L,S	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	UL,S	28	1.82
206-44-0	**Fluoranthene**	**84**	L,S	28	2.21
86-73-7	Fluorene	28 U	UL,S	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	|	28	0.910
91-20-3	Naphthalene	130 U	〃	130	10.3
85-01-8	**Phenanthrene**	**30**	L,S	28	0.780
129-00-0	**Pyrene**	**54**	〃	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB3B**	QC Batch:	90834 -115
Sample #:	**345627**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	160 U	UL,S	160	15.0
208-96-8	Acenaphthylene	330 U		330	18.6
120-12-7	Anthracene	33 U		33	1.12
56-55-3	Benzo (a) Anthracene	33 U		33	1.28
50-32-8	Benzo (a) Pyrene	33 U		33	1.60
205-99-2	Benzo (b) Fluoranthene	33 U		33	2.08
191-24-2	Benzo (g,h,i,) Perylene	33 U		33	20.0
207-08-9	Benzo (k) Fluoranthene	33 U		33	1.60
218-01-9	Chrysene	33 U		33	1.92
53-70-3	Dibenzo (a,h) Anthracene	33 U		33	2.24
206-44-0	Fluoranthene	33 U		33	2.72
86-73-7	Fluorene	33 U		33	2.08
193-39-5	Indeno (1,2,3-cd) Pyrene	33 U		33	1.12
91-20-3	Naphthalene	160 U		160	12.6
85-01-8	Phenanthrene	33 U		33	0.960
129-00-0	Pyrene	33 U		33	1.44

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Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**57SB3C**	QC Batch:	90834 -115
Sample #:	**345628**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**57SB2A**	QC Batch:	90834 -115
Sample #:	**345629**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	**Anthracene**	**1.5 J**	28	0.910
56-55-3	**Benzo (a) Anthracene**	**7.1 J**	28	1.04
50-32-8	**Benzo (a) Pyrene**	**10 J**	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	**Chrysene**	**9.2 J**	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	**Fluoranthene**	**29**	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**7.2 J**	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**11 J**	28	0.780
129-00-0	**Pyrene**	**20 J**	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB2B**	QC Batch:	90834 -115
Sample #:	**345630**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB2C**	QC Batch:	90834 -115
Sample #:	**345631**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.4
208-96-8	Acenaphthylene	280 U		280	15.3
120-12-7	Anthracene	28 U		28	0.924
56-55-3	Benzo (a) Anthracene	28 U		28	1.06
50-32-8	Benzo (a) Pyrene	28 U		28	1.32
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.72
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	16.5
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.32
218-01-9	Chrysene	28 U		28	1.58
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.85
206-44-0	Fluoranthene	28 U		28	2.24
86-73-7	Fluorene	28 U		28	1.72
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.924
91-20-3	Naphthalene	130 U		130	10.4
85-01-8	Phenanthrene	28 U		28	0.792
129-00-0	Pyrene	28 U		28	1.19

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB4A**	QC Batch:	90834 -115
Sample #:	**345737**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	300 U	300	16.2
120-12-7	Anthracene	30 U	30	0.980
56-55-3	Benzo (a) Anthracene	30 U	30	1.12
50-32-8	Benzo (a) Pyrene	30 U	30	1.40
205-99-2	Benzo (b) Fluoranthene	30 U	30	1.82
191-24-2	Benzo (g,h,i,) Perylene	30 U	30	17.5
207-08-9	Benzo (k) Fluoranthene	30 U	30	1.40
218-01-9	Chrysene	30 U	30	1.68
53-70-3	Dibenzo (a,h) Anthracene	30 U	30	1.96
206-44-0	Fluoranthene	30 U	30	2.38
86-73-7	Fluorene	30 U	30	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U	30	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	30 U	30	0.840
129-00-0	Pyrene	30 U	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB1A**	QC Batch:	90834 -115
Sample #:	**345738**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.2
208-96-8	Acenaphthylene	270 U		270	15.1
120-12-7	Anthracene	27 U		27	0.910
56-55-3	Benzo (a) Anthracene	27 U		27	1.04
50-32-8	Benzo (a) Pyrene	27 U		27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U		27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U		27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U		27	1.30
218-01-9	Chrysene	27 U		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U		27	1.82
206-44-0	Fluoranthene	27 U		27	2.21
86-73-7	Fluorene	27 U		27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U		27	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	27 U		27	0.780
129-00-0	Pyrene	27 U		27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB1B**	QC Batch:	90834 -115
Sample #:	**345739**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	260 U	260	13.9
120-12-7	Anthracene	26 U	26	0.840
56-55-3	Benzo (a) Anthracene	26 U	26	0.960
50-32-8	Benzo (a) Pyrene	26 U	26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.20
218-01-9	Chrysene	26 U	26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.68
206-44-0	Fluoranthene	26 U	26	2.04
86-73-7	Fluorene	26 U	26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	Phenanthrene	26 U	26	0.720
129-00-0	Pyrene	26 U	26	1.08

UL,S

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**69SB1C**	QC Batch:	90834 -115
Sample #:	**345740**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	UL,S	140	13.2
208-96-8	Acenaphthylene	280 U		280	16.2
120-12-7	Anthracene	28 U		28	0.980
56-55-3	Benzo (a) Anthracene	28 U		28	1.12
50-32-8	Benzo (a) Pyrene	28 U		28	1.40
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.82
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	17.5
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.40
218-01-9	Chrysene	28 U		28	1.68
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.96
206-44-0	Fluoranthene	28 U		28	2.38
86-73-7	Fluorene	28 U		28	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.980
91-20-3	Naphthalene	140 U		140	11.1
85-01-8	Phenanthrene	28 U		28	0.840
129-00-0	Pyrene	28 U		28	1.26

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-4**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**69SB3A**
Sample #:	**345741**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/08/03 @ 14:15
Sampler:	B.F. & J.S.
Received:	10/09/03 @ 08:40
Prepared:	10/15/03 by DJM
Prep. Method:	USEPA-8310
Analyzed:	10/28/03 by TAJ
Anal. Method:	USEPA-8310
QC Batch:	90834 -115
Anal. Batch:	208739
Percent Solids:	84
Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	250 U	250	13.9
120-12-7	Anthracene	25 U	25	0.840
56-55-3	Benzo (a) Anthracene	25 U	25	0.960
50-32-8	Benzo (a) Pyrene	25 U	25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U	25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U	25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U	25	1.20
218-01-9	Chrysene	25 U	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	25	1.68
206-44-0	**Fluoranthene**	**3.8 J**	25	2.04
86-73-7	Fluorene	25 U	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U	25	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	**Phenanthrene**	**1.6 J**	25	0.720
129-00-0	**Pyrene**	**2.9 J**	25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD7**	QC Batch:	90834 -115
Sample #:	**345742**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	VL,S	120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U		25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB3B**	QC Batch:	90834 -115
Sample #:	**345743**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	VL,S	120	11.3
208-96-8	Acenaphthylene	260 U		260	13.9
120-12-7	Anthracene	26 U		26	0.840
56-55-3	Benzo (a) Anthracene	26 U		26	0.960
50-32-8	Benzo (a) Pyrene	26 U		26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U		26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.20
218-01-9	Chrysene	26 U		26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.68
206-44-0	Fluoranthene	26 U		26	2.04
86-73-7	Fluorene	26 U		26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	26 U		26	0.720
129-00-0	Pyrene	26 U		26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB3C**	QC Batch:	90834 -115
Sample #:	**345744**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	280 U	280	16.2
120-12-7	Anthracene	28 U	28	0.980
56-55-3	Benzo (a) Anthracene	28 U	28	1.12
50-32-8	Benzo (a) Pyrene	28 U	28	1.40
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.82
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	17.5
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.40
218-01-9	Chrysene	28 U	28	1.68
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.96
206-44-0	Fluoranthene	28 U	28	2.38
86-73-7	Fluorene	28 U	28	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	28 U	28	0.840
129-00-0	Pyrene	28 U	28	1.26

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Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**68SB3A**	QC Batch:	90259 -115
Sample #:	**345619**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**68SB3B**	QC Batch:	90259 -115
Sample #:	**345620**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**68SB3C**	QC Batch:	90259 -115
Sample #:	**345621**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	73
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB1A**	QC Batch:	90259 -115
Sample #:	**345622**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	86
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	UJ,C	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB1B**	QC Batch:	90259 -115
Sample #:	**345623**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U		1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	UJ,c	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-4**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**57SB1C**
Sample #:	**345624**
Matrix:	Soil
Unit:	mg/kg dry

Sampled:	10/07/03 @ 10:30
Sampler:	B.F. & J.S.
Received:	10/08/03 @ 08:50
Prepared:	10/15/03 by DJM
Prep. Method:	USEPA-8330
Analyzed:	10/27/03 by JMK1
Anal. Method:	USEPA-8330
QC Batch:	90259 -115
Anal. Batch:	208354
Percent Solids:	67
Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	UJ,C	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB3A**	QC Batch:	90508 -116
Sample #:	**345625**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U		1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**SBD6**	QC Batch:	90259 -115
Sample #:	**345626**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	UJ,C	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB3B**	QC Batch:	90508 -116
Sample #:	**345627**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	63
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U		1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	VJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB3C**	QC Batch:	90508 -116
Sample #:	**345628**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**57SB2A**	QC Batch:	90508 -116
Sample #:	**345629**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB2B**	QC Batch:	90508 -116
Sample #:	**345630**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB2C**	QC Batch:	90508 -116
Sample #:	**345631**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**57SB4A**	QC Batch:	90508 -116
Sample #:	**345737**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**	Prepared:	10/16/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/23/03 by JMK1
Sample ID:	**69SB1A**	Anal. Method:	USEPA-8330
Sample #:	**345738**	QC Batch:	90508 -116
Matrix:	Soil	Anal. Batch:	208166
Unit:	mg/kg dry	Percent Solids:	78
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**69SB1B**	QC Batch:	90508 -116
Sample #:	**345739**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB1C**	QC Batch:	90508 -116
Sample #:	**345740**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	74
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	VJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB3A**	QC Batch:	90508 -116
Sample #:	**345741**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	VJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**SBD7**	QC Batch:	90508 -116
Sample #:	**345742**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB3B**	QC Batch:	90508 -116
Sample #:	**345743**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**69SB3C**	QC Batch:	90508 -116
Sample #:	**345744**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	74
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**57SB4A**	QC Batch:	90181 -116
Sample #:	**345737**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	28 U	28	0.357
72-55-9	4,4'-DDE	28 U	28	0.263
50-29-3	4,4'-DDT	28 U	28	0.270
309-00-2	Aldrin	28 U	28	0.456
319-84-6	Alpha-BHC	28 U	28	0.455
57-74-9	A-Chlordane	28 U	28	0.651
5103-74-2	G-Chlordane	28 U	28	1.05
319-85-7	Beta-BHC	28 U	28	1.70
319-86-8	Delta-BHC	28 U	28	1.23
60-57-1	Dieldrin	28 U	28	0.464
115-29-7	Endosulfan I	28 U	28	1.37
33213-65-9	Endosulfan II	28 U	28	0.321
1031-07-8	Endosulfan Sulfate	28 U	28	0.755
72-20-8	Endrin	28 U	28	0.447
7421-93-4	Endrin Aldehyde	28 U	28	1.67
53494-70-5	Endrin Ketone	28 U	28	0.413
58-89-9	Lindane	28 U	28	0.291
76-44-8	Heptachlor	28 U	28	1.06
1024-57-3	Heptachlor Epoxide	28 U	28	0.683
72-43-5	Methoxychlor	28 U	28	0.420
8001-35-2	Toxaphene	240 U	240	35.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**57SB4A**	QC Batch:	89881 -116
Sample #:	**345737**	Anal. Batch:	208229
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
12674-11-2	PCB-1016	93 U		93	22.4
11104-28-2	PCB-1221	46 U		46	2.80
11141-16-5	PCB-1232	46 U		46	7.00
53469-21-9	PCB-1242	46 U		46	4.20
12672-29-6	PCB-1248	46 U		46	7.00
11097-69-1	**PCB-1254**	**12 J**	J,g	46	4.20
11096-82-5	PCB-1260	46 U		46	9.80

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by MSN
		Anal. Method:	USEPA-8151A
Sample ID:	**57SB4A**	QC Batch:	90218 -110
Sample #:	**345737**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	70 U	70	2.80
93-72-1	2,4,5-TP (Silvex)	70 U	70	5.60
94-75-7	2,4-D	280 U	280	22.4
94-82-6	2,4-DB	280 U	280	86.8
75-99-0	Dalapon	350 U	350	79.8
1918-00-9	Dicamba	280 U	280	2.80
120-36-5	Dichlorprop	280 U	280	23.8
~~88-85-7~~	~~*Dinoseb~~	~~280 R~~	~~280~~	~~29.4~~
94-74-6	MCPA	28000 U	28000	1950
93-65-2	MCPP	28000 U	28000	7080

AS 2/12/04

* See attached Statement of Data Qualifications.

See re-extraction

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**57SB4A**	QC Batch:	90218 -110
Sample #:	**345737DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
~~93-76-5~~	~~2,4,5-T~~	~~70 U~~	~~70~~	~~2.80~~
93-72-1	2,4,5-TP (Silvex)	70 U	70	5.60
94-75-7	2,4-D	~~280 U~~	280	22.4
94-82-6	2,4-DB	280 U	280	86.8
75-99-0	Dalapon	350 U	350	79.8
1918-00-9	Dicamba	280 U	280	2.80
~~120-36-5~~	~~Dichlorprop~~	~~280 U~~	~~280~~	~~23.8~~
88-85-7	Dinoseb	280 U	280	29.4
~~94-74-6~~	~~MCPA~~	~~28000 U~~	~~28000~~	~~1950~~
~~93-65-2~~	~~MCPP~~	~~28000 U~~	~~28000~~	~~7080~~

Use only Dinoseb result, ~~TS~~ 2/12/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 08:10
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB3A**
Sample #: **345619**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	12200		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	13		0.50	0.0518	mg/kg dry	10/22/03	MSG	USEPA-6020
Arsenic, Total	2.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	111		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.63 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	5.6		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1600		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	40		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	10	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	8.6		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	16600		250	17.9	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	23		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	789		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	939		25	2.06	mg/kg dry	10/23/03	DSC	USEPA-6010B
Mercury, Total	0.028 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	8.8		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	640	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.65 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.054 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	28 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.16 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	31		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	128		20	2.59	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 08:30
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB3B**
Sample #: **345620**
Matrix: Soil

Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20400		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	1.7		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	6.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	25		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.91 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.4		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	248 J		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	18		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.8	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	20		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	45100		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	8.6		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1220		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	135		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.040 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	20		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1360	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.040 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	151		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.14 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	44		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	21		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 08:50
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB3C**
Sample #: **345621**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28600		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.094 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	7.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	70		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	2.7	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.6		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	31		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	20	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	21		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	42700		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	10		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	20600		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	497		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.030 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	46		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	4130	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.78 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	69 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	57		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 10:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB1A**
Sample #: **345622**
Matrix: Soil

Percent Solids: 86

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	11900		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	1.2		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	99		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.44 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	4440		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	20		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	5.8	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	4.9		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	13400		250	17.9	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2700		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	699		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.049 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	6.0		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	528	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.51 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.054 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	33 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.17 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	29		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	52		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 10:15
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB1B**
Sample #: **345623**
Matrix: Soil

Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	23800		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.21 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	56		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.58 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.8		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1030		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	28		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	8.7	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	13		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	41300		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	29		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1430		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	264		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.035 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1240	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.33 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.028 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	74 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.18 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	69		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	54		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 10:30
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB1C**
Sample #: **345624**
Matrix: Soil

Percent Solids: 67

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	38900		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.15 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	73		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.84 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	4.0		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	88		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	28		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	37300		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	5120		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	354		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.053 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	18		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	3290	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.71 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	343		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.24 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	58		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	97		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 11:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB3A**
Sample #: **345625**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28900		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	102		0.50	1.30	mg/kg dry	10/22/03	MSG	USEPA-6020
Arsenic, Total	5.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	107	J,f	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.45 J	J,s	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	27	J,f	1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1750	J,f	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	268	J,f	25	4.56	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Cobalt, Total	75	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	27		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	47100		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	175		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	1420		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	544		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.11		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	13		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	967	J,s	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.57 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	76 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.24 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	69		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	895	J,f	40	5.17	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD6**
Sample #: **345626**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	33000		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	104		0.50	1.30	mg/kg dry	10/22/03	MSC	USEPA-6020
Arsenic, Total	5.3		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	154	J,f	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.39 J	J,s	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	41	J,f	1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	2760	J,f	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	454	J,f	25	4.56	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Cobalt, Total	8.0	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	38		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	46500		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	268		50	1.09	mg/kg dry	10/28/03	JMF	USEPA-6020
Magnesium, Total	1990		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	514		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.13		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1060	J,s	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.64 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	97 J	B,p	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.24 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	67		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	1370	J,f	100	12.9	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 11:15
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB3B**
Sample #: **345627**
Matrix: Soil

Percent Solids: 63

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	37400	250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.29 J	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	12	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	62	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.4 J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.2	1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	43	5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	23 J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	38	1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	53400	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	4280	250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	518	5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.023 J	0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	28	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	3020 J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.55 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	339	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.28 J	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	59	1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	53	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 11:30
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB3C**
Sample #: **345628**
Matrix: Soil

Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	29600		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	5.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	52		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	2.0	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.87 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	294		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	31		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	18	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	17		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	35200		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	9.2		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	35000		1250	16.1	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Manganese, Total	828		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	50		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	5900	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.88 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	169		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.22 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	59		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	52		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB2A**
Sample #: **345629**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	32200		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	3.6		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	80		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.48 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	6.7		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1530		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	70		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	6.1	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	18		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	39700		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	49		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1560		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	361		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.16		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	968	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.69 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.10 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	312		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.25 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	76		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	160		20	2.59	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 14:20
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB2B**
Sample #: **345630**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	13900		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	39		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.1	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.46 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	9.3		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	26	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	15		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	34500		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	2.6		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
* Magnesium, Total	487		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
* Manganese, Total	1090		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.013 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	999	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.55 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.034 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	161		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
* Thallium, Total	0.11 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	18		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	9.3		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 14:40
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB2C**
Sample #: **345631**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21800		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.073 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	7.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	42		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	3.2	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.3		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	207 J		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	33		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	19	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	23		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	39500		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	9.8		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	22300		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	632		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	75		5.0	0.356	mg/kg dry	10/24/03	DWJ	USEPA-6020
Potassium, Total	4570	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.75 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	84 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.18 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	50		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	43		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 09:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB4A**
Sample #: **345737**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	30100		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	6.3		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.7		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	149		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.60 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1420		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	43		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.7	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	26		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	78700		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	923		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	3200		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.14		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	8.7		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	908	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.57 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.076 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	127		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.30 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	84		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	281		20	2.59	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 11:30
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1A**
Sample #: **345738**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	23700		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.35 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.8		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	76		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.34 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.53 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	346		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	36		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	14	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	10		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	34600		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	793		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	1470		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.13		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	10		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	810	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.36 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.043 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	27 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.30 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	63		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 11:45
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1B**
Sample #: **345739**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17200		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	9.3		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	50		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.30 J	J/S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.97 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	332		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	34		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	15	J/S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	9.4		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	26500		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	15		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	934		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	511		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.052 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1100	J/S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.38 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.036 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	2010		500	90.5	mg/kg dry	10/23/03	DSC	USEPA-6010B
Thallium, Total	0.20 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	53		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	28		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 12:00
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1C**
Sample #: **345740**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28400		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	1.7		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	12		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	65		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.1	J/S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.2		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	155 J		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	35		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.9	J/S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	25		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	32200		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	17		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	34600		1250	16.1	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Manganese, Total	247		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.042 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	33		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	8480	J/S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.66 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	2460		500	90.5	mg/kg dry	10/23/03	DSC	USEPA-6010B
Thallium, Total	0.43 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	66		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	55		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3A**
Sample #: **345741**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14000	J,f	50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	19		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	71		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.26 J	J,s	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.1		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	721		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	22		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	11	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	8.7		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	17100	J,f	250	17.9	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	25		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	997		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	914		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.041 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	8.5		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	813	J,s	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.40 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.051 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	110		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.26 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	35		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	45		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD7**
Sample #: **345742**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20400	J,f	50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	14		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.3		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	90		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.48 J	J,s	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.5		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	835		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	38		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	10	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	12		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	24800	J,f	500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	22		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1040		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	1010		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.078 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	879	J,s	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.60 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.050 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	116		100	18.1	mg/kg dry	10/23/03	DSC	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	49		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	61		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3B**
Sample #: **345743**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21700		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	12		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	54		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.37 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.77 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	521		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	49		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	23	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	14		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	33600		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	17		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2240		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	1020		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.069 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	15		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1510	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.29 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.045 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	393		100	18.1	mg/kg dry	10/23/03	DSC	USEPA-6010B
Thallium, Total	0.26 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	55		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:45
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3C**
Sample #: **345744**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	30400		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	6.1		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	8.3		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	63		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.7	J,S	1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	0.48 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	417		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	56		5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	16	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	27		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	46900		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	13		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	17800		250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	491		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.046 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	37		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	4180	J,S	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.74 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	544		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.26 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	59		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	48		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**68SB3A**		
Sample #:	**345619**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.16 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**68SB3B**		
Sample #:	**345620**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB3C**		
Sample #:	**345621**		
Matrix:	Soil	Percent Solids:	73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 10:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB1A**
Sample #: **345622**
Matrix: Soil

Percent Solids: 86

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	86	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.10 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB1B**		
Sample #:	**345623**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB1C**		
Sample #:	**345624**		
Matrix:	Soil	Percent Solids:	67

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	67	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB3A**		
Sample #:	**345625**		
Matrix:	Soil	Percent Solids:	77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.17 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**SBD6**		
Sample #:	**345626**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.16 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB3B**		
Sample #:	**345627**		
Matrix:	Soil	Percent Solids:	63

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	63	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.08 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB3C**		
Sample #:	**345628**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB2A**		
Sample #:	**345629**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.09 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB2B**		
Sample #:	**345630**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
* Cyanide, Total	0.08 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**57SB2C**		
Sample #:	**345631**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 09:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB4A**
Sample #: **345737**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.05 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 11:30
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1A**
Sample #: **345738**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 11:45
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1B**
Sample #: **345739**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**69SB1C**		
Sample #:	**345740**		
Matrix:	Soil	Percent Solids:	74

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	74	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.07 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3A**
Sample #: **345741**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**SBD7**		
Sample #:	**345742**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**69SB3B**		
Sample #:	**345743**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.06 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:45
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3C**
Sample #: **345744**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	74	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x acetone		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery							Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?						x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?						x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?								x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.								
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.								x
		1 or more <10%	1 high/low	2 or 3 high/low	2 or 3 all low	2 or 3 all high			
	Positives	L	J	J	L	K			
	Non-detects	R	UJ	UJ	UL	NONE			
	Note: The B qualifier remains over surrogate flagging.								

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

57SB2B CE MSD 74% (79), CS2 33/37% (53), Styrene MSD 48% (50), methylacetate 47/52% (70)

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively identified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 21			
	Number of target compounds in each analysis:50			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentrationof the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD ≤ 15%, ICV %D < 30%, and CCV %D ≤ 20%.		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ±50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine,hexachlorocyclopentadiene,2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	x		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?		x	
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?		x	
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		x	
	1 or more <10% / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / L / K Non-detects: R / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 10-150%?	x		
7.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 10-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?		x	
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentativelyidenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 21			
	Number of target compounds in each analysis:66			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: February-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	21			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	21			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer:	AS	**Project Name:**	Radford SSP
Date:	February-04	**Project Number:**	15291974.30000
DV Level:	II III IV	**Laboratory:**	TriMatrix
Review Document:		**SDG No.:**	36440-4
X SW-846 - 8081/8082		**Test Name:**	PEST/PCB
X NFG - Region III Modifications		**Method No.:**	8081A/8082
___ CLP			

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Preservation/ Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	x		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	x		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.				x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?				x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?						x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)						x
	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance			
	1 out	high/low	No action	No action			
	2 out	2 high same column	K	No action			
		2 low same column	L, UL	No action			
		mixed same column	J, UJ	No action			
		2 high diff columns	J	Not applicable			
		2 low diff columns	J, UJ	Not applicable			
		mixed diff columns	Professional judgement	Not applicable			
	3 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		2 high, 1 low	K (2 high)	J (1 low 2nd column)			
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)			
		other mixed	J, UJ	Not applicable			
	4 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		Mixed	J, UJ	Not applicable			
	If any recovery is >0% and <10% then L(+)/R(-).						
	If any recovery is 0% then R(+/-).						

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A/SBD1 submitted in SDG 36440-2, BDL for pest and 0.053/0.051 for Aroclor 1254.

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).		x	
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

Florisil cleanup was performed, no laboratory submission for these CLP descriptors was provided.

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	1	1			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: February-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

57SB4A collected on 10/08/03, re-extracted on 10/17/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		x	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		x	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD see SDG 36440-1

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A and SDB-3 submitted in SDG 36440-2 were both non-detect.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	1			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

Project Name: Radford SSP
SDG No.: 36440-4
Reviewer: AS
Project No.: 15291974.30000
Date: February-04

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{O}C \pm 2\ ^{O}C$)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x			x			x	

Note:

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7 + BLK			4 + BLK			5 + BLK			6 + BLK		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (labelled LCS by TriMatrix) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	x					x	x			x		
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K							passed within 70-130%			passed within 80-120%		

Note: A high point added to Al, Ba, Ca, Fe, Mg, Mn, & K curves and the RLs were elevated by 5.

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)												
	< -IDL > IDL < 50% 50% - 79% >120%												
	L(+)/UL(-) K(+) L(+)/R(-) L(+)/UL(-) K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x			x			x			x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x			x			x			x	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note:

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	x			x			x			x		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	x			x			x			x		

Note:

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous and lab limits for soil?												
	%R > 125% 30%< %R < 74% < 30%		x			x		x				x	
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x			x					x

Note: 57SB2B Mg by 6010B MSD 121% (111), Tl MSD 84% (87), CN 74% (80)

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	x				x							

Note: Serial Dilution: 57SB2B - Be, Co, K; post digestion spike recovery passes

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	x				x		x			x		

Note: _____

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: *69SB3C displayed yttrium internal at 148%. The sample was reanalyzed at DF5 elevating MDL but not RL as MDLx3 is still <RL.*

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples: 21												
13.1.2	Number of target compounds in each analysis: various												
13.1.3	Number of results rejected and not reported: 0												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%	100%			100%			100%			100%		

Note: _____

Vol Soil Fridge
Big Cart
№ 1152

Radford Army Ammunition Plant
Chain Of Custody Record

Project Number	Project Name
07804517	RFAAP

Project Contact (Name and Phone Number): Donna Rena (804) 731(5-9001)

Samplers: Brett Fisher / John Sponhour

LAB: Tri-Metrix

AIRBILL No: 000034

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] (8015) NERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
57563A	10/7/03 810	5		X	5	F	/	5	X	X	X			X		X							345619
57563B	10/7/03 830	5		X	5	F	/	5	X	X	X			X		X							345620
57563C	10/7/03 850	5		X	5	F	/	5	X	X	X			X		X							345621
57561A	10/7/03 1000	5		X	5	F	/	5	X	X	X			X		X							345622
57561B	10/7/03 1015	5		X	5	F	/	5	X	X	X			X		X							345623
57561C	10/7/03 1050	5		X	5	F	/	5	X	X	X			X		X							345624
57563A	10/7/03 1100	5		X	5	F	/	5	X	X	X			X		X							345625
JBD6	10/7/03 —	5		X	5	F	/	5	X	X	X			X		X							345626
57563B	10/7/03 1115	5		X	5	F	/	5	X	X	X			X		X							345627
57563C	10/7/03 1130	5		X	5	F	/	5	X	X	X			X		X							345628
57562A	10/7/03 1400	5		X	5	F	/	5	X	X	X			X		X							345629
57562B	10/7/03 1420	5		X	5	F	/	5	X	X	X			X		X							345630
57562B MS/MSD	10/7/03 1420	5		X	5	F	/	6	X	X	X			X		X							—
57562C	10/7/03 1440	5		X	5	F	/	5	X	X	X			X		X							345631

T-2

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/7/03 1500				
Relinquished by:	Date/time	Received by: (for lab)	Date/Time: 10/8/03 8:50		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

TMO136 17-5 36440-4

TM0172 Cart 5
Volatile Soil

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1148

Project Number	Project Name
0960317	RFNAP

Project Contact (Name and Phone Number): Darren Penne (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No: 000039

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330)	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /Li/N	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] Herb	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
575B4A	10/8/03 915	5		X	S	F	/	7	X	X	X	X	X	X		X						X	345737
695B1A	10/8/03 1130	5		X	S	F	/	5	X	X	X			X		X							345738
695B1B	10/8/03 1145	5		X	S	F	/	5	X	X	X			X		X							345739
695B1C	10/8/03 1200	5		X	S	F	/	5	X	X	X			X		X							345740
695B3A	10/8/03 1415	5		X	S	F	/	5	X	X	X			X		X							345741
5BD7	10/8/03 —	5		X	S	F	/	5	X	X	X			X		X							345742
695B3B	10/8/03 1430	5		X	S	F	/	5	X	X	X			X		X							345743
695B3C	10/8/03 1445	5		X	S	F	/	5	X	X	X			X		X							345744

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/8/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/9/03 8:40	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-4

19-3

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-5 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_13,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: For the VOC analyses, the method blank for batch 90061-120 contained acetone at 23 ug/Kg and methylene chloride at 4.0 ug/Kg. The method blank for batch 90061-121 contained acetone at 10 ug/Kg. The method blank for batch 90257-121 contained acetone at 10 ug/Kg. The method blank for batch 90037-122 contained methylene chloride at 27 ug/Kg. Positive results less than ten times the blank concentration were flagged "B,z" in the associated samples.

The associated equipment blank EQB5 submitted with sample delivery group 36440-6 displayed positive detections for acetone at 1.6 ug/L and methylene chloride at 0.60 ug/L. The field blank detection for methylene chloride was previously qualified due to a method blank detection. Positive associated soil boring sample results for acetone less than ten times the field blank concentration were previously flagged for method blank detections. No further data qualifying action was taken.

The continuing calibration analyzed on 10/20/03 at 1115 displayed a percent difference greater than the control limit (i.e., 20%) with a negative bias for methyl acetate at 23.6%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed percent differences greater than the control limit with a positive bias for methyl-tert-butyl ether at 22.0%, bromochloromethane at 24.0%, trans-1,3-dichloropropene at 23.3%, dibromochloromethane at 34.3%, bromoform at 33.1%, and 1,2-dibromo-3-chloropropane at 29.0%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/21/03 at 0901 displayed a percent difference greater than the control limit with a negative bias for chloroethane at 24.1%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed percent differences greater than the control limit with a positive bias for trans-1,3-dichloropropene at 23.1%, dibromochloromethane at 24.8%, bromoform at 20.7%, and 1,2-dibromo-3-chloropropane at 31.6%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/22/03 at 1151 displayed percent differences greater than the control limit with a negative bias for acetone at 28.4%, 4-methyl-2-pentanone at 26.8%, and 2-hexanone at 27.7%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed percent differences greater than the control limit with a positive bias for dichlorodifluoromethane at 20.3% and carbon disulfide at 22.5%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The laboratory control spike for batch 90061-120 displayed recoveries greater than the laboratory generated upper control limits for bromoform at 133% and chlorodibromomethane at 135%. The laboratory control spike for batch 90061-121 displayed recoveries greater than the laboratory generated upper control limits for 1,2-dibromo-3-chloropropane at 132% and methyl acetate at 131%. The laboratory control spike for batch 90257-121 displayed recoveries greater than the laboratory generated upper control limits for 1,2-dibromo-3-chloropropane at 132% and methyl acetate at 131%. The laboratory control spike for batch 90037-122 displayed recoveries greater than the laboratory generated upper control limit (i.e., 139%) for carbon disulfide at 142%. The associated field sample results were non-detect while the laboratory control spike displayed a positive bias. No data qualifying action was required.

The matrix spike pair for sample 13SB7C displayed several percent recoveries less than the laboratory generated lower control limits. The matrix spike pair was reanalyzed and both of the matrix spikes displayed low recoveries again. The parent sample results for acetone and methylene chloride were previously flagged for method blank detections and no further data qualifying action was taken. All other parent sample results were non-detect and were flagged "UJ,m" for all recoveries that indicated a negative bias. This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits. The parent sample was positive for methyl ethyl ketone and this result was flagged "J,d". The matrix spike displayed a recovery greater than the upper control limit (i.e., 130%) for 1,2-dibromo-3-chloropropane. The laboratory control spike for this batch displayed a similar recovery and the associated parent sample result was non-detect. No data qualifying action was taken based on the matrix spike anomaly for 1,2-dibromo-3-chloropropane.

Sample 13SB12C displayed an internal standard area count less than the lower control limit (i.e., 50%) for 1,4-dichlorobenzene-d_4 at 42%. This sample was reanalyzed with similar results. Only the initial analysis was reported and should be used for data interpretation. All associated field sample results were non-detect and were flagged "UJ,i".

For the SVOC analyses, the method blank for extraction batch 90482-114 displayed positive detections for bis(2-ethylhexyl)phthalate at 26 ug/Kg and di-n-butylphthalate at 11 ug/Kg. Positive associated field sample results less than ten times the blank concentrations were flagged "B,z".

The equipment blank EQB5 contained bis(2-ethylhexyl)phthalate at 0.35 ug/L, butyl benzyl phthalate at 0.060 ug/L, and several tentatively identified compounds (TICs). The equipment blank detections for these phthalates were previously flagged due to method blank detections and no further data qualifying action was taken. Positive results less than five times the blank concentration of the TICs were flagged "B,x" in the associated soil boring field samples.

The continuing calibration analyzed on 11/01/03 at 0653 displayed a percent difference greater than the control limit (i.e., 20%) with a negative bias for 4-chloroaniline at 21.7%. The

continuing calibration analyzed on 11/01/03 at 2117 displayed a percent difference greater than the control limit with a negative bias for 2,4-dinitrophenol at 39.2%. The continuing calibration analyzed on 11/02/03 at 1249 displayed percent differences greater than the control limit with a negative bias for hexachlorocyclopentadiene at 28.0% and 2,4-dinitrophenol at 22.4%. The associated field sample results were non-detect and were flagged "UJ,c".

The laboratory control spike for batch 90482-114 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 128%, 2,6-dinitrotoluene at 123%, 2-nitroaniline at 127%, 3,3'-dichlorobenzidine at 117%, acenaphthylene at 118%, benzo(b)fluoranthene at 125%, benzo(g,h,i)perylene at 130%, carbazole at 127%, dibenzo(a,h) anthracene at 126%, diethylphthalate at 119%, dimethylphthalate at 118%, fluorene at 121%, hexachlorocyclopentadiene at 115%, and indeno(1,2,3-cd)pyrene at 125%. The laboratory control spike for batch 90572-114 displayed a recovery greater than the laboratory generated upper control limit (i.e., 113%) for 3,3'-dichlorobenzidine at 120%. Positive associated field sample results were flagged "J,l".

The matrix spike pair for sample 13SB7C displayed percent recoveries less than the laboratory generated lower control limits for 2,4-dinitrophenol (15%/23%), 4-chloroaniline (26%), and hexachlorocyclopentadiene (12%/12%). The parent sample result for 2,4-dinitrophenol was previously flagged for a negative bias anomaly in the continuing calibration. Since the matrix spike recoveries were greater than the project QAPP lower limit (i.e., 10%), no data qualifying action was taken based on these anomalies. This matrix spike pair displayed percent recoveries greater than the laboratory generated upper control limits for 4-bromophenyl phenyl ether (114%), atrazine (124%/128%), benzo(k)fluoranthene (127%/134%), bis(2-ethylhexyl) phthalate (125%), butyl benzyl phthalate (121%), and fluorene (131%/127%). This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 32%) for 2,4-dinitrophenol at 39%. All associated parent sample results were non-detect or previously flagged due to a method blank detection for bis(2-ethylhexyl) phthalate while the matrix spike recoveries exhibited a positive bias or imprecision. Since the matrix spike recoveries were less than the project QAPP upper limit (i.e., 150%), no data qualifying action was taken based on these anomalies.

The field duplicate pair (13SB12B and SBD8) displayed a relative percent difference greater than the control limit (i.e., 35%) for di-n-butylphthalate at 37.5%. These two results were flagged positive and were flagged "J,f".

Samples 13SB12B and SBD8 displayed concentrations that exceed the linear range of the analytical instrument initial calibration. These results were flagged "J,g". The samples were re-analyzed at a dilution factor of two and display acceptable results for these compounds that should be used for data interpretation.

For the PAH analyses, the 2-fluorobiphenyl surrogate percent recoveries were less than the laboratory generated lower control limit (i.e., 49%) for 69SB2B at 47%, 69SB2C at 46%, and 13SB11B at 45%. Positive associated field sample results were flagged "L,s" while non-detects were flagged "UL,s".

The field duplicate pair (13SB9A and SBD9) displayed relative percent differences greater than the control limit (i.e., 35%) for benzo(g,h,i)perylene at 77%, fluoranthene at 83%, and pyrene at 74%. The field duplicate pair results were positive for these compounds and were flagged "J,f".

For the explosive analyses, the continuing calibration analyzed on 10/23/03 at 0859 displayed a percent difference greater than the control limit (i.e., 15%) with a negative bias for 3-nitrotoluene at 16.5%. The continuing calibration analyzed on 10/23/03 at 1358 displayed a percent difference greater than the control limit with a negative bias for RDX at 23.0%. The continuing calibration analyzed on 10/23/03 at 1426 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 15.1%. The continuing calibration analyzed on 10/23/03 at 1952 displayed a percent difference greater than the control limit with a negative bias for RDX at 21.0%. The continuing calibration analyzed on 10/23/03 at 2019 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 18.3%. The positive associated field sample result was flagged "J,c" while non-detects were flagged "UJ,c". The continuing calibrations analyzed on 10/24/03 at 0119 and 0646 displayed percent differences greater than the control limit with a positive bias for 2,6-dinitrotoluene at 16.0% and 15.2%, respectively. The associated field sample results were non-detect for 2,6-dinitrotoluene while the continuing calibration displayed a positive bias. No data qualifying action was required.

The confirmation opening continuing calibration analyzed on 11/11/03 at 0817 displayed a percent difference greater than the control limit with a negative bias for RDX at 20.8%. The confirmation closing continuing calibration analyzed on 11/11/03 at 1317 displayed percent differences greater than the control limit with a negative bias for 2,4-dinitrotoluene at 15.1% and RDX at 35.8%. The laboratory reported the higher of the two concentrations for the positive 2,4-dinitrotoluene results from the primary column. The associated field sample results for RDX were previously flagged for a negative bias for the primary column continuing calibration. No further data qualifying action was taken based on these confirmation continuing calibration anomalies.

For the pesticide analyses, the continuing calibration analyzed on 10/31/03 at 0413 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias for endrin at 21.6% and 4,4'-DDD at 19.9% on the front column. The associated field sample results were non-detect for endrin and 4,4'-DDD while the continuing calibration displayed a positive bias. No data qualifying action was required.

For the PCB analyses, the continuing calibration analyzed on 10/17/03 at 2007 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias for aroclor 1016 at 17.7% and aroclor 1260 at 25.0% on the front column. The associated field sample results were non-detect while the continuing calibration displayed a positive bias. No data qualifying action was required.

For the herbicide analyses, the laboratory control spike for batch 90218-110 displayed a recovery less than the laboratory generated lower control limit (i.e., 50%) for dinoseb at 0% and a recovery greater than the laboratory generated upper control limit (i.e., 91%) for MCPP at 117%. The associated field sample results were non-detect for MCPP while the laboratory control spike displayed a positive bias, therefore, no data qualifying action was required. All dinoseb results from the original extraction were rejected and manually removed from the result forms by the reviewer. Only dinoseb results from the re-extraction should be used for data interpretation.

The surrogate recoveries were greater than the upper laboratory generated control limit (i.e., 114%) for both the original and re-extraction of sample 69SB2A. Since the associated field sample results were non-detect, no data qualifying action was required.

The closing continuing calibration displayed a percent difference greater than the control limit (i.e., 15%) with a positive bias for dicamba at 29.6% on column one and silvex at 17.0% on column two. The associated field sample results were non-detect. No data qualifying action was required.

For the metal analyses by 6020, the method blank for batch 90043-117 contained antimony at 0.082 mg/Kg and silver at 0.0060 mg/Kg. The method blank for batch 90112-120 contained lead at 0.098 mg/Kg. The associated positive field sample results less than five times the method blank concentrations were flagged "B,p". The equipment blank EQB5 contained chromium at 4.5 ug/L and thallium at 0.5 ug/L. The associated positive field sample results less than five times the equipment blank concentrations were flagged "B,x".

Samples 13SB11B and 13SB8A contained concentration of lead that interfered with the internal standard response for bismuth. The bismuth internal standard is used to quantitate thallium detections. TriMatrix used an alternate internal standard, holmium, and performed a seven replicate method detection limit (MDL) study for thallium using this alternate internal standard. The MDL for thallium using the holmium internal standard (0.0358 mg/Kg) could not be incorporated into the electronic data deliverable (EDD). The concentration of the thallium MDL for these two samples was manually corrected by URS within the EDD.

For the metal analyses by 6010B, the method blank for batch 90177-120 contained cobalt at 0.374 mg/Kg and sodium at 8.95 mg/Kg. The method blank for batch 90187-117 contained cobalt at 0.43 mg/Kg and iron at 14.9 mg/Kg. The associated positive field sample results were greater than five times the blank concentrations. No data qualifying action was required. The equipment blank EQB5 contained beryllium at 0.3 ug/L, iron at 7.6 ug/L, and sodium at 280 ug/L. The equipment blank results for beryllium, iron, and sodium were previously qualified due to method blank detections. No further data qualifying action was required.

The matrix spike pair performed on sample 13SB7C displayed percent recoveries greater than the laboratory generated upper control limits for calcium (133/129%), chromium (119/114%), and magnesium (127/142%). The associated field sample results were positive and were flagged "J,m", unless previously flagged for due to an equipment blank detection. The serial dilution performed on sample 13SB7C displayed percent differences greater than the control limit (i.e., 10%) for cobalt at 53.8% and copper at 21.1%. All associated field sample results were positive and were flagged "J,s".

The internal standard recovery was greater than the laboratory upper control limit (i.e., 120%) for yttrium during the neat analyses of samples 13SB7A at 135%, 13SB7B at 138%, 13SB7C at 149%, 13SB11A at 146%, 13SB11C at 152%, 13SB10A at 134%, 13SB10B at 137%, 13SB9A at 151%, and SBD9 at 151%. The samples were reanalyzed at a dilution factor of five and display acceptable internal standard recoveries. The associated field sample results for beryllium were reported from the dilution and display elevated method detection limits. Since the reporting limits were greater than three times the elevated method detection limits, the reporting limits were not elevated based on the dilution factor.

Correctable Anomalies: None.

Comments: Field coolers were received at the laboratory with internal temperatures less than the lower control limit (i.e., 2°C) at 0.9, 0.8, and 0.4 °C. Since the sample aliquots were not frozen and the containers were intact, no data qualifying action was taken.

Sample 69SB2C was analyzed at a medium level for VOC due to severe loss of internal standards for a neat original and a neat re-analysis. The sample reporting limits are appropriately elevated.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. The GIS-Key format is limited to 12 characters for a TIC CAS number. One SVOC TIC detection exceeded this limitation for samples 13SB10A and SBD9. The laboratory reported the CAS number without the dashes. The reviewer manually entered the dashes for evaluation purposes on the hardcopy result forms included in this report.

The concentrations reported for lead by SW6020 for samples 13SB11B at 26500 mg/Kg, 13SB8A at 8620 mg/Kg, 13SB12C at 1140 mg/Kg, and 13SB9A at 434 mg/Kg were greater than the concentrations not reported for lead from the SW6010B analyses for the same samples at 277 mg/Kg, 101 mg/Kg, 956 mg/Kg, and 378 mg/Kg, respectively. The two analyses have separate digestates. There was no evidence of laboratory contamination present in the method blanks. Due to the small initial volumes used for digestion, there may be fragments of lead that create heterogeneity.

No anomalies were encountered if a given fraction was not mentioned. All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP
Duplicate Statistics

13SB9A and SBD9

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/Fail
Volatiles											
methyl ethyl ketone	ug/Kg	26	130	41		33		22%	8.0	104	Pass
acetone	ug/Kg	26	130	140		130		7.4%	10	104	Pass
methylene chloride	ug/Kg	26	130	5.7	J	5.7	J	0.0%	0.0	104	N/A
toluene	ug/Kg	6.4	32	2.7	J	0.69	J	119%	**2.0**	26	N/A
Semi-Volatiles											
2,4-dinitrotoluene	ug/Kg	220	1100	220		23	J	162%	197	880	N/A
4-chloro-3-methylphenol	ug/Kg	220	1100	25	J	8	J	103%	17	880	N/A
acenaphthene	ug/Kg	220	1100	10	J	7	J	35%	3.0	880	N/A
acephthylene	ug/Kg	220	1100	7.0	J	3	J	80%	4.0	880	N/A
anthracene	ug/Kg	220	1100	25	J	18	J	33%	7.0	880	N/A
benzo(a)anthracene	ug/Kg	220	1100	200	J	140	J	35%	60	880	N/A
benxo(a)pyrene	ug/Kg	220	1100	140	J	120	J	15%	20	880	N/A
benzo(b)fluoranthene	ug/Kg	220	1100	240		170	J	34%	70	880	N/A
benzo(g,h,i)perylene	ug/Kg	220	1100	46	J	58	J	23%	12	880	N/A
benzo(k)fluoranthene	ug/Kg	220	1100	93	J	85	J	9.0%	8.0	880	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	220	1100	43	J	33	J	26%	10	880	N/A
carbazole	ug/Kg	220	1100	220	U	37	J	142%	183	880	N/A
chrysene	ug/Kg	220	1100	220		160	J	32%	60	880	N/A
dibenzo(a,h)anthracene	ug/Kg	220	1100	13	J	18	J	32%	5.0	880	N/A
diethylphthalate	ug/Kg	220	1100	230		44	J	136%	186	880	N/A
dimethylphthalate	ug/Kg	220	1100	18	J	210	U	168%	192	880	N/A
di-n-butylphthalate	ug/Kg	220	1100	580		430		30%	**150**	880	Pass
fluoranthene	ug/Kg	220	1100	260		190	J	31%	70	880	N/A
fluorene	ug/Kg	220	1100	6.0	J	4.0	J	40%	2.0	880	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	220	1100	43	J	52	J	19%	9.0	880	N/A
n-nitroso-di-phenylamine	ug/Kg	220	1100	25	J	46	J	59%	21	880	N/A
phenanthene	ug/Kg	220	1100	79	J	60	J	27%	19.0	880	N/A
pyrene	ug/Kg	220	1100	230		170	J	30%	60.0	880	N/A
Polyaromatic Hydrocarbons											
acenaphthene	ug/Kg	130	650	17	J	130	U	154%	113	520	N/A
anthracene	ug/Kg	26	130	38		15		87%	**23**	104	N/A
benzo(a)anthracene	ug/Kg	26	130	130		61		72%	**69**	104	N/A
benxo(a)pyrene	ug/Kg	26	130	170		73		80%	**97**	104	N/A
benzo(b)fluoranthene	ug/Kg	26	130	120		56		73%	**64**	104	N/A
benzo(g,h,i)perylene	ug/Kg	26	130	540		240		**77%**	300	104	**Fail**
benzo(k)fluoranthene	ug/Kg	26	130	77		36		73%	**41**	104	N/A
chrysene	ug/Kg	26	130	150		74		68%	**76**	104	N/A
fluoranthene	ug/Kg	26	130	290		120		**83%**	170	104	**Fail**
fluorene	ug/Kg	26	130	11	J	26	U	81%	15	104	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	26	130	100		46		74%	**54**	104	N/A
phenanthene	ug/Kg	26	130	130		50		89%	**80**	104	N/A
pyrene	ug/Kg	26	130	240		110		**74%**	130	104	**Fail**
Explosives											
BDL											
Pesticides											
BDL											
Polychlorinated Biphenyls											
BDL											
Herbicides											
BDL											
Metals											
aluminum	mg/Kg	50	250	20400		18600		9.2%	1800	200	Pass
antimony	mg/Kg	0.50	2.5	0.095	J	0.10	J	5.1%	0.005	2	N/A
arsenic	mg/Kg	0.40	2.0	2.7		2.4		12%	0.3	1.6	Pass
barium	mg/Kg	5.0	25	175		178		2%	3	20	Pass
beryllium	mg/Kg	1.0	5.0	1.2		1.1		9%	0.1	4	Pass
cadmium	mg/Kg	1.0	5.0	2.2		2.4		9%	0.2	4	Pass
calcium	mg/Kg	250	1250	1890		2070		9%	180	1000	Pass
chromium	mg/Kg	5.0	25	36		34		6%	2	20	Pass
cobalt	mg/Kg	1.0	5.0	13		13		0.0%	0	4	Pass
copper	mg/Kg	2.0	10.0	25		26		3.9%	1	8	Pass
iron	mg/Kg	200	1000	36500		35900		1.7%	600	800	Pass
lead	mg/Kg	50.0	250.0	434		396		9%	38	200	Pass
magnesium	mg/Kg	250	1250	3690		3690		0.0%	0	1000	Pass
manganese	mg/Kg	25.0	125	1240		1390		11%	150	100	Pass
mercury	mg/Kg	0.10	0.50	0.043	J	0.043	J	0%	0	0.4	N/A
nickel	mg/Kg	0.50	2.5	19		17		11%	2	2	Pass
potassium	mg/Kg	100	500	1980		1910		3.6%	70	400	Pass
selenium	mg/Kg	1.0	5.0	0.93	J	0.84	J	10%	0.09	4	N/A
silver	mg/Kg	3.0	15	0.12	J	0.12	J	0.0%	0	12	N/A
sodium	mg/Kg	100	500	44	J	45	J	2.2%	1	400	N/A
thallium	mg/Kg	0.50	2.5	0.78		0.95		20%	0.17	2	Pass
vanadium	mg/Kg	1.0	5.0	37		35		6%	2	4	Pass
zinc	mg/Kg	100	500	1010		969		4%	41	400	Pass
Cyanide											
Total Cyanide	mg/Kg	0.50	2.5	0.35	J	0.26	J	30%	0.09	2	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

URS
Measurement Systems DV Service

Radford SSP
Duplicate Statistics

13SB12B and SBD8

	Units	RL	5xRL	Sample Conc	Duplicate Conc	%RPD	Delta	4xRL	Pass/ Fail
Volatiles									
methyl ethyl ketone	ug/Kg	28	140	25 J	27 J	7.7%	2	112	N/A
acetone	ug/Kg	28	140	55 B	62 B	12%	7	112	N/A
methylene chloride	ug/Kg	28	140	6.9 B	6.1 B	12%	0.8	112	N/A
benzene	ug/Kg	7.0	35	7.0 U	1.0 J	150%	**6**	28	N/A
Semi-Volatiles									
2,4-dinitrotoluene	ug/Kg	240	1200	700	1500	73%	**800**	960	Pass
2,6-dinitrotoluene	ug/Kg	240	1200	61 J	56 J	8.5%	5	960	N/A
4-chloro-3-methylphenol	ug/Kg	240	1200	18 J	23 J	24%	5	960	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	240	1200	360	300	18%	60	960	Pass
diethylphthalate	ug/Kg	240	1200	2200	2400	8.7%	200	960	Pass
dimethylphthalate	ug/Kg	240	1200	32 J	250 U	155%	218	960	N/A
di-n-butylphthalate	ug/Kg	240	1200	1300	1900	**37.5%**	600	960	**Fail**
fluoranthene	ug/Kg	240	1200	240 U	21 J	168%	219	960	N/A
n-nitroso-di-phenylamine	ug/Kg	240	1200	900	700	25%	200	960	Pass
phenanthrene	ug/Kg	240	1200	240 U	9.0 J	186%	231	960	N/A
pyrene	ug/Kg	240	1200	240 U	16 J	175%	224	960	N/A
Polyaromatic Hydrocarbons									
benzo(a)anthracene	ug/Kg	30	150	1.7 J	6 J	116%	4.7	120	N/A
benzo(a)pyrene	ug/Kg	30	150	30 U	8 J	116%	22	120	N/A
benzo(b)fluoranthene	ug/Kg	30	150	30 U	7 J	127%	23.3	120	N/A
benzo(g,h,i)perylene	ug/Kg	30	150	30 U	21 J	35%	9	120	N/A
chrysene	ug/Kg	30	150	30 U	7 J	127%	23.3	120	N/A
fluoranthene	ug/Kg	30	150	7.4 J	16 J	74%	8.6	120	N/A
indeon(1,2,3-cd)pyrene	ug/Kg	30	150	30 U	7 J	126%	23.2	120	N/A
phenanthrene	ug/Kg	30	150	2.2 J	3 J	20%	0.5	120	N/A
pyrene	ug/Kg	30	150	3.9 J	10 J	88%	6.1	120	N/A
Explosives									
fluoranthene	mg/Kg	0.50	2.5	0.50 U	0.32 J	44%	0.18	2	N/A
indeon(1,2,3-cd)pyrene	mg/Kg	0.50	2.5	0.55	0.56	2%	0.01	2	Pass
phenanthrene	mg/Kg	0.50	2.5	0.19 J	0.50 U	90%	0.31	2	N/A
pyrene	mg/Kg	0.50	2.5	0.29 J	0.50 U	53%	0.21	2	N/A
Metals									
aluminum	mg/Kg	50	250	9910	8930	10%	980	200	Pass
antimony	mg/Kg	0.50	2.5	1.1	1.30	17%	0.2	2	Pass
arsenic	mg/Kg	0.40	2.0	1.2	1.2	0.0%	0	1.6	Pass
barium	mg/Kg	5.0	25	106	102	3.8%	4	20	Pass
cadmium	mg/Kg	1.0	5.0	1.4	1.6	13%	0.2	4	Pass
calcium	mg/Kg	250	1250	4820	4640	3.8%	180	1000	Pass
chromium	mg/Kg	5.0	25	27	26	3.8%	1	20	Pass
cobalt	mg/Kg	1.0	5.0	6.4	6	1.6%	0.1	4	Pass
copper	mg/Kg	2.0	10.0	37	36	2.7%	1	8	Pass
iron	mg/Kg	100	500	15000	14700	2.0%	300	400	Pass
lead	mg/Kg	50.0	250.0	325	318	2.2%	7	200	Pass
magnesium	mg/Kg	250	1250	3270	3050	7.0%	220	1000	Pass
manganese	mg/Kg	5.0	25	280	291	3.9%	11	20	Pass
mercury	mg/Kg	0.10	0.50	0.041 J	0.035 J	16%	0.006	0.4	N/A
nickel	mg/Kg	0.50	2.5	11	10	14%	1.4	2	Pass
potassium	mg/Kg	100	500	1420	1290	9.6%	130	400	Pass
selenium	mg/Kg	1.0	5.0	0.39 J	0.41 J	5%	0.02	4	N/A
silver	mg/Kg	3.0	15	0.027 J	0.030 J	11%	0.003	12	N/A
sodium	mg/Kg	100	500	252	88 J	96%	**164**	400	N/A
thallium	mg/Kg	0.50	2.5	0.23 J	0.15 J	42%	0.08	2	N/A
vanadium	mg/Kg	1.0	5.0	17	17	0.0%	0	4	Pass
zinc	mg/Kg	4.0	20	377	426	12%	49	16	Pass
Cyanide									
Total Cyanide	mg/Kg	0.50	2.5	0.39 J	0.23 J	52%	0.16	2	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

URS
Measurement Systems DV Service

Radford SSP

Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-5	345745	69SB2A	SO	10/08/03
36440-5	345746	69SB2B	SO	10/08/03
36440-5	345747	69SB2C	SO	10/08/03
36440-5	345748	57SB4B	SO	10/08/03
36440-5	345883	13SB7A	SO	10/09/03
36440-5	345884	13SB7B	SO	10/09/03
36440-5	345885	13SB7C	SO	10/09/03
36440-5	345886	13SB12A	SO	10/09/03
36440-5	345887	13SB12B	SO	10/09/03
36440-5	345888	SBD8	SO	10/09/03
36440-5	345889	13SB12C	SO	10/09/03
36440-5	345890	13SB11A	SO	10/09/03
36440-5	345891	13SB11B	SO	10/09/03
36440-5	345892	13SB11C	SO	10/09/03
36440-5	345893	13SB10A	SO	10/09/03
36440-5	345894	13SB10B	SO	10/09/03
36440-5	345895	13SB10C	SO	10/09/03
36440-5	345896	13SB9A	SO	10/09/03
36440-5	345897	SBD9	SO	10/09/03
36440-5	345898	13SB9B	SO	10/09/03
36440-5	345899	13SB9C	SO	10/09/03
36440-5	345900	13SB8A	SO	10/09/03
36440-5	345901	13SB8B	SO	10/09/03

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2A**	QC Batch:	90061 -120
Sample #:	**345745**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.784
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.712
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.869
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.880
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.581
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.517
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.852
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.844
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.703
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.653
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.492
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.322
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.852
78-93-3	**Methyl Ethyl Ketone**	**30**		24	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	***Acetone**	**110 B**	B,Z	24	6.00
71-43-2	Benzene	6.0 U		6.0	0.632
74-97-5	Bromochloromethane	6.0 U		6.0	0.913
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.601
75-25-2	Bromoform	6.0 U		6.0	0.694
74-83-9	Bromomethane	6.0 U		6.0	1.80
75-15-0	Carbon Disulfide	6.0 U		6.0	1.74
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.559
108-90-7	Chlorobenzene	6.0 U		6.0	0.793
75-00-3	Chloroethane	6.0 U		6.0	1.62
67-66-3	Chloroform	6.0 U		6.0	0.535

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2A**	QC Batch:	90061 -120
Sample #:	**345745**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U	6.0	1.00
110-82-7	Cyclohexane	12 U	12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.0 U	6.0	0.589
10061-02-6	trans-1,3-Dichloropropene	6.0 U	6.0	0.625
75-71-8	Dichlorodifluoromethane	6.0 U	6.0	0.802
124-48-1	Chlorodibromomethane	6.0 U	6.0	0.620
100-41-4	Ethylbenzene	6.0 U	6.0	0.508
98-82-8	Isopropylbenzene	6.0 U	6.0	0.655
79-20-9	Methyl Acetate	24 U	UJ,c 24	4.16
108-87-2	Methylcyclohexane	12 U	12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U	6.0	0.769
75-09-2	Methylene Chloride	24 U	24	3.37
100-42-5	Styrene	6.0 U	6.0	0.530
127-18-4	Tetrachloroethene	6.0 U	6.0	0.736
108-88-3	Toluene	6.0 U	6.0	0.557
79-01-6	Trichloroethene	6.0 U	6.0	0.812
75-69-4	Trichlorofluoromethane	6.0 U	6.0	0.892
75-01-4	Vinyl Chloride	6.0 U	6.0	0.444
1330-20-7	Xylene (Total)	6.0 U	6.0	0.505

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2A**	QC Batch:	90061 -120
Sample #:	**345745**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Hexanal	66-25-1	17	E	NJ, +

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB2B**	QC Batch:	90061 -120
Sample #:	**345746**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.26

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.3 U		6.3	0.537
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.3 U		6.3	0.956
79-34-5	1,1,2,2-Tetrachloroethane	6.3 U		6.3	0.823
79-00-5	1,1,2-Trichloroethane	6.3 U		6.3	0.747
75-34-3	1,1-Dichloroethane	6.3 U		6.3	0.912
75-35-4	1,1-Dichloroethylene	6.3 U		6.3	0.924
106-93-4	1,2-Dibromoethane	6.3 U		6.3	0.863
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.62
95-50-1	1,2-Dichlorobenzene	6.3 U		6.3	0.610
107-06-2	1,2-Dichloroethane	6.3 U		6.3	0.543
156-59-2	cis-1,2-Dichloroethene	6.3 U		6.3	0.895
156-60-5	trans-1,2-Dichloroethene	6.3 U		6.3	0.886
78-87-5	1,2-Dichloropropane	6.3 U		6.3	0.738
87-61-6	1,2,3-Trichlorobenzene	6.3 U		6.3	0.685
120-82-1	1,2,4-Trichlorobenzene	6.3 U		6.3	0.517
541-73-1	1,3-Dichlorobenzene	6.3 U		6.3	0.338
106-46-7	1,4-Dichlorobenzene	6.3 U		6.3	0.895
78-93-3	**Methyl Ethyl Ketone**	**23 J**		26	6.30
591-78-6	2-Hexanone	13 U		13	2.85
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.84
67-64-1	***Acetone**	**65 B**	B,Z	26	6.30
71-43-2	Benzene	6.3 U		6.3	0.664
74-97-5	Bromochloromethane	6.3 U		6.3	0.959
75-27-4	Dichlorobromomethane	6.3 U		6.3	0.631
75-25-2	Bromoform	6.3 U		6.3	0.728
74-83-9	Bromomethane	6.3 U		6.3	1.89
75-15-0	Carbon Disulfide	6.3 U		6.3	1.83
56-23-5	Carbon Tetrachloride	6.3 U		6.3	0.587
108-90-7	Chlorobenzene	6.3 U		6.3	0.833
75-00-3	Chloroethane	6.3 U		6.3	1.70
67-66-3	Chloroform	6.3 U		6.3	0.562

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2B**	QC Batch:	90061 -120
Sample #:	**345746**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.26

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.3 U	6.3	1.05
110-82-7	Cyclohexane	13 U	13	0.398
10061-01-5	cis-1,3-Dichloropropene	6.3 U	6.3	0.619
10061-02-6	trans-1,3-Dichloropropene	6.3 U	6.3	0.656
75-71-8	Dichlorodifluoromethane	6.3 U	6.3	0.842
124-48-1	Chlorodibromomethane	6.3 U	6.3	0.651
100-41-4	Ethylbenzene	6.3 U	6.3	0.533
98-82-8	Isopropylbenzene	6.3 U	6.3	0.688
79-20-9	Methyl Acetate	26 U	UJ,C 26	4.37
108-87-2	Methylcyclohexane	13 U	13	1.06
1634-04-4	Methyl(tert)butyl Ether	6.3 U	6.3	0.808
75-09-2	Methylene Chloride	26 U	26	3.54
100-42-5	Styrene	6.3 U	6.3	0.557
127-18-4	Tetrachloroethene	6.3 U	6.3	0.772
108-88-3	Toluene	6.3 U	6.3	0.585
79-01-6	Trichloroethene	6.3 U	6.3	0.853
75-69-4	Trichlorofluoromethane	6.3 U	6.3	0.936
75-01-4	Vinyl Chloride	6.3 U	6.3	0.466
1330-20-7	Xylene (Total)	6.3 U	6.3	0.530

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2B**	QC Batch:	90061 -120
Sample #:	**345746**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB2C**	QC Batch:	90037 -122
Sample #:	**345747**	Anal. Batch:	208078
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	67 U		67	9.23
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	67 U		67	11.6
79-34-5	1,1,2,2-Tetrachloroethane	67 U		67	9.62
79-00-5	1,1,2-Trichloroethane	67 U		67	9.23
75-34-3	1,1-Dichloroethane	67 U		67	3.71
75-35-4	1,1-Dichloroethylene	67 U		67	8.65
106-93-4	1,2-Dibromoethane	67 U		67	11.1
96-12-8	1,2-Dibromo-3-chloropropane	130 U		130	17.6
95-50-1	1,2-Dichlorobenzene	67 U		67	10.7
107-06-2	1,2-Dichloroethane	67 U		67	7.22
156-59-2	cis-1,2-Dichloroethene	67 U		67	9.04
156-60-5	trans-1,2-Dichloroethene	67 U		67	9.30
78-87-5	1,2-Dichloropropane	67 U		67	16.6
87-61-6	1,2,3-Trichlorobenzene	67 U		67	14.8
120-82-1	1,2,4-Trichlorobenzene	67 U		67	12.3
541-73-1	1,3-Dichlorobenzene	67 U		67	10.4
106-46-7	1,4-Dichlorobenzene	67 U		67	8.06
78-93-3	**Methyl Ethyl Ketone**	**260 J**		670	27.0
591-78-6	2-Hexanone	670 U	UJ,c	670	29.6
108-10-1	4-Methyl-2-Pentanone	670 U	UJ,c	670	23.7
67-64-1	Acetone	670 U	UJ,c	670	69.6
71-43-2	Benzene	67 U		67	1.40
74-97-5	Bromochloromethane	67 U		67	4.93
75-27-4	Dichlorobromomethane	130 U		130	28.1
75-25-2	Bromoform	67 U		67	7.15
74-83-9	Bromomethane	67 U		67	17.4
75-15-0	Carbon Disulfide	67 U		67	3.86
56-23-5	Carbon Tetrachloride	67 U		67	7.48
108-90-7	Chlorobenzene	67 U		67	10.2
75-00-3	Chloroethane	67 U		67	11.7
67-66-3	Chloroform	67 U		67	6.57

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2C**	QC Batch:	90037 -122
Sample #:	**345747**	Anal. Batch:	208078
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	67 U	67	6.70
110-82-7	Cyclohexane	670 U	670	14.0
10061-01-5	cis-1,3-Dichloropropene	67 U	67	12.3
10061-02-6	trans-1,3-Dichloropropene	67 U	67	7.61
75-71-8	Dichlorodifluoromethane	67 U	67	7.80
124-48-1	Chlorodibromomethane	67 U	67	7.02
100-41-4	Ethylbenzene	67 U	67	12.7
98-82-8	Isopropylbenzene	67 U	67	5.86
79-20-9	Methyl Acetate	670 U	670	15.1
108-87-2	Methylcyclohexane	670 U	670	10.9
1634-04-4	Methyl(tert)butyl Ether	67 U	67	5.01
75-09-2	**Methylene Chloride**	**42 J** B,2	67	7.61
100-42-5	Styrene	67 U	67	8.91
127-18-4	Tetrachloroethene	67 U	67	12.5
108-88-3	Toluene	67 U	67	13.9
79-01-6	Trichloroethene	67 U	67	13.8
75-69-4	Trichlorofluoromethane	67 U	67	3.30
75-01-4	Vinyl Chloride	67 U	67	7.74
1330-20-7	Xylene (Total)	200 U	200	34.5

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2C**	QC Batch:	90037 -122
Sample #:	**345747**	Anal. Batch:	208078
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4B**	QC Batch:	90061 -120
Sample #:	**345748**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.575
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.02
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.882
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.801
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.977
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	0.990
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.925
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.81
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.653
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.582
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.959
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.949
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.791
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.734
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.554
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.362
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.959
78-93-3	**Methyl Ethyl Ketone**	**27 J**		28	6.75
591-78-6	2-Hexanone	14 U		14	3.05
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.97
67-64-1	***Acetone**	**66 B**	B, Z	28	6.75
71-43-2	Benzene	6.8 U		6.8	0.711
74-97-5	Bromochloromethane	6.8 U		6.8	1.03
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.676
75-25-2	Bromoform	6.8 U		6.8	0.780
74-83-9	Bromomethane	6.8 U		6.8	2.03
75-15-0	Carbon Disulfide	6.8 U		6.8	1.96
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.629
108-90-7	Chlorobenzene	6.8 U		6.8	0.892
75-00-3	Chloroethane	6.8 U		6.8	1.82
67-66-3	Chloroform	6.8 U		6.8	0.602

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4B**	QC Batch:	90061 -120
Sample #:	**345748**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.13
110-82-7	Cyclohexane	14 U		14	0.427
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.663
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.703
75-71-8	Dichlorodifluoromethane	6.8 U		6.8	0.902
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.698
100-41-4	Ethylbenzene	6.8 U		6.8	0.571
98-82-8	Isopropylbenzene	6.8 U		6.8	0.737
79-20-9	Methyl Acetate	28 U	UJ, C	28	4.68
108-87-2	Methylcyclohexane	14 U		14	1.14
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.865
75-09-2	Methylene Chloride	28 U		28	3.79
100-42-5	Styrene	6.8 U		6.8	0.597
127-18-4	Tetrachloroethene	6.8 U		6.8	0.828
108-88-3	Toluene	6.8 U		6.8	0.626
79-01-6	Trichloroethene	6.8 U		6.8	0.914
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.00
75-01-4	Vinyl Chloride	6.8 U		6.8	0.500
1330-20-7	Xylene (Total)	6.8 U		6.8	0.568

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4B**	QC Batch:	90061 -120
Sample #:	**345748**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7A**	QC Batch:	90061 -120
Sample #:	**345883**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U		6.1	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U		6.1	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U		6.1	0.784
79-00-5	1,1,2-Trichloroethane	6.1 U		6.1	0.712
75-34-3	1,1-Dichloroethane	6.1 U		6.1	0.869
75-35-4	1,1-Dichloroethylene	6.1 U		6.1	0.880
106-93-4	1,2-Dibromoethane	6.1 U		6.1	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.1 U		6.1	0.581
107-06-2	1,2-Dichloroethane	6.1 U		6.1	0.517
156-59-2	cis-1,2-Dichloroethene	6.1 U		6.1	0.852
156-60-5	trans-1,2-Dichloroethene	6.1 U		6.1	0.844
78-87-5	1,2-Dichloropropane	6.1 U		6.1	0.703
87-61-6	1,2,3-Trichlorobenzene	6.1 U		6.1	0.653
120-82-1	1,2,4-Trichlorobenzene	6.1 U		6.1	0.492
541-73-1	1,3-Dichlorobenzene	6.1 U		6.1	0.322
106-46-7	1,4-Dichlorobenzene	6.1 U		6.1	0.852
78-93-3	**Methyl Ethyl Ketone**	**38**		24	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	**Acetone**	**140**	B,Z	24	6.00
71-43-2	Benzene	6.1 U		6.1	0.632
74-97-5	Bromochloromethane	6.1 U		6.1	0.913
75-27-4	Dichlorobromomethane	6.1 U		6.1	0.601
75-25-2	Bromoform	6.1 U		6.1	0.694
74-83-9	Bromomethane	6.1 U		6.1	1.80
75-15-0	Carbon Disulfide	6.1 U		6.1	1.74
56-23-5	Carbon Tetrachloride	6.1 U		6.1	0.559
108-90-7	Chlorobenzene	6.1 U		6.1	0.793
75-00-3	Chloroethane	6.1 U		6.1	1.62
67-66-3	Chloroform	6.1 U		6.1	0.535

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Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7A**	QC Batch:	90061 -120
Sample #:	**345883**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.00
110-82-7	Cyclohexane	12 U		12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.589
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.625
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.802
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.620
100-41-4	Ethylbenzene	6.1 U		6.1	0.508
98-82-8	Isopropylbenzene	6.1 U		6.1	0.655
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.16
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.769
75-09-2	**Methylene Chloride**	**6.4 J**	B,Z	24	3.37
100-42-5	Styrene	6.1 U		6.1	0.530
127-18-4	Tetrachloroethene	6.1 U		6.1	0.736
108-88-3	Toluene	6.1 U		6.1	0.557
79-01-6	Trichloroethene	6.1 U		6.1	0.812
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.892
75-01-4	Vinyl Chloride	6.1 U		6.1	0.444
1330-20-7	Xylene (Total)	6.1 U		6.1	0.505

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7A**	QC Batch:	90061 -120
Sample #:	**345883**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	13	E NJ, +

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7B**	QC Batch:	90061 -120
Sample #:	**345884**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.784
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.712
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.869
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.880
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.581
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.517
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	0.852
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	0.844
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.703
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.653
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.492
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.322
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.852
78-93-3	**Methyl Ethyl Ketone**	**37**		25	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	**Acetone**	**130**	B,Z	25	6.00
71-43-2	Benzene	6.2 U		6.2	0.632
74-97-5	Bromochloromethane	6.2 U		6.2	0.913
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.601
75-25-2	Bromoform	6.2 U		6.2	0.694
74-83-9	Bromomethane	6.2 U		6.2	1.80
75-15-0	Carbon Disulfide	6.2 U		6.2	1.74
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.559
108-90-7	Chlorobenzene	6.2 U		6.2	0.793
75-00-3	Chloroethane	6.2 U		6.2	1.62
67-66-3	Chloroform	6.2 U		6.2	0.535

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7B**	QC Batch:	90061 -120
Sample #:	**345884**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U		6.2	1.00
110-82-7	Cyclohexane	12 U		12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.2 U		6.2	0.589
10061-02-6	trans-1,3-Dichloropropene	6.2 U		6.2	0.625
75-71-8	Dichlorodifluoromethane	6.2 U		6.2	0.802
124-48-1	Chlorodibromomethane	6.2 U		6.2	0.620
100-41-4	Ethylbenzene	6.2 U		6.2	0.508
98-82-8	Isopropylbenzene	6.2 U		6.2	0.655
79-20-9	Methyl Acetate	25 U	UJ,C	25	4.16
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.2 U		6.2	0.769
75-09-2	**Methylene Chloride**	**6.8 J**	B,Z	25	3.37
100-42-5	Styrene	6.2 U		6.2	0.530
127-18-4	Tetrachloroethene	6.2 U		6.2	0.736
108-88-3	Toluene	6.2 U		6.2	0.557
79-01-6	Trichloroethene	6.2 U		6.2	0.812
75-69-4	Trichlorofluoromethane	6.2 U		6.2	0.892
75-01-4	Vinyl Chloride	6.2 U		6.2	0.444
1330-20-7	Xylene (Total)	6.2 U		6.2	0.505

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7B**	QC Batch:	90061 -120
Sample #:	**345884**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7C**	QC Batch:	90061 -120
Sample #:	**345885**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.26

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	*1,1,1-Trichloroethane	6.3 U	UJ,M	6.3	0.537
76-13-1	*1,1,2-Trichloro-1,2,2-trifluoroethane	6.3 U	UJ,M	6.3	0.956
79-34-5	*1,1,2,2-Tetrachloroethane	6.3 U		6.3	0.823
79-00-5	1,1,2-Trichloroethane	6.3 U		6.3	0.747
75-34-3	1,1-Dichloroethane	6.3 U		6.3	0.912
75-35-4	*1,1-Dichloroethylene	6.3 U	UJ,M	6.3	0.924
106-93-4	*1,2-Dibromoethane	6.3 U	UJ,M	6.3	0.863
96-12-8	*1,2-Dibromo-3-chloropropane	13 U		13	2.62
95-50-1	*1,2-Dichlorobenzene	6.3 U	UJ,M	6.3	0.610
107-06-2	1,2-Dichloroethane	6.3 U		6.3	0.543
156-59-2	cis-1,2-Dichloroethene	6.3 U		6.3	0.895
156-60-5	*trans-1,2-Dichloroethene	6.3 U	UJ,M	6.3	0.886
78-87-5	1,2-Dichloropropane	6.3 U		6.3	0.738
87-61-6	*1,2,3-Trichlorobenzene	6.3 U	UJ,M	6.3	0.685
120-82-1	*1,2,4-Trichlorobenzene	6.3 U	UJ,M	6.3	0.517
541-73-1	*1,3-Dichlorobenzene	6.3 U	UJ,M	6.3	0.338
106-46-7	*1,4-Dichlorobenzene	6.3 U	UJ,M	6.3	0.895
78-93-3	***Methyl Ethyl Ketone**	**29**	J,d	25	6.30
591-78-6	*2-Hexanone	13 U		13	2.85
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.84
67-64-1	***Acetone**	**110 B**	B,Z	25	6.30
71-43-2	*Benzene	6.3 U	UJ,M	6.3	0.664
74-97-5	Bromochloromethane	6.3 U		6.3	0.959
75-27-4	*Dichlorobromomethane	6.3 U		6.3	0.631
75-25-2	*Bromoform	6.3 U		6.3	0.728
74-83-9	Bromomethane	6.3 U		6.3	1.89
75-15-0	*Carbon Disulfide	6.3 U	UJ,M	6.3	1.83
56-23-5	*Carbon Tetrachloride	6.3 U	UJ,M	6.3	0.587
108-90-7	*Chlorobenzene	6.3 U	UJ,M	6.3	0.833
75-00-3	*Chloroethane	6.3 U	UJ,M	6.3	1.70
67-66-3	Chloroform	6.3 U		6.3	0.562

* See attached Statement of Data Qualifications.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7C**	QC Batch:	90061 -120
Sample #:	**345885**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.26

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.3 U		6.3	1.05
110-82-7	*Cyclohexane	13 U	UJ,M	13	0.398
10061-01-5	*cis-1,3-Dichloropropene	6.3 U		6.3	0.619
10061-02-6	*trans-1,3-Dichloropropene	6.3 U		6.3	0.656
75-71-8	*Dichlorodifluoromethane	6.3 U	UJ,M	6.3	0.842
124-48-1	*Chlorodibromomethane	6.3 U		6.3	0.651
100-41-4	*Ethylbenzene	6.3 U	UJ,M	6.3	0.533
98-82-8	*Isopropylbenzene	6.3 U	UJ,M	6.3	0.688
79-20-9	*Methyl Acetate	25 U	UJ,C	25	4.37
108-87-2	*Methylcyclohexane	13 U		13	1.06
1634-04-4	Methyl(tert)butyl Ether	6.3 U		6.3	0.808
75-09-2	***Methylene Chloride**	**7.2 J**	B,Z	25	3.54
100-42-5	*Styrene	6.3 U	UJ,M	6.3	0.557
127-18-4	*Tetrachloroethene	6.3 U	UJ,M	6.3	0.772
108-88-3	*Toluene	6.3 U	UJ,M	6.3	0.585
79-01-6	*Trichloroethene	6.3 U		6.3	0.853
75-69-4	*Trichlorofluoromethane	6.3 U	UJ,M	6.3	0.936
75-01-4	Vinyl Chloride	6.3 U		6.3	0.466
1330-20-7	*Xylene (Total)	6.3 U	UJ,M	6.3	0.530

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7C**	QC Batch:	90061 -120
Sample #:	**345885**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12A**	QC Batch:	90061 -120
Sample #:	**345886**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.849
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.771
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.941
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.953
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.629
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.560
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.923
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.914
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.762
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.707
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.533
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.348
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.923
78-93-3	**Methyl Ethyl Ketone**	**26**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	***Acetone**	**49 B**	B, Z	26	6.50
71-43-2	Benzene	6.4 U		6.4	0.685
74-97-5	Bromochloromethane	6.4 U		6.4	0.989
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.651
75-25-2	Bromoform	6.4 U		6.4	0.751
74-83-9	Bromomethane	6.4 U		6.4	1.95
75-15-0	Carbon Disulfide	6.4 U		6.4	1.89
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.606
108-90-7	Chlorobenzene	6.4 U		6.4	0.859
75-00-3	Chloroethane	6.4 U		6.4	1.76
67-66-3	Chloroform	6.4 U		6.4	0.580

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12A**	QC Batch:	90061 -120
Sample #:	**345886**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.638
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.677
75-71-8	Dichlorodifluoromethane	6.4 U		6.4	0.868
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.672
100-41-4	Ethylbenzene	6.4 U		6.4	0.550
98-82-8	Isopropylbenzene	6.4 U		6.4	0.710
79-20-9	Methyl Acetate	26 U	UJ, c	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.4 U		6.4	0.833
75-09-2	**Methylene Chloride**	**4.7 J**	B, Z	26	3.65
100-42-5	Styrene	6.4 U		6.4	0.575
127-18-4	Tetrachloroethene	6.4 U		6.4	0.797
108-88-3	**Toluene**	**1.2 J**		6.4	0.603
79-01-6	Trichloroethene	6.4 U		6.4	0.880
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.966
75-01-4	Vinyl Chloride	6.4 U		6.4	0.481
1330-20-7	Xylene (Total)	6.4 U		6.4	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**	Prepared:	n/a
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	n/a
		Analyzed:	10/20/03 JDM
Sample ID:	**13SB12A**	Anal. Method:	USEPA-8260B
Sample #:	**345886**	QC Batch:	90061 -120
Matrix:	Soil	Anal. Batch:	208021
		Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12B**	QC Batch:	90061 -120
Sample #:	**345887**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U	7.0	0.596
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U	7.0	1.06
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U	7.0	0.914
79-00-5	1,1,2-Trichloroethane	7.0 U	7.0	0.830
75-34-3	1,1-Dichloroethane	7.0 U	7.0	1.01
75-35-4	1,1-Dichloroethylene	7.0 U	7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U	7.0	0.959
96-12-8	1,2-Dibromo-3-chloropropane	14 U	14	2.91
95-50-1	1,2-Dichlorobenzene	7.0 U	7.0	0.678
107-06-2	1,2-Dichloroethane	7.0 U	7.0	0.603
156-59-2	cis-1,2-Dichloroethene	7.0 U	7.0	0.994
156-60-5	trans-1,2-Dichloroethene	7.0 U	7.0	0.984
78-87-5	1,2-Dichloropropane	7.0 U	7.0	0.820
87-61-6	1,2,3-Trichlorobenzene	7.0 U	7.0	0.762
120-82-1	1,2,4-Trichlorobenzene	7.0 U	7.0	0.574
541-73-1	1,3-Dichlorobenzene	7.0 U	7.0	0.375
106-46-7	1,4-Dichlorobenzene	7.0 U	7.0	0.994
78-93-3	**Methyl Ethyl Ketone**	**25 J**	28	7.00
591-78-6	2-Hexanone	14 U	14	3.16
108-10-1	4-Methyl-2-Pentanone	14 U	14	2.04
67-64-1	***Acetone**	**55 B** B,Z	28	7.00
71-43-2	Benzene	7.0 U	7.0	0.738
74-97-5	Bromochloromethane	7.0 U	7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U	7.0	0.701
75-25-2	Bromoform	7.0 U	7.0	0.809
74-83-9	Bromomethane	7.0 U	7.0	2.10
75-15-0	Carbon Disulfide	7.0 U	7.0	2.03
56-23-5	Carbon Tetrachloride	7.0 U	7.0	0.652
108-90-7	Chlorobenzene	7.0 U	7.0	0.925
75-00-3	Chloroethane	7.0 U	7.0	1.89
67-66-3	Chloroform	7.0 U	7.0	0.624

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12B**	QC Batch:	90061 -120
Sample #:	**345887**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.17
110-82-7	Cyclohexane	14 U		14	0.442
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.687
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.729
75-71-8	Dichlorodifluoromethane	7.0 U		7.0	0.935
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.724
100-41-4	Ethylbenzene	7.0 U		7.0	0.592
98-82-8	Isopropylbenzene	7.0 U		7.0	0.764
79-20-9	Methyl Acetate	28 U	VJ/c	28	4.86
108-87-2	Methylcyclohexane	14 U		14	1.18
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.897
75-09-2	**Methylene Chloride**	**6.9 J**	B,Z	28	3.93
100-42-5	Styrene	7.0 U		7.0	0.619
127-18-4	Tetrachloroethene	7.0 U		7.0	0.858
108-88-3	Toluene	7.0 U		7.0	0.650
79-01-6	Trichloroethene	7.0 U		7.0	0.948
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.04
75-01-4	Vinyl Chloride	7.0 U		7.0	0.518
1330-20-7	Xylene (Total)	7.0 U		7.0	0.589

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12B**	QC Batch:	90061 -120
Sample #:	**345887**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD8**	QC Batch:	90061 -120
Sample #:	**345888**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.5 U	7.5	0.639
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.5 U	7.5	1.14
79-34-5	1,1,2,2-Tetrachloroethane	7.5 U	7.5	0.980
79-00-5	1,1,2-Trichloroethane	7.5 U	7.5	0.890
75-34-3	1,1-Dichloroethane	7.5 U	7.5	1.09
75-35-4	1,1-Dichloroethylene	7.5 U	7.5	1.10
106-93-4	1,2-Dibromoethane	7.5 U	7.5	1.03
96-12-8	1,2-Dibromo-3-chloropropane	15 U	15	3.12
95-50-1	1,2-Dichlorobenzene	7.5 U	7.5	0.726
107-06-2	1,2-Dichloroethane	7.5 U	7.5	0.647
156-59-2	cis-1,2-Dichloroethene	7.5 U	7.5	1.07
156-60-5	trans-1,2-Dichloroethene	7.5 U	7.5	1.05
78-87-5	1,2-Dichloropropane	7.5 U	7.5	0.879
87-61-6	1,2,3-Trichlorobenzene	7.5 U	7.5	0.816
120-82-1	1,2,4-Trichlorobenzene	7.5 U	7.5	0.615
541-73-1	1,3-Dichlorobenzene	7.5 U	7.5	0.402
106-46-7	1,4-Dichlorobenzene	7.5 U	7.5	1.07
78-93-3	**Methyl Ethyl Ketone**	**27 J**	30	7.50
591-78-6	2-Hexanone	15 U	15	3.39
108-10-1	4-Methyl-2-Pentanone	15 U	15	2.19
67-64-1	***Acetone**	**62 B** B,Z	30	7.50
71-43-2	**Benzene**	**1.0 J**	7.5	0.791
74-97-5	Bromochloromethane	7.5 U	7.5	1.14
75-27-4	Dichlorobromomethane	7.5 U	7.5	0.752
75-25-2	Bromoform	7.5 U	7.5	0.867
74-83-9	Bromomethane	7.5 U	7.5	2.25
75-15-0	Carbon Disulfide	7.5 U	7.5	2.18
56-23-5	Carbon Tetrachloride	7.5 U	7.5	0.699
108-90-7	Chlorobenzene	7.5 U	7.5	0.992
75-00-3	Chloroethane	7.5 U	7.5	2.03
67-66-3	Chloroform	7.5 U	7.5	0.669

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD8**	QC Batch:	90061 -120
Sample #:	**345888**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.5 U		7.5	1.25
110-82-7	Cyclohexane	15 U		15	0.474
10061-01-5	cis-1,3-Dichloropropene	7.5 U		7.5	0.737
10061-02-6	trans-1,3-Dichloropropene	7.5 U		7.5	0.782
75-71-8	Dichlorodifluoromethane	7.5 U		7.5	1.00
124-48-1	Chlorodibromomethane	7.5 U		7.5	0.776
100-41-4	Ethylbenzene	7.5 U		7.5	0.635
98-82-8	Isopropylbenzene	7.5 U		7.5	0.819
79-20-9	Methyl Acetate	30 U	VJ,C	30	5.21
108-87-2	Methylcyclohexane	15 U		15	1.27
1634-04-4	Methyl(tert)butyl Ether	7.5 U		7.5	0.962
75-09-2	**Methylene Chloride**	**6.1 J**	B,Z	30	4.22
100-42-5	Styrene	7.5 U		7.5	0.663
127-18-4	Tetrachloroethene	7.5 U		7.5	0.920
108-88-3	Toluene	7.5 U		7.5	0.696
79-01-6	Trichloroethene	7.5 U		7.5	1.02
75-69-4	Trichlorofluoromethane	7.5 U		7.5	1.11
75-01-4	Vinyl Chloride	7.5 U		7.5	0.555
1330-20-7	Xylene (Total)	7.5 U		7.5	0.632

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD8**	QC Batch:	90061 -120
Sample #:	**345888**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB12C**	QC Batch:	90061 -120
Sample #:	**345889**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	8.1 U		8.1	0.682
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	8.1 U		8.1	1.21
79-34-5	*1,1,2,2-Tetrachloroethane	8.1 UJ	UJ,i	8.1	1.04
79-00-5	1,1,2-Trichloroethane	8.1 U		8.1	0.949
75-34-3	1,1-Dichloroethane	8.1 U		8.1	1.16
75-35-4	1,1-Dichloroethylene	8.1 U		8.1	1.17
106-93-4	1,2-Dibromoethane	8.1 U		8.1	1.10
96-12-8	*1,2-Dibromo-3-chloropropane	16 UJ	UJ,i	16	3.33
95-50-1	*1,2-Dichlorobenzene	8.1 UJ	UJ,i	8.1	0.774
107-06-2	1,2-Dichloroethane	8.1 U		8.1	0.690
156-59-2	cis-1,2-Dichloroethene	8.1 U		8.1	1.14
156-60-5	trans-1,2-Dichloroethene	8.1 U		8.1	1.12
78-87-5	1,2-Dichloropropane	8.1 U		8.1	0.938
87-61-6	*1,2,3-Trichlorobenzene	8.1 UJ	UJ,i	8.1	0.870
120-82-1	*1,2,4-Trichlorobenzene	8.1 UJ	UJ,i	8.1	0.656
541-73-1	*1,3-Dichlorobenzene	8.1 UJ	UJ,i	8.1	0.429
106-46-7	*1,4-Dichlorobenzene	8.1 UJ	UJ,i	8.1	1.14
78-93-3	Methyl Ethyl Ketone	32 U		32	8.00
591-78-6	2-Hexanone	16 U		16	3.62
108-10-1	4-Methyl-2-Pentanone	16 U		16	2.34
67-64-1	***Acetone**	**63 B**	B,z	32	8.00
71-43-2	Benzene	8.1 U		8.1	0.843
74-97-5	Bromochloromethane	8.1 U		8.1	1.22
75-27-4	Dichlorobromomethane	8.1 U		8.1	0.802
75-25-2	Bromoform	8.1 U		8.1	0.925
74-83-9	Bromomethane	8.1 U		8.1	2.40
75-15-0	Carbon Disulfide	8.1 U		8.1	2.32
56-23-5	Carbon Tetrachloride	8.1 U		8.1	0.746
108-90-7	Chlorobenzene	8.1 U		8.1	1.06
75-00-3	Chloroethane	8.1 U		8.1	2.16
67-66-3	Chloroform	8.1 U		8.1	0.714

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12C**	QC Batch:	90061 -120
Sample #:	**345889**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	8.1 U		8.1	1.33
110-82-7	Cyclohexane	16 U		16	0.506
10061-01-5	cis-1,3-Dichloropropene	8.1 U		8.1	0.786
10061-02-6	trans-1,3-Dichloropropene	8.1 U		8.1	0.834
75-71-8	Dichlorodifluoromethane	8.1 U		8.1	1.07
124-48-1	Chlorodibromomethane	8.1 U		8.1	0.827
100-41-4	Ethylbenzene	8.1 U		8.1	0.677
98-82-8	*Isopropylbenzene	8.1 UJ	UJ;	8.1	0.874
79-20-9	Methyl Acetate	32 U	UJ,C	32	5.55
108-87-2	Methylcyclohexane	16 U		16	1.35
1634-04-4	Methyl(tert)butyl Ether	8.1 U		8.1	1.03
75-09-2	Methylene Chloride	32 U		32	4.50
100-42-5	Styrene	8.1 U		8.1	0.707
127-18-4	Tetrachloroethene	8.1 U		8.1	0.981
108-88-3	Toluene	8.1 U		8.1	0.742
79-01-6	Trichloroethene	8.1 U		8.1	1.08
75-69-4	Trichlorofluoromethane	8.1 U		8.1	1.19
75-01-4	Vinyl Chloride	8.1 U		8.1	0.592
1330-20-7	Xylene (Total)	8.1 U		8.1	0.674

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12C**	QC Batch:	90061 -120
Sample #:	**345889**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	62
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Ethyl Ether	60-29-7	28	Q	NJ, +

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11A**	QC Batch:	90061 -120
Sample #:	**345890**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U	6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U	6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U	6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U	6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U	6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U	6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U	6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U	13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U	6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U	6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U	6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U	6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U	6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U	6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U	6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U	6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U	6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**45**	26	6.50
591-78-6	2-Hexanone	13 U	13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U	13	1.90
67-64-1	**Acetone**	**240**	26	6.50
71-43-2	**Benzene**	**0.91 J**	6.5	0.685
74-97-5	Bromochloromethane	6.5 U	6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U	6.5	0.651
75-25-2	Bromoform	6.5 U	6.5	0.751
74-83-9	Bromomethane	6.5 U	6.5	1.95
75-15-0	Carbon Disulfide	6.5 U	6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U	6.5	0.606
108-90-7	Chlorobenzene	6.5 U	6.5	0.859
75-00-3	Chloroethane	6.5 U	6.5	1.76
67-66-3	Chloroform	6.5 U	6.5	0.580

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11A**	QC Batch:	90061 -120
Sample #:	**345890**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.672
100-41-4	Ethylbenzene	6.5 U		6.5	0.550
98-82-8	Isopropylbenzene	6.5 U		6.5	0.710
79-20-9	Methyl Acetate	26 U	VJ,C	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	0.833
75-09-2	**Methylene Chloride**	**7.3 J**	B,Z	26	3.65
100-42-5	Styrene	6.5 U		6.5	0.575
127-18-4	Tetrachloroethene	6.5 U		6.5	0.797
108-88-3	**Toluene**	**1.9 J**		6.5	0.603
79-01-6	**Trichloroethene**	**9.6**		6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.966
75-01-4	Vinyl Chloride	6.5 U		6.5	0.481
1330-20-7	Xylene (Total)	6.5 U		6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11A**	QC Batch:	90061 -120
Sample #:	**345890**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11B**	QC Batch:	90061 -120
Sample #:	**345891**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.7 U		5.7	0.469
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.7 U		5.7	0.835
79-34-5	1,1,2,2-Tetrachloroethane	5.7 U		5.7	0.718
79-00-5	1,1,2-Trichloroethane	5.7 U		5.7	0.652
75-34-3	1,1-Dichloroethane	5.7 U		5.7	0.796
75-35-4	1,1-Dichloroethylene	5.7 U		5.7	0.806
106-93-4	1,2-Dibromoethane	5.7 U		5.7	0.754
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.29
95-50-1	1,2-Dichlorobenzene	5.7 U		5.7	0.532
107-06-2	1,2-Dichloroethane	5.7 U		5.7	0.474
156-59-2	**cis-1,2-Dichloroethene**	**1.9 J**		5.7	0.781
156-60-5	trans-1,2-Dichloroethene	5.7 U		5.7	0.773
78-87-5	1,2-Dichloropropane	5.7 U		5.7	0.645
87-61-6	1,2,3-Trichlorobenzene	5.7 U		5.7	0.598
120-82-1	1,2,4-Trichlorobenzene	5.7 U		5.7	0.451
541-73-1	1,3-Dichlorobenzene	5.7 U		5.7	0.295
106-46-7	1,4-Dichlorobenzene	5.7 U		5.7	0.781
78-93-3	**Methyl Ethyl Ketone**	**32**		23	5.50
591-78-6	2-Hexanone	11 U		11	2.49
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.61
67-64-1	**Acetone**	**150**	B,Z	23	5.50
71-43-2	**Benzene**	**1.5 J**		5.7	0.580
74-97-5	Bromochloromethane	5.7 U		5.7	0.837
75-27-4	Dichlorobromomethane	5.7 U		5.7	0.551
75-25-2	Bromoform	5.7 U		5.7	0.636
74-83-9	Bromomethane	5.7 U		5.7	1.65
75-15-0	Carbon Disulfide	5.7 U		5.7	1.60
56-23-5	Carbon Tetrachloride	5.7 U		5.7	0.513
108-90-7	Chlorobenzene	5.7 U		5.7	0.727
75-00-3	Chloroethane	5.7 U		5.7	1.49
67-66-3	Chloroform	5.7 U		5.7	0.491

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11B**	QC Batch:	90061 -120
Sample #:	**345891**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.7 U		5.7	0.917
110-82-7	Cyclohexane	11 U		11	0.348
10061-01-5	cis-1,3-Dichloropropene	5.7 U		5.7	0.540
10061-02-6	trans-1,3-Dichloropropene	5.7 U		5.7	0.573
75-71-8	Dichlorodifluoromethane	5.7 U		5.7	0.735
124-48-1	Chlorodibromomethane	5.7 U		5.7	0.569
100-41-4	Ethylbenzene	5.7 U		5.7	0.465
98-82-8	Isopropylbenzene	5.7 U		5.7	0.601
79-20-9	Methyl Acetate	23 U	UJ,C	23	3.82
108-87-2	Methylcyclohexane	11 U		11	0.930
1634-04-4	Methyl(tert)butyl Ether	5.7 U		5.7	0.705
75-09-2	**Methylene Chloride**	**6.1 J**	B,Z	23	3.09
100-42-5	Styrene	5.7 U		5.7	0.486
127-18-4	Tetrachloroethene	5.7 U		5.7	0.674
108-88-3	**Toluene**	**1.4 J**		5.7	0.510
79-01-6	**Trichloroethene**	**31**		5.7	0.745
75-69-4	Trichlorofluoromethane	5.7 U		5.7	0.817
75-01-4	Vinyl Chloride	5.7 U		5.7	0.407
1330-20-7	Xylene (Total)	5.7 U		5.7	0.463

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Individual sample results relate only to the sample tested.
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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11B**	QC Batch:	90061 -120
Sample #:	**345891**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	8.9	E

NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB11C**	QC Batch:	90061 -120
Sample #:	**345892**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U	6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U	6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U	6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U	6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U	6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U	6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U	6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U	13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U	6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U	6.5	0.560
156-59-2	**cis-1,2-Dichloroethene**	**4.2 J**	6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U	6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U	6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U	6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U	6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U	6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U	6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**40**	26	6.50
591-78-6	2-Hexanone	13 U	13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U	13	1.90
67-64-1	**Acetone**	**200** B,Z	26	6.50
71-43-2	**Benzene**	**1.5 J**	6.5	0.685
74-97-5	Bromochloromethane	6.5 U	6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U	6.5	0.651
75-25-2	Bromoform	6.5 U	6.5	0.751
74-83-9	Bromomethane	6.5 U	6.5	1.95
75-15-0	Carbon Disulfide	6.5 U	6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U	6.5	0.606
108-90-7	Chlorobenzene	6.5 U	6.5	0.859
75-00-3	Chloroethane	6.5 U	6.5	1.76
67-66-3	Chloroform	6.5 U	6.5	0.580

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11C**	QC Batch:	90061 -120
Sample #:	**345892**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.672
100-41-4	Ethylbenzene	6.5 U		6.5	0.550
98-82-8	Isopropylbenzene	6.5 U		6.5	0.710
79-20-9	Methyl Acetate	26 U	UJ/C	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	0.833
75-09-2	**Methylene Chloride**	**5.8 J**	B/Z	26	3.65
100-42-5	Styrene	6.5 U		6.5	0.575
127-18-4	Tetrachloroethene	6.5 U		6.5	0.797
108-88-3	**Toluene**	**1.1 J**		6.5	0.603
79-01-6	**Trichloroethene**	**57**		6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.966
75-01-4	Vinyl Chloride	6.5 U		6.5	0.481
1330-20-7	Xylene (Total)	6.5 U		6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11C**	QC Batch:	90061 -120
Sample #:	**345892**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	4.7	E

NJA

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10A**	QC Batch:	90061 -120
Sample #:	**345893**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U	7.0	0.596
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U	7.0	1.06
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U	7.0	0.914
79-00-5	1,1,2-Trichloroethane	7.0 U	7.0	0.830
75-34-3	1,1-Dichloroethane	7.0 U	7.0	1.01
75-35-4	1,1-Dichloroethylene	7.0 U	7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U	7.0	0.959
96-12-8	1,2-Dibromo-3-chloropropane	14 U	14	2.91
95-50-1	1,2-Dichlorobenzene	7.0 U	7.0	0.678
107-06-2	1,2-Dichloroethane	7.0 U	7.0	0.603
156-59-2	cis-1,2-Dichloroethene	7.0 U	7.0	0.994
156-60-5	trans-1,2-Dichloroethene	7.0 U	7.0	0.984
78-87-5	1,2-Dichloropropane	7.0 U	7.0	0.820
87-61-6	1,2,3-Trichlorobenzene	7.0 U	7.0	0.762
120-82-1	**1,2,4-Trichlorobenzene**	**0.96 J**	7.0	0.574
541-73-1	1,3-Dichlorobenzene	7.0 U	7.0	0.375
106-46-7	1,4-Dichlorobenzene	7.0 U	7.0	0.994
78-93-3	**Methyl Ethyl Ketone**	**39**	28	7.00
591-78-6	2-Hexanone	14 U	14	3.16
108-10-1	4-Methyl-2-Pentanone	14 U	14	2.04
67-64-1	**Acetone**	**320**	28	7.00
71-43-2	Benzene	7.0 U	7.0	0.738
74-97-5	Bromochloromethane	7.0 U	7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U	7.0	0.701
75-25-2	Bromoform	7.0 U	7.0	0.809
74-83-9	Bromomethane	7.0 U	7.0	2.10
75-15-0	Carbon Disulfide	7.0 U	7.0	2.03
56-23-5	Carbon Tetrachloride	7.0 U	7.0	0.652
108-90-7	Chlorobenzene	7.0 U	7.0	0.925
75-00-3	Chloroethane	7.0 U	7.0	1.89
67-66-3	Chloroform	7.0 U	7.0	0.624

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10A**	QC Batch:	90061 -120
Sample #:	**345893**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.17
110-82-7	Cyclohexane	14 U		14	0.442
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.687
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.729
75-71-8	Dichlorodifluoromethane	7.0 U		7.0	0.935
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.724
100-41-4	Ethylbenzene	7.0 U		7.0	0.592
98-82-8	Isopropylbenzene	7.0 U		7.0	0.764
79-20-9	Methyl Acetate	28 U	UJ,C	28	4.86
108-87-2	Methylcyclohexane	14 U		14	1.18
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.897
75-09-2	**Methylene Chloride**	**11 J**	B,Z	28	3.93
100-42-5	Styrene	7.0 U		7.0	0.619
127-18-4	Tetrachloroethene	7.0 U		7.0	0.858
108-88-3	**Toluene**	**3.5 J**		7.0	0.650
79-01-6	Trichloroethene	7.0 U		7.0	0.948
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.04
75-01-4	Vinyl Chloride	7.0 U		7.0	0.518
1330-20-7	Xylene (Total)	7.0 U		7.0	0.589

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10A**	QC Batch:	90061 -120
Sample #:	**345893**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	350	E

NJ/+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB10B**	QC Batch:	90061 -120
Sample #:	**345894**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U		6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U		6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U		6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U		6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**39**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**180**	B,Z	26	6.50
71-43-2	Benzene	6.5 U		6.5	0.685
74-97-5	Bromochloromethane	6.5 U		6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.651
75-25-2	Bromoform	6.5 U		6.5	0.751
74-83-9	Bromomethane	6.5 U		6.5	1.95
75-15-0	Carbon Disulfide	6.5 U		6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U		6.5	0.606
108-90-7	Chlorobenzene	6.5 U		6.5	0.859
75-00-3	Chloroethane	6.5 U		6.5	1.76
67-66-3	Chloroform	6.5 U		6.5	0.580

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB10B**	QC Batch:	90061 -120
Sample #:	**345894**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.672
100-41-4	Ethylbenzene	6.5 U		6.5	0.550
98-82-8	Isopropylbenzene	6.5 U		6.5	0.710
79-20-9	Methyl Acetate	26 U	VJC	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	0.833
75-09-2	**Methylene Chloride**	**6.6 J**	B/Z	26	3.65
100-42-5	Styrene	6.5 U		6.5	0.575
127-18-4	Tetrachloroethene	6.5 U		6.5	0.797
108-88-3	**Toluene**	**1.0 J**		6.5	0.603
79-01-6	Trichloroethene	6.5 U		6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.966
75-01-4	Vinyl Chloride	6.5 U		6.5	0.481
1330-20-7	Xylene (Total)	6.5 U		6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10B**	QC Batch:	90061 -120
Sample #:	**345894**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	9.0	E

NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB10C**	QC Batch:	90061 -120
Sample #:	**345895**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.596
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.06
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.914
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.830
75-34-3	1,1-Dichloroethane	6.8 U		6.8	1.01
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	1.03
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.959
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.91
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.678
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.603
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.994
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.984
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.820
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.762
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.574
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.375
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.994
78-93-3	**Methyl Ethyl Ketone**	**36**		27	7.00
591-78-6	2-Hexanone	14 U		14	3.16
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.04
67-64-1	**Acetone**	**160**	B,Z	27	7.00
71-43-2	Benzene	6.8 U		6.8	0.738
74-97-5	Bromochloromethane	6.8 U		6.8	1.07
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.701
75-25-2	Bromoform	6.8 U		6.8	0.809
74-83-9	Bromomethane	6.8 U		6.8	2.10
75-15-0	Carbon Disulfide	6.8 U		6.8	2.03
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.652
108-90-7	Chlorobenzene	6.8 U		6.8	0.925
75-00-3	Chloroethane	6.8 U		6.8	1.89
67-66-3	Chloroform	6.8 U		6.8	0.624

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10C**	QC Batch:	90061 -120
Sample #:	**345895**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.17
110-82-7	Cyclohexane	14 U		14	0.442
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.687
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.729
75-71-8	Dichlorodifluoromethane	6.8 U		6.8	0.935
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.724
100-41-4	Ethylbenzene	6.8 U		6.8	0.592
98-82-8	Isopropylbenzene	6.8 U		6.8	0.764
79-20-9	Methyl Acetate	27 U		27	4.86
108-87-2	Methylcyclohexane	14 U		14	1.18
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.897
75-09-2	**Methylene Chloride**	**7.4 J**	B,Z	27	3.93
100-42-5	Styrene	6.8 U		6.8	0.619
127-18-4	Tetrachloroethene	6.8 U		6.8	0.858
108-88-3	Toluene	6.8 U		6.8	0.650
79-01-6	Trichloroethene	6.8 U		6.8	0.948
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.04
75-01-4	Vinyl Chloride	6.8 U		6.8	0.518
1330-20-7	Xylene (Total)	6.8 U		6.8	0.589

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10C**	QC Batch:	90061 -120
Sample #:	**345895**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9A**	QC Batch:	90061 -121
Sample #:	**345896**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.849
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.771
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.941
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.953
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.629
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.560
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.923
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.914
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.762
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.707
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.533
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.348
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.923
78-93-3	**Methyl Ethyl Ketone**	**41**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**140**		26	6.50
71-43-2	Benzene	6.4 U		6.4	0.685
74-97-5	Bromochloromethane	6.4 U		6.4	0.989
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.651
75-25-2	Bromoform	6.4 U		6.4	0.751
74-83-9	Bromomethane	6.4 U		6.4	1.95
75-15-0	Carbon Disulfide	6.4 U		6.4	1.89
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.606
108-90-7	Chlorobenzene	6.4 U		6.4	0.859
75-00-3	Chloroethane	6.4 U	VJ,c	6.4	1.76
67-66-3	Chloroform	6.4 U		6.4	0.580

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9A**	QC Batch:	90061 -121
Sample #:	**345896**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U	6.4	1.08
110-82-7	Cyclohexane	13 U	13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.4 U	6.4	0.638
10061-02-6	trans-1,3-Dichloropropene	6.4 U	6.4	0.677
75-71-8	Dichlorodifluoromethane	6.4 U	6.4	0.868
124-48-1	Chlorodibromomethane	6.4 U	6.4	0.672
100-41-4	Ethylbenzene	6.4 U	6.4	0.550
98-82-8	Isopropylbenzene	6.4 U	6.4	0.710
79-20-9	Methyl Acetate	26 U	26	4.51
108-87-2	Methylcyclohexane	13 U	13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.4 U	6.4	0.833
75-09-2	**Methylene Chloride**	**5.7 J**	26	3.65
100-42-5	Styrene	6.4 U	6.4	0.575
127-18-4	Tetrachloroethene	6.4 U	6.4	0.797
108-88-3	**Toluene**	**2.7 J**	6.4	0.603
79-01-6	Trichloroethene	6.4 U	6.4	0.880
75-69-4	Trichlorofluoromethane	6.4 U	6.4	0.966
75-01-4	Vinyl Chloride	6.4 U	6.4	0.481
1330-20-7	Xylene (Total)	6.4 U	6.4	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9A**	QC Batch:	90061 -121
Sample #:	**345896**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD9**	QC Batch:	90061 -121
Sample #:	**345897**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.784
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.712
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.869
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.880
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.581
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.517
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	0.852
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	0.844
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.703
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.653
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.492
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.322
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.852
78-93-3	**Methyl Ethyl Ketone**	**33**		25	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	**Acetone**	**130**		25	6.00
71-43-2	Benzene	6.2 U		6.2	0.632
74-97-5	Bromochloromethane	6.2 U		6.2	0.913
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.601
75-25-2	Bromoform	6.2 U		6.2	0.694
74-83-9	Bromomethane	6.2 U		6.2	1.80
75-15-0	Carbon Disulfide	6.2 U		6.2	1.74
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.559
108-90-7	Chlorobenzene	6.2 U		6.2	0.793
75-00-3	Chloroethane	6.2 U	UJc	6.2	1.62
67-66-3	Chloroform	6.2 U		6.2	0.535

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD9**	QC Batch:	90061 -121
Sample #:	**345897**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U	6.2	1.00
110-82-7	Cyclohexane	12 U	12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.2 U	6.2	0.589
10061-02-6	trans-1,3-Dichloropropene	6.2 U	6.2	0.625
75-71-8	Dichlorodifluoromethane	6.2 U	6.2	0.802
124-48-1	Chlorodibromomethane	6.2 U	6.2	0.620
100-41-4	Ethylbenzene	6.2 U	6.2	0.508
98-82-8	Isopropylbenzene	6.2 U	6.2	0.655
79-20-9	Methyl Acetate	25 U	25	4.16
108-87-2	Methylcyclohexane	12 U	12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.2 U	6.2	0.769
75-09-2	**Methylene Chloride**	**5.7 J**	25	3.37
100-42-5	Styrene	6.2 U	6.2	0.530
127-18-4	Tetrachloroethene	6.2 U	6.2	0.736
108-88-3	**Toluene**	**0.69 J**	6.2	0.557
79-01-6	Trichloroethene	6.2 U	6.2	0.812
75-69-4	Trichlorofluoromethane	6.2 U	6.2	0.892
75-01-4	Vinyl Chloride	6.2 U	6.2	0.444
1330-20-7	Xylene (Total)	6.2 U	6.2	0.505

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD9**	QC Batch:	90061 -121
Sample #:	**345897**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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Individual sample results relate only to the sample tested.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9B**	QC Batch:	90061 -121
Sample #:	**345898**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.596
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.06
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.914
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.830
75-34-3	1,1-Dichloroethane	6.8 U		6.8	1.01
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	1.03
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.959
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.91
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.678
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.603
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.994
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.984
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.820
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.762
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.574
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.375
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.994
78-93-3	**Methyl Ethyl Ketone**	**400**		27	7.00
591-78-6	2-Hexanone	14 U		14	3.16
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.04
67-64-1	**Acetone**	**140**		27	7.00
71-43-2	Benzene	6.8 U		6.8	0.738
74-97-5	Bromochloromethane	6.8 U		6.8	1.07
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.701
75-25-2	Bromoform	6.8 U		6.8	0.809
74-83-9	Bromomethane	6.8 U		6.8	2.10
75-15-0	Carbon Disulfide	6.8 U		6.8	2.03
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.652
108-90-7	Chlorobenzene	6.8 U		6.8	0.925
75-00-3	Chloroethane	6.8 U	VJ,C	6.8	1.89
67-66-3	Chloroform	6.8 U		6.8	0.624

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9B**	QC Batch:	90061 -121
Sample #:	**345898**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U	6.8	1.17
110-82-7	Cyclohexane	14 U	14	0.442
10061-01-5	cis-1,3-Dichloropropene	6.8 U	6.8	0.687
10061-02-6	trans-1,3-Dichloropropene	6.8 U	6.8	0.729
75-71-8	Dichlorodifluoromethane	6.8 U	6.8	0.935
124-48-1	Chlorodibromomethane	6.8 U	6.8	0.724
100-41-4	Ethylbenzene	6.8 U	6.8	0.592
98-82-8	Isopropylbenzene	6.8 U	6.8	0.764
79-20-9	Methyl Acetate	27 U	27	4.86
108-87-2	Methylcyclohexane	14 U	14	1.18
1634-04-4	Methyl(tert)butyl Ether	6.8 U	6.8	0.897
75-09-2	**Methylene Chloride**	**5.5 J**	27	3.93
100-42-5	Styrene	6.8 U	6.8	0.619
127-18-4	Tetrachloroethene	6.8 U	6.8	0.858
108-88-3	Toluene	6.8 U	6.8	0.650
79-01-6	Trichloroethene	6.8 U	6.8	0.948
75-69-4	Trichlorofluoromethane	6.8 U	6.8	1.04
75-01-4	Vinyl Chloride	6.8 U	6.8	0.518
1330-20-7	Xylene (Total)	6.8 U	6.8	0.589

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9B**	QC Batch:	90061 -121
Sample #:	**345898**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	8.6	E NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9C**	QC Batch:	90257 -121
Sample #:	**345899**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.849
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.771
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.941
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.953
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.629
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.560
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.923
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.914
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.762
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.707
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.533
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.348
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.923
78-93-3	**Methyl Ethyl Ketone**	**24 J**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**31**	B,Z	26	6.50
71-43-2	Benzene	6.4 U		6.4	0.685
74-97-5	Bromochloromethane	6.4 U		6.4	0.989
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.651
75-25-2	Bromoform	6.4 U		6.4	0.751
74-83-9	Bromomethane	6.4 U		6.4	1.95
75-15-0	Carbon Disulfide	6.4 U		6.4	1.89
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.606
108-90-7	Chlorobenzene	6.4 U		6.4	0.859
75-00-3	Chloroethane	6.4 U	VJ,C	6.4	1.76
67-66-3	Chloroform	6.4 U		6.4	0.580

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9C**	QC Batch:	90257 -121
Sample #:	**345899**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U	6.4	1.08
110-82-7	Cyclohexane	13 U	13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.4 U	6.4	0.638
10061-02-6	trans-1,3-Dichloropropene	6.4 U	6.4	0.677
75-71-8	Dichlorodifluoromethane	6.4 U	6.4	0.868
124-48-1	Chlorodibromomethane	6.4 U	6.4	0.672
100-41-4	Ethylbenzene	6.4 U	6.4	0.550
98-82-8	Isopropylbenzene	6.4 U	6.4	0.710
79-20-9	Methyl Acetate	26 U	26	4.51
108-87-2	Methylcyclohexane	13 U	13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.4 U	6.4	0.833
75-09-2	**Methylene Chloride**	**5.0 J**	26	3.65
100-42-5	Styrene	6.4 U	6.4	0.575
127-18-4	Tetrachloroethene	6.4 U	6.4	0.797
108-88-3	Toluene	6.4 U	6.4	0.603
79-01-6	Trichloroethene	6.4 U	6.4	0.880
75-69-4	Trichlorofluoromethane	6.4 U	6.4	0.966
75-01-4	Vinyl Chloride	6.4 U	6.4	0.481
1330-20-7	Xylene (Total)	6.4 U	6.4	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9C**	QC Batch:	90257 -121
Sample #:	**345899**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB8A**	QC Batch:	90257 -121
Sample #:	**345900**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U		6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U		6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U		6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U		6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**30**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**120**		26	6.50
71-43-2	Benzene	6.5 U		6.5	0.685
74-97-5	Bromochloromethane	6.5 U		6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.651
75-25-2	Bromoform	6.5 U		6.5	0.751
74-83-9	Bromomethane	6.5 U		6.5	1.95
75-15-0	Carbon Disulfide	6.5 U		6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U		6.5	0.606
108-90-7	Chlorobenzene	6.5 U		6.5	0.859
75-00-3	Chloroethane	6.5 U	VJc	6.5	1.76
67-66-3	Chloroform	6.5 U		6.5	0.580

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8A**	QC Batch:	90257 -121
Sample #:	**345900**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U	6.5	1.08
110-82-7	Cyclohexane	13 U	13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U	6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U	6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U	6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U	6.5	0.672
100-41-4	Ethylbenzene	6.5 U	6.5	0.550
98-82-8	Isopropylbenzene	6.5 U	6.5	0.710
79-20-9	Methyl Acetate	26 U	26	4.51
108-87-2	Methylcyclohexane	13 U	13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U	6.5	0.833
75-09-2	**Methylene Chloride**	**4.1 J**	26	3.65
100-42-5	Styrene	6.5 U	6.5	0.575
127-18-4	Tetrachloroethene	6.5 U	6.5	0.797
108-88-3	**Toluene**	**0.66 J**	6.5	0.603
79-01-6	Trichloroethene	6.5 U	6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U	6.5	0.966
75-01-4	Vinyl Chloride	6.5 U	6.5	0.481
1330-20-7	Xylene (Total)	6.5 U	6.5	0.547

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8A**	QC Batch:	90257 -121
Sample #:	**345900**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8B**	QC Batch:	90257 -121
Sample #:	**345901**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U		6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U		6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U		6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U		6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**25 J**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**77**	B,Z	26	6.50
71-43-2	Benzene	6.5 U		6.5	0.685
74-97-5	Bromochloromethane	6.5 U		6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.651
75-25-2	Bromoform	6.5 U		6.5	0.751
74-83-9	Bromomethane	6.5 U		6.5	1.95
75-15-0	Carbon Disulfide	6.5 U		6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U		6.5	0.606
108-90-7	Chlorobenzene	6.5 U		6.5	0.859
75-00-3	Chloroethane	6.5 U	UJ,C	6.5	1.76
67-66-3	Chloroform	6.5 U		6.5	0.580

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8B**	QC Batch:	90257 -121
Sample #:	**345901**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U	6.5	1.08
110-82-7	Cyclohexane	13 U	13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U	6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U	6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U	6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U	6.5	0.672
100-41-4	Ethylbenzene	6.5 U	6.5	0.550
98-82-8	Isopropylbenzene	6.5 U	6.5	0.710
79-20-9	Methyl Acetate	26 U	26	4.51
108-87-2	Methylcyclohexane	13 U	13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U	6.5	0.833
75-09-2	**Methylene Chloride**	**5.6 J**	26	3.65
100-42-5	Styrene	6.5 U	6.5	0.575
127-18-4	Tetrachloroethene	6.5 U	6.5	0.797
108-88-3	Toluene	6.5 U	6.5	0.603
79-01-6	Trichloroethene	6.5 U	6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U	6.5	0.966
75-01-4	Vinyl Chloride	6.5 U	6.5	0.481
1330-20-7	Xylene (Total)	6.5 U	6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8B**	QC Batch:	90257 -121
Sample #:	**345901**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2A**	QC Batch:	90482 -114
Sample #:	**345745**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	400 U	400	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	66.5
99-09-2	3-Nitroaniline	200 U	200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**12 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	400 U	400	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2A**	QC Batch:	90482 -114
Sample #:	**345745**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**22 J**	B,Z	200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**6.0 J**	J,I	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**53 J**	B,Z	200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	**Fluoranthene**	**8.0 J**		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2A**	QC Batch:	90482 -114
Sample #:	**345745**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**5.0 J**	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**9.0 J**	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2A**	QC Batch:	90482 -114
Sample #:	**345745**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	190	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	38	E	B,X
D-Friedoolean-14-ene, 3-methoxy-, (3.beta.)-	14021-23-9	210	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~600~~	~~E~~	~~AS~~ 2/18/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2B**	QC Batch:	90482 -114
Sample #:	**345746**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U		420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**12 J**		220	6.77
106-47-8	4-Chloroaniline	220 U	VJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2B**	QC Batch:	90482 -114
Sample #:	**345746**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**15 J**	B,Z	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**4.0 J**	J,1	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**50 J**	B,Z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2B**	QC Batch:	90482 -114
Sample #:	**345746**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2B**	QC Batch:	90482 -114
Sample #:	**345746**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	79
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	57	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	34	E	NJ,+
Erucylamide	112-84-5	190	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~270~~	~~E~~	

AS 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2C**	QC Batch:	90482 -114
Sample #:	**345747**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.72
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.34
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.41
120-83-2	2,4-Dichlorophenol	230 U		230	4.58
105-67-9	2,4-Dimethylphenol	230 U		230	10.3
51-28-5	2,4-Dinitrophenol	440 U		440	4.16
121-14-2	2,4-Dinitrotoluene	230 U		230	4.10
606-20-2	2,6-Dinitrotoluene	230 U		230	36.0
91-58-7	2-Chloronaphthalene	230 U		230	2.99
95-57-8	2-Chlorophenol	230 U		230	2.61
91-57-6	2-Methylnaphthalene	230 U		230	3.56
95-48-7	2-Methylphenol	230 U		230	6.29
88-74-4	2-Nitroaniline	230 U		230	5.98
88-75-5	2-Nitrophenol	230 U		230	2.21
91-94-1	3,3'-Dichlorobenzidine	230 U		230	72.0
99-09-2	3-Nitroaniline	230 U		230	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	5.86
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**16 J**		230	6.77
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.25
106-44-5	4-Methylphenol	230 U		230	8.28
100-01-6	4-Nitroaniline	230 U		230	9.43
100-02-7	4-Nitrophenol	440 U		440	3.68
83-32-9	Acenaphthene	230 U		230	2.24
208-96-8	Acenaphthylene	230 U		230	1.95
98-86-2	Acetophenone	230 U		230	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2C**	QC Batch:	90482 -114
Sample #:	**345747**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.01
1912-24-9	Atrazine	230 U		230	8.94
100-52-7	Benzaldehyde	230 U		230	5.27
56-55-3	Benzo (a) Anthracene	230 U		230	17.3
50-32-8	Benzo (a) Pyrene	230 U		230	7.42
205-99-2	Benzo (b) Fluoranthene	230 U		230	12.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	11.3
207-08-9	Benzo (k) Fluoranthene	230 U		230	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.08
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**16 J**	B,Z	230	2.69
85-68-7	Butyl Benzyl Phthalate	230 U		230	5.82
105-60-2	Caprolactam	440 U		440	8.29
86-74-8	Carbazole	230 U		230	7.93
218-01-9	Chrysene	230 U		230	13.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	7.67
132-64-9	Dibenzofuran	230 U		230	4.11
84-66-2	**Diethylphthalate**	**5.0 J**	J,I	230	2.47
131-11-3	Dimethylphthalate	230 U		230	4.30
84-74-2	**Di-n-Butylphthalate**	**70 J**	B,Z	230	4.97
117-84-0	Di-n-Octylphthalate	230 U		230	4.03
206-44-0	Fluoranthene	230 U		230	3.06
86-73-7	Fluorene	230 U		230	2.18
118-74-1	Hexachlorobenzene	230 U		230	3.26
87-68-3	Hexachlorobutadiene	230 U		230	5.03
77-47-4	Hexachlorocyclopentadiene	230 U		230	2.57
67-72-1	Hexachloroethane	230 U		230	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.10
78-59-1	Isophorone	230 U		230	2.25
91-20-3	Naphthalene	230 U		230	3.58
98-95-3	Nitrobenzene	230 U		230	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2C**	QC Batch:	90482 -114
Sample #:	**345747**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.28
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.18
87-86-5	Pentachlorophenol	440 U	440	5.71
85-01-8	Phenanthrene	230 U	230	2.99
108-95-2	Phenol	230 U	230	5.15
129-00-0	Pyrene	230 U	230	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2C**	QC Batch:	90482 -114
Sample #:	**345747**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	76	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	63	E	NJ,+
Erucylamide	112-84-5	380	E	B X
Ethanol, 2-(hexadecyloxy)-	2136-71-2	42	E	NJ,+
Squalene	7683-64-9	46	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB4B**	QC Batch:	90482 -114
Sample #:	**345748**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	440 U		440	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**		230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	440 U		440	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB4B**	QC Batch:	90482 -114
Sample #:	**345748**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	Benzo (a) Anthracene	230 U		230	18.6
50-32-8	Benzo (a) Pyrene	230 U		230	7.99
205-99-2	Benzo (b) Fluoranthene	230 U		230	13.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**24 J**	B,2	230	2.90
85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
105-60-2	Caprolactam	440 U		440	8.93
86-74-8	Carbazole	230 U		230	8.54
218-01-9	Chrysene	230 U		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**6.0 J**	J,1	230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**76 J**	B,2	230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	Fluoranthene	230 U		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U		230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB4B**	QC Batch:	90482 -114
Sample #:	**345748**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	440 U	440	6.15
85-01-8	Phenanthrene	230 U	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	Pyrene	230 U	230	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB4B**	QC Batch:	90482 -114
Sample #:	**345748**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	160	E	NJ,+
1-Hexadecanol	36653-82-4	48	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	58	E	NJ,+
4-(1,1,3,3-Tetramethyl Butyl)-Phenol	140-66-9	29	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~150~~	~~E~~	~~+~~ KS 2/18/04
Phenol, 4-(1,1-dimethylpropyl)-	80-46-6	720	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7A**	QC Batch:	90482 -114
Sample #:	**345883**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U	UJ,c	400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**		210	6.25
106-47-8	4-Chloroaniline	210 U		210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7A**	QC Batch:	90482 -114
Sample #:	**345883**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	**Benzo (a) Pyrene**	**18 J**		210	6.85
205-99-2	**Benzo (b) Fluoranthene**	**25 J**	J,1	210	11.7
191-24-2	**Benzo (g,h,i,) Perylene**	**11 J**	J,1	210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**19 J**	B,2	210	2.48
85-68-7	**Butyl Benzyl Phthalate**	**6.0 J**		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	**Chrysene**	**24 J**		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**9.0 J**	J,1	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**70 J**	B,2	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**9.0 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**10 J**	J,1	210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7A**	QC Batch:	90482 -114
Sample #:	**345883**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**4.0 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**6.0 J**	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7A**	QC Batch:	90482 -114
Sample #:	**345883**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	69	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	50	E	B,X
Erucylamide	112-84-5	300	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~170~~	~~E~~	AS 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7B**	QC Batch:	90482 -114
Sample #:	**345884**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	410 U	VJC	410	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**16 J**		210	6.25
106-47-8	4-Chloroaniline	210 U		210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U		410	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7B**	QC Batch:	90482 -114
Sample #:	**345884**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	**Benzo (a) Pyrene**	**11 J**		210	6.85
205-99-2	**Benzo (b) Fluoranthene**	**17 J**	J,1	210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**18 J**	B,2	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U		410	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	**Chrysene**	**16 J**		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**8.0 J**	J,1	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**85 J**	B,2	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7B**	QC Batch:	90482 -114
Sample #:	**345884**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7B**	QC Batch:	90482 -114
Sample #:	**345884**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	140	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	42	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~330~~	~~E~~	AB 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7C**	QC Batch:	90482 -114
Sample #:	**345885**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,C	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**8.0 J**		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7C**	QC Batch:	90482 -114
Sample #:	**345885**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**17 J**	B,Z	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**6.0 J**	J,I	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**120 J**	B,Z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7C**	QC Batch:	90482 -114
Sample #:	**345885**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7C**	QC Batch:	90482 -114
Sample #:	**345885**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	79
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	200	E	NJ+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	36	E	B,X
Erucylamide	112-84-5	120	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~500~~	~~E~~	~~B,X~~ ts 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12A**	QC Batch:	90572 -114
Sample #:	**345886**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	420 U VJ,C	420	4.16
121-14-2	**2,4-Dinitrotoluene**	**710**	220	4.10
606-20-2	**2,6-Dinitrotoluene**	**210 J**	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	420 U	420	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12A**	QC Batch:	90572 -114
Sample #:	**345886**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	220 U	220	6.01
1912-24-9	Atrazine	220 U	220	8.94
100-52-7	Benzaldehyde	220 U	220	5.27
56-55-3	Benzo (a) Anthracene	220 U	220	17.3
50-32-8	Benzo (a) Pyrene	220 U	220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**13 J**	220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U	220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U	220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U	220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U	220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**71 J**	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U	220	5.82
105-60-2	Caprolactam	420 U	420	8.29
86-74-8	Carbazole	220 U	220	7.93
218-01-9	Chrysene	220 U	220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U	220	7.67
132-64-9	Dibenzofuran	220 U	220	4.11
84-66-2	**Diethylphthalate**	**950**	220	2.47
131-11-3	Dimethylphthalate	220 U	220	4.30
84-74-2	**Di-n-Butylphthalate**	**680**	220	4.97
117-84-0	Di-n-Octylphthalate	220 U	220	4.03
206-44-0	**Fluoranthene**	**25 J**	220	3.06
86-73-7	Fluorene	220 U	220	2.18
118-74-1	Hexachlorobenzene	220 U	220	3.26
87-68-3	Hexachlorobutadiene	220 U	220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	220	2.57
67-72-1	Hexachloroethane	220 U	220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U	220	5.10
78-59-1	Isophorone	220 U	220	2.25
91-20-3	Naphthalene	220 U	220	3.58
98-95-3	Nitrobenzene	220 U	220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12A**	QC Batch:	90572 -114
Sample #:	**345886**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**630**	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	**Phenanthrene**	**15 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**21 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12A**	QC Batch:	90572 -114
Sample #:	**345886**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	120	E	NJ,t
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	290	E	NJ,t
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	350	E	NJ,t
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	280	E	NJ,t
Erucylamide	112-84-5	330	E	B,x
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~670~~	~~E~~	~~*~~ 2/18/04
Triacetin	102-76-1	140	E	NJ,t
Urea, N,N'-dimethyl-N,N'-diphenyl-	611-92-7	910	E	NJ,t

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U	UJ,C	460	4.48
121-14-2	**2,4-Dinitrotoluene**	**700**		240	4.41
606-20-2	**2,6-Dinitrotoluene**	**61 J**		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	2-Methylnaphthalene	240 U		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	77.6
99-09-2	3-Nitroaniline	240 U		240	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**		240	7.29
106-47-8	4-Chloroaniline	240 U		240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	Acenaphthene	240 U		240	2.41
208-96-8	Acenaphthylene	240 U		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	240 U	240	6.47
1912-24-9	Atrazine	240 U	240	9.63
100-52-7	Benzaldehyde	240 U	240	5.67
56-55-3	Benzo (a) Anthracene	240 U	240	18.6
50-32-8	Benzo (a) Pyrene	240 U	240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U	240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U	240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U	240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U	240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U	240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**360**	240	2.90
85-68-7	Butyl Benzyl Phthalate	240 U	240	6.27
105-60-2	Caprolactam	460 U	460	8.93
86-74-8	Carbazole	240 U	240	8.54
218-01-9	Chrysene	240 U	240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U	240	8.26
132-64-9	Dibenzofuran	240 U	240	4.42
* ~~84-66-2~~	~~**Diethylphthalate**~~	~~**2000 E**~~ J,R	~~240~~	~~2.66~~ ~~*~~ 2/18/04
131-11-3	**Dimethylphthalate**	**32 J**	240	4.63
* ~~84-74-2~~	~~**Di-n-Butylphthalate**~~	~~**1200 E**~~ J,R	~~240~~	~~5.35~~ ~~*~~ 2/18/04
117-84-0	Di-n-Octylphthalate	240 U	240	4.34
206-44-0	Fluoranthene	240 U	240	3.29
86-73-7	Fluorene	240 U	240	2.35
118-74-1	Hexachlorobenzene	240 U	240	3.51
87-68-3	Hexachlorobutadiene	240 U	240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U	240	2.77
67-72-1	Hexachloroethane	240 U	240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U	240	5.49
78-59-1	Isophorone	240 U	240	2.42
91-20-3	Naphthalene	240 U	240	3.85
98-95-3	Nitrobenzene	240 U	240	4.48

* See Dilution for these results, *s 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	**N-Nitroso-di-Phenylamine**	**900**	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	270	E	NJ,+
2-Ethyl-hexanoic Acid	149-57-5	180	E	NJ,+
7H-Dibenzo (a,g) carbazole	207-84-1	280	E	NJ,+
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	260	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	900	E	NJ,+
Octacosane	630-02-4	180	E	NJ,+
Triacetin	102-76-1	1300	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	2.8

AK 2/18/04

Do not use, See undiluted results

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	480 U		480	6.89
95-94-3	1,2,4,5-Tetrachloro-benzene	480 U		480	80.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	480 U		480	3.70
95-95-4	2,4,5-Trichlorophenol	480 U		480	9.35
88-06-2	2,4,6-Trichlorophenol	480 U		480	7.34
120-83-2	2,4-Dichlorophenol	480 U		480	9.86
105-67-9	2,4-Dimethylphenol	480 U		480	22.2
51-28-5	2,4-Dinitrophenol	930 U	UJC	930	8.96
121-14-2	**2,4-Dinitrotoluene**	**690**		480	8.82
606-20-2	2,6-Dinitrotoluene	480 U		480	77.6
91-58-7	2-Chloronaphthalene	480 U		480	6.44
95-57-8	2-Chlorophenol	480 U		480	5.63
91-57-6	2-Methylnaphthalene	480 U		480	7.67
95-48-7	2-Methylphenol	480 U		480	13.6
88-74-4	2-Nitroaniline	480 U		480	12.9
88-75-5	2-Nitrophenol	480 U		480	4.76
91-94-1	3,3'-Dichlorobenzidine	480 U		480	155
99-09-2	3-Nitroaniline	480 U		480	51.2
534-52-1	4,6-Dinitro-2-Methylphenol	480 U		480	12.6
101-55-3	4-Bromophenyl Phenylether	480 U		480	9.46
59-50-7	**4-Chloro-3-Methylphenol**	**17 J**		480	14.6
106-47-8	4-Chloroaniline	480 U		480	3.53
7005-72-3	4-Chlorophenylphenyl-Ether	480 U		480	9.16
106-44-5	4-Methylphenol	480 U		480	17.8
100-01-6	4-Nitroaniline	480 U		480	20.3
100-02-7	4-Nitrophenol	930 U		930	7.92
83-32-9	Acenaphthene	480 U		480	4.82
208-96-8	Acenaphthylene	480 U		480	4.20
98-86-2	Acetophenone	480 U		480	5.32

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	2.8

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	480 U		480	12.9
1912-24-9	Atrazine	480 U		480	19.3
100-52-7	Benzaldehyde	480 U		480	11.3
56-55-3	Benzo (a) Anthracene	480 U		480	37.2
50-32-8	Benzo (a) Pyrene	480 U		480	16.0
205-99-2	Benzo (b) Fluoranthene	480 U		480	27.3
191-24-2	Benzo (g,h,i,) Perylene	480 U		480	24.4
207-08-9	Benzo (k) Fluoranthene	480 U		480	37.5
111-91-1	Bis (2-Chloroethoxy)-Methane	480 U		480	8.79
111-44-4	Bis (2-Chloroethyl) Ether	480 U		480	4.84
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**420 J**		480	5.80
85-68-7	Butyl Benzyl Phthalate	480 U		480	12.5
105-60-2	Caprolactam	930 U		930	17.9
86-74-8	Carbazole	480 U		480	17.1
218-01-9	Chrysene	480 U		480	28.6
53-70-3	Dibenzo (a,h) Anthracene	480 U		480	16.5
132-64-9	Dibenzofuran	480 U		480	8.85
84-66-2	**Diethylphthalate**	**2200**		480	5.32
131-11-3	**Dimethylphthalate**	**33 J**		480	9.27
84-74-2	**Di-n-Butylphthalate**	**1300**	J,f	480	10.7
117-84-0	Di-n-Octylphthalate	480 U		480	8.68
206-44-0	**Fluoranthene**	**7.0 J**		480	6.58
86-73-7	Fluorene	480 U		480	4.70
118-74-1	Hexachlorobenzene	480 U		480	7.03
87-68-3	Hexachlorobutadiene	480 U		480	10.8
77-47-4	Hexachlorocyclopentadiene	480 U	UJ,c	480	5.54
67-72-1	Hexachloroethane	480 U		480	6.54
193-39-5	Indeno (1,2,3-cd) Pyrene	480 U		480	11.0
78-59-1	Isophorone	480 U		480	4.84
91-20-3	Naphthalene	480 U		480	7.70
98-95-3	Nitrobenzene	480 U		480	8.96

2-18-04 2/18/04

* Use only these two results from this run 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	2.8

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	480 U	480	9.21
86-30-6	**N-Nitroso-di-Phenylamine**	**1200**	480	13.3
87-86-5	Pentachlorophenol	930 U	930	12.3
85-01-8	Phenanthrene	480 U	480	6.44
108-95-2	Phenol	480 U	480	11.1
129-00-0	**Pyrene**	**7.0 J**	480	4.14

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	250 U	250	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	250 U	250	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	250 U	250	1.98
95-95-4	2,4,5-Trichlorophenol	250 U	250	5.01
88-06-2	2,4,6-Trichlorophenol	250 U	250	3.93
120-83-2	2,4-Dichlorophenol	250 U	250	5.28
105-67-9	2,4-Dimethylphenol	250 U	250	11.9
51-28-5	2,4-Dinitrophenol	490 U UJ,c	490	4.80
~~121-14-2~~	~~**2,4-Dinitrotoluene**~~	~~**1500 E**~~ J,q	250	~~4.73~~ see dilution 4, 2/18/04
606-20-2	**2,6-Dinitrotoluene**	**56 J**	250	41.6
91-58-7	2-Chloronaphthalene	250 U	250	3.45
95-57-8	2-Chlorophenol	250 U	250	3.02
91-57-6	2-Methylnaphthalene	250 U	250	4.11
95-48-7	2-Methylphenol	250 U	250	7.26
88-74-4	2-Nitroaniline	250 U	250	6.90
88-75-5	2-Nitrophenol	250 U	250	2.55
91-94-1	3,3'-Dichlorobenzidine	250 U	250	83.1
99-09-2	3-Nitroaniline	250 U	250	27.5
534-52-1	4,6-Dinitro-2-Methylphenol	250 U	250	6.77
101-55-3	4-Bromophenyl Phenylether	250 U	250	5.07
59-50-7	**4-Chloro-3-Methylphenol**	**23 J**	250	7.82
106-47-8	4-Chloroaniline	250 U	250	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	250 U	250	4.91
106-44-5	4-Methylphenol	250 U	250	9.56
100-01-6	4-Nitroaniline	250 U	250	10.9
100-02-7	4-Nitrophenol	490 U	490	4.25
83-32-9	Acenaphthene	250 U	250	2.58
208-96-8	Acenaphthylene	250 U	250	2.25
98-86-2	Acetophenone	250 U	250	2.85

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL	
120-12-7	Anthracene	250 U	250	6.93	
1912-24-9	Atrazine	250 U	250	10.3	
100-52-7	Benzaldehyde	250 U	250	6.08	
56-55-3	Benzo (a) Anthracene	250 U	250	20.0	
50-32-8	Benzo (a) Pyrene	250 U	250	8.57	
205-99-2	Benzo (b) Fluoranthene	250 U	250	14.6	
191-24-2	Benzo (g,h,i,) Perylene	250 U	250	13.1	
207-08-9	Benzo (k) Fluoranthene	250 U	250	20.1	
111-91-1	Bis (2-Chloroethoxy)-Methane	250 U	250	4.71	
111-44-4	Bis (2-Chloroethyl) Ether	250 U	250	2.60	
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**300**	250	3.11	
85-68-7	Butyl Benzyl Phthalate	250 U	250	6.72	
105-60-2	Caprolactam	490 U	490	9.57	
86-74-8	Carbazole	250 U	250	9.15	
218-01-9	Chrysene	250 U	250	15.3	
53-70-3	Dibenzo (a,h) Anthracene	250 U	250	8.85	
132-64-9	Dibenzofuran	250 U	250	4.74	
~~84-66-2~~	~~**Diethylphthalate**~~	~~**2200 E**~~ J,q	250	2.85	see dilution 1, 2/18/04
131-11-3	Dimethylphthalate	250 U	250	4.97	
~~84-74-2~~	~~**Di-n-Butylphthalate**~~	~~**1800 E**~~ J,q	250	5.73	see dilution 1, 2/18/04
117-84-0	Di-n-Octylphthalate	250 U	250	4.65	
206-44-0	**Fluoranthene**	**21 J**	250	3.53	
86-73-7	Fluorene	250 U	250	2.52	
118-74-1	Hexachlorobenzene	250 U	250	3.77	
87-68-3	Hexachlorobutadiene	250 U	250	5.81	
77-47-4	Hexachlorocyclopentadiene	250 U	250	2.97	
67-72-1	Hexachloroethane	250 U	250	3.50	
193-39-5	Indeno (1,2,3-cd) Pyrene	250 U	250	5.88	
78-59-1	Isophorone	250 U	250	2.60	
91-20-3	Naphthalene	250 U	250	4.13	
98-95-3	Nitrobenzene	250 U	250	4.80	

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	250 U	250	4.94
86-30-6	**N-Nitroso-di-Phenylamine**	**700**	250	7.13
87-86-5	Pentachlorophenol	490 U	490	6.59
85-01-8	**Phenanthrene**	**9.0 J**	250	3.45
108-95-2	Phenol	250 U	250	5.94
129-00-0	**Pyrene**	**16 J**	250	2.22

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,1'-Biphenyl, bis(1-methylethyl)-	69009-90-1	66	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	400	E	NJ,+
2-Ethyl-hexanoic Acid	149-57-5	140	E	NJ,+
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	160	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	600	E	NJ,+
Erucylamide	112-84-5	440	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~560~~	~~E~~	~~+~~ 2/18/04
Triacetin	102-76-1	1000	E	NJ,+
Triphenyl Phosphate	115-86-6	200	E	NJ,+
Urea, N,N'-dimethyl-N,N'-diphenyl-	611-92-7	100	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	510 U	510	7.38
95-94-3	1,2,4,5-Tetrachloro-benzene	510 U	510	86.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	510 U	510	3.96
95-95-4	2,4,5-Trichlorophenol	510 U	510	10.0
88-06-2	2,4,6-Trichlorophenol	510 U	510	7.86
120-83-2	2,4-Dichlorophenol	510 U	510	10.6
105-67-9	2,4-Dimethylphenol	510 U	510	23.8
51-28-5	2,4-Dinitrophenol	980 U	980	9.60
121-14-2	**2,4-Dinitrotoluene**	**1500**	510	9.45
606-20-2	2,6-Dinitrotoluene	510 U	510	83.1
91-58-7	2-Chloronaphthalene	510 U	510	6.90
95-57-8	2-Chlorophenol	510 U	510	6.03
91-57-6	2-Methylnaphthalene	510 U	510	8.22
95-48-7	2-Methylphenol	510 U	510	14.5
88-74-4	2-Nitroaniline	510 U	510	13.8
88-75-5	2-Nitrophenol	510 U	510	5.10
91-94-1	3,3'-Dichlorobenzidine	510 U	510	166
99-09-2	3-Nitroaniline	510 U	510	54.9
534-52-1	4,6-Dinitro-2-Methylphenol	510 U	510	13.5
101-55-3	4-Bromophenyl Phenylether	510 U	510	10.1
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	510	15.6
106-47-8	4-Chloroaniline	510 U	510	3.78
7005-72-3	4-Chlorophenylphenyl-Ether	510 U	510	9.81
106-44-5	4-Methylphenol	510 U	510	19.1
100-01-6	4-Nitroaniline	510 U	510	21.8
100-02-7	4-Nitrophenol	980 U	980	8.49
83-32-9	Acenaphthene	510 U	510	5.16
208-96-8	Acenaphthylene	510 U	510	4.50
98-86-2	Acetophenone	510 U	510	5.70

UJ,C ✱ 2/18/04 ✱ 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	510 U	510	13.9
1912-24-9	Atrazine	510 U	510	20.6
100-52-7	Benzaldehyde	510 U	510	12.2
56-55-3	Benzo (a) Anthracene	510 U	510	39.9
50-32-8	Benzo (a) Pyrene	510 U	510	17.1
205-99-2	Benzo (b) Fluoranthene	510 U	510	29.3
191-24-2	Benzo (g,h,i,) Perylene	510 U	510	26.2
207-08-9	Benzo (k) Fluoranthene	510 U	510	40.2
111-91-1	Bis (2-Chloroethoxy)-Methane	510 U	510	9.42
111-44-4	Bis (2-Chloroethyl) Ether	510 U	510	5.19
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**320 J**	510	6.21
85-68-7	Butyl Benzyl Phthalate	510 U	510	13.4
105-60-2	Caprolactam	980 U	980	19.1
86-74-8	Carbazole	510 U	510	18.3
218-01-9	Chrysene	510 U	510	30.6
53-70-3	Dibenzo (a,h) Anthracene	510 U	510	17.7
132-64-9	Dibenzofuran	510 U	510	9.48
84-66-2	**Diethylphthalate**	**2400**	510	5.70
131-11-3	Dimethylphthalate	510 U	510	9.93
84-74-2	**Di-n-Butylphthalate**	**1900** J,f	510	11.5
117-84-0	Di-n-Octylphthalate	510 U	510	9.30
206-44-0	**Fluoranthene**	**21 J**	510	7.05
86-73-7	Fluorene	510 U	510	5.04
118-74-1	Hexachlorobenzene	510 U	510	7.53
87-68-3	Hexachlorobutadiene	510 U	510	11.6
77-47-4	Hexachlorocyclopentadiene	510 U UJ,c	510	5.94
67-72-1	Hexachloroethane	510 U	510	7.00
193-39-5	Indeno (1,2,3-cd) Pyrene	510 U	510	11.8
78-59-1	Isophorone	510 U	510	5.19
91-20-3	Naphthalene	510 U	510	8.25
98-95-3	Nitrobenzene	510 U	510	9.60

* Use only these results, AS 2/18/04

AS 2/18/04

AS 2/18/04

AS 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	510 U	510	9.87
86-30-6	**N-Nitroso-di-Phenylamine**	**820**	510	14.3
87-86-5	Pentachlorophenol	980 U	980	13.2
85-01-8	**Phenanthrene**	**8.0 J**	510	6.90
108-95-2	Phenol	510 U	510	11.9
129-00-0	**Pyrene**	**22 J**	510	4.44

Do not use See next analysis, TS 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12C**	QC Batch:	90572 -114
Sample #:	**345889**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	270 U		270	3.94
95-94-3	1,2,4,5-Tetrachloro-benzene	270 U		270	45.9
108-60-1	Bis (2-Chloroisopropyl)-Ether	270 U		270	2.11
95-95-4	2,4,5-Trichlorophenol	270 U		270	5.34
88-06-2	2,4,6-Trichlorophenol	270 U		270	4.19
120-83-2	2,4-Dichlorophenol	270 U		270	5.63
105-67-9	2,4-Dimethylphenol	270 U		270	12.7
51-28-5	2,4-Dinitrophenol	530 U	VJ,C	530	5.12
121-14-2	**2,4-Dinitrotoluene**	**65 J**		270	5.04
606-20-2	2,6-Dinitrotoluene	270 U		270	44.3
91-58-7	2-Chloronaphthalene	270 U		270	3.68
95-57-8	2-Chlorophenol	270 U		270	3.22
91-57-6	2-Methylnaphthalene	270 U		270	4.38
95-48-7	2-Methylphenol	270 U		270	7.74
88-74-4	2-Nitroaniline	270 U		270	7.36
88-75-5	2-Nitrophenol	270 U		270	2.72
91-94-1	3,3'-Dichlorobenzidine	270 U		270	88.6
99-09-2	3-Nitroaniline	270 U		270	29.3
534-52-1	4,6-Dinitro-2-Methylphenol	270 U		270	7.22
101-55-3	4-Bromophenyl Phenylether	270 U		270	5.41
59-50-7	**4-Chloro-3-Methylphenol**	**24 J**		270	8.34
106-47-8	4-Chloroaniline	270 U		270	2.02
7005-72-3	4-Chlorophenylphenyl-Ether	270 U		270	5.23
106-44-5	4-Methylphenol	270 U		270	10.2
100-01-6	4-Nitroaniline	270 U		270	11.6
100-02-7	4-Nitrophenol	530 U		530	4.53
83-32-9	**Acenaphthene**	**3.0 J**		270	2.75
208-96-8	Acenaphthylene	270 U		270	2.40
98-86-2	Acetophenone	270 U		270	3.04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12C**	QC Batch:	90572 -114
Sample #:	**345889**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	270 U	270	7.39
1912-24-9	Atrazine	270 U	270	11.0
100-52-7	Benzaldehyde	270 U	270	6.48
56-55-3	**Benzo (a) Anthracene**	**25 J**	270	21.3
50-32-8	**Benzo (a) Pyrene**	**21 J**	270	9.14
205-99-2	**Benzo (b) Fluoranthene**	**40 J**	270	15.6
191-24-2	Benzo (g,h,i,) Perylene	270 U	270	14.0
207-08-9	**Benzo (k) Fluoranthene**	**22 J**	270	21.4
111-91-1	Bis (2-Chloroethoxy)-Methane	270 U	270	5.02
111-44-4	Bis (2-Chloroethyl) Ether	270 U	270	2.77
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1000**	270	3.31
85-68-7	Butyl Benzyl Phthalate	270 U	270	7.17
105-60-2	Caprolactam	530 U	530	10.2
86-74-8	Carbazole	270 U	270	9.76
218-01-9	**Chrysene**	**24 J**	270	16.3
53-70-3	Dibenzo (a,h) Anthracene	270 U	270	9.44
132-64-9	Dibenzofuran	270 U	270	5.06
84-66-2	**Diethylphthalate**	**940**	270	3.04
131-11-3	Dimethylphthalate	270 U	270	5.30
84-74-2	**Di-n-Butylphthalate**	**650**	270	6.11
117-84-0	Di-n-Octylphthalate	270 U	270	4.96
206-44-0	**Fluoranthene**	**59 J**	270	3.76
86-73-7	**Fluorene**	**4.0 J**	270	2.69
118-74-1	Hexachlorobenzene	270 U	270	4.02
87-68-3	Hexachlorobutadiene	270 U	270	6.19
77-47-4	Hexachlorocyclopentadiene	270 U	270	3.17
67-72-1	Hexachloroethane	270 U	270	3.73
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**10 J**	270	6.27
78-59-1	Isophorone	270 U	270	2.77
91-20-3	**Naphthalene**	**15 J**	270	4.40
98-95-3	Nitrobenzene	270 U	270	5.12

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12C**	QC Batch:	90572 -114
Sample #:	**345889**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	270 U	270	5.26
86-30-6	**N-Nitroso-di-Phenylamine**	**480**	270	7.60
87-86-5	Pentachlorophenol	530 U	530	7.02
85-01-8	**Phenanthrene**	**52 J**	270	3.68
108-95-2	Phenol	270 U	270	6.34
129-00-0	**Pyrene**	**54 J**	270	2.37

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12C**	QC Batch:	90572 -114
Sample #:	**345889**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	62
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,1'-Biphenyl, (1,1-dimethylethoxy)-	72101-19-0	360	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	460	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	250	E	NJ,+
Ether, bis(p-tert-butylphenyl)	24085-65-2	830	E	NJ,+
Triacetin	102-76-1	240	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11A**	QC Batch:	90572 -114
Sample #:	**345890**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U	VJ,c	430	4.16
121-14-2	**2,4-Dinitrotoluene**	**35 J**		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	**2-Methylnaphthalene**	**5.0 J**		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**9.0 J**		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	**Acenaphthene**	**8.0 J**		220	2.24
208-96-8	**Acenaphthylene**	**2.0 J**		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11A**	QC Batch:	90572 -114
Sample #:	**345890**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**15 J**	220	6.01
1912-24-9	Atrazine	220 U	220	8.94
100-52-7	Benzaldehyde	220 U	220	5.27
56-55-3	**Benzo (a) Anthracene**	**51 J**	220	17.3
50-32-8	**Benzo (a) Pyrene**	**44 J**	220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**78 J**	220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**25 J**	220	11.3
207-08-9	**Benzo (k) Fluoranthene**	**28 J**	220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U	220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U	220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**59 J**	220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**13 J**	220	5.82
105-60-2	Caprolactam	430 U	430	8.29
86-74-8	Carbazole	220 U	220	7.93
218-01-9	**Chrysene**	**57 J**	220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U	220	7.67
132-64-9	Dibenzofuran	220 U	220	4.11
84-66-2	**Diethylphthalate**	**93 J**	220	2.47
131-11-3	Dimethylphthalate	220 U	220	4.30
84-74-2	**Di-n-Butylphthalate**	**360**	220	4.97
117-84-0	Di-n-Octylphthalate	220 U	220	4.03
206-44-0	**Fluoranthene**	**150 J**	220	3.06
86-73-7	**Fluorene**	**6.0 J**	220	2.18
118-74-1	Hexachlorobenzene	220 U	220	3.26
87-68-3	Hexachlorobutadiene	220 U	220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	220	2.57
67-72-1	Hexachloroethane	220 U	220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**22 J**	220	5.10
78-59-1	Isophorone	220 U	220	2.25
91-20-3	**Naphthalene**	**4.0 J**	220	3.58
98-95-3	Nitrobenzene	220 U	220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11A**	QC Batch:	90572 -114
Sample #:	**345890**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**200 J**	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**63 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**110 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11A**	QC Batch:	90572 -114
Sample #:	**345890**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	500	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	360	E	NJ,+
1-Heneicosanol	15594-90-8	220	E	NJ,+
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	280	E	NJ,+
Butyl Ester Octadecanioc	123-95-5	130	E	NJ,+
Erucylamide	112-84-5	140	E	B,X NJ,+
Ethanol, 2-(hexadecyloxy)-	2136-71-2	390	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~2200~~	~~E~~	AB 2/18/04
Stigmast-4-en-3-one	1058-61-3	140	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11B**	QC Batch:	90572 -114
Sample #:	**345891**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	190 U		190	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	190 U		190	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	190 U		190	1.45
95-95-4	2,4,5-Trichlorophenol	190 U		190	3.67
88-06-2	2,4,6-Trichlorophenol	190 U		190	2.88
120-83-2	2,4-Dichlorophenol	190 U		190	3.87
105-67-9	2,4-Dimethylphenol	190 U		190	8.73
51-28-5	2,4-Dinitrophenol	380 U	UJ,c	380	3.52
121-14-2	**2,4-Dinitrotoluene**	**87 J**		190	3.47
606-20-2	**2,6-Dinitrotoluene**	**32 J**		190	30.5
91-58-7	2-Chloronaphthalene	190 U		190	2.53
95-57-8	2-Chlorophenol	190 U		190	2.21
91-57-6	2-Methylnaphthalene	190 U		190	3.01
95-48-7	2-Methylphenol	190 U		190	5.32
88-74-4	2-Nitroaniline	190 U		190	5.06
88-75-5	2-Nitrophenol	190 U		190	1.87
91-94-1	3,3'-Dichlorobenzidine	190 U		190	60.9
99-09-2	3-Nitroaniline	190 U		190	20.1
534-52-1	4,6-Dinitro-2-Methylphenol	190 U		190	4.96
101-55-3	4-Bromophenyl Phenylether	190 U		190	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**13 J**		190	5.73
106-47-8	4-Chloroaniline	190 U		190	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	190 U		190	3.60
106-44-5	4-Methylphenol	190 U		190	7.01
100-01-6	4-Nitroaniline	190 U		190	7.98
100-02-7	4-Nitrophenol	380 U		380	3.11
83-32-9	Acenaphthene	190 U		190	1.89
208-96-8	**Acenaphthylene**	**2.0 J**		190	1.65
98-86-2	Acetophenone	190 U		190	2.09

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11B**	QC Batch:	90572 -114
Sample #:	**345891**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	190 U	190	5.08
1912-24-9	Atrazine	190 U	190	7.57
100-52-7	Benzaldehyde	190 U	190	4.46
56-55-3	Benzo (a) Anthracene	190 U	190	14.6
50-32-8	**Benzo (a) Pyrene**	**7.0 J**	190	6.28
205-99-2	**Benzo (b) Fluoranthene**	**13 J**	190	10.7
191-24-2	Benzo (g,h,i,) Perylene	190 U	190	9.59
207-08-9	Benzo (k) Fluoranthene	190 U	190	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	190 U	190	3.45
111-44-4	Bis (2-Chloroethyl) Ether	190 U	190	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**380**	190	2.28
85-68-7	**Butyl Benzyl Phthalate**	**24 J**	190	4.93
105-60-2	Caprolactam	380 U	380	7.02
86-74-8	Carbazole	190 U	190	6.71
218-01-9	Chrysene	190 U	190	11.2
53-70-3	Dibenzo (a,h) Anthracene	190 U	190	6.49
132-64-9	Dibenzofuran	190 U	190	3.48
84-66-2	**Diethylphthalate**	**39 J**	190	2.09
131-11-3	**Dimethylphthalate**	**550**	190	3.64
84-74-2	**Di-n-Butylphthalate**	**600**	190	4.20
117-84-0	Di-n-Octylphthalate	190 U	190	3.41
206-44-0	**Fluoranthene**	**12 J**	190	2.59
86-73-7	Fluorene	190 U	190	1.85
118-74-1	Hexachlorobenzene	190 U	190	2.76
87-68-3	Hexachlorobutadiene	190 U	190	4.26
77-47-4	Hexachlorocyclopentadiene	190 U	190	2.18
67-72-1	Hexachloroethane	190 U	190	2.57
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**5.0 J**	190	4.31
78-59-1	Isophorone	190 U	190	1.90
91-20-3	Naphthalene	190 U	190	3.03
98-95-3	Nitrobenzene	190 U	190	3.52

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11B**	QC Batch:	90572 -114
Sample #:	**345891**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	190 U	190	3.62
86-30-6	**N-Nitroso-di-Phenylamine**	**950**	190	5.23
87-86-5	Pentachlorophenol	380 U	380	4.83
85-01-8	**Phenanthrene**	**9.0 J**	190	2.53
108-95-2	Phenol	190 U	190	4.36
129-00-0	**Pyrene**	**11 J**	190	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11B**	QC Batch:	90572 -114
Sample #:	**345891**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	430	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	150	E	NJ,+
Bis(2-ethylhexyl)maleate	142-16-5	120	E	NJ,+
Erucylamide	112-84-5	510	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~4500~~	~~E~~	~~A~~ 2/19/04
Triphenyl Phosphate	115-86-6	110	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11C**	QC Batch:	90572 -114
Sample #:	**345892**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U UJ,c	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11C**	QC Batch:	90572 -114
Sample #:	**345892**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**14 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**24 J**		220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**17 J**		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**540**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**40 J**		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**16 J**		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**6.0 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**320**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**16 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	UJ,C	220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**16 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11C**	QC Batch:	90572 -114
Sample #:	**345892**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**7.0 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**14 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11C**	QC Batch:	90572 -114
Sample #:	**345892**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl cyclohexyl ester	84-64-0	310	E	NJ,+
Bis(2-ethylhexyl)maleate	142-16-5	140	E	NJ,+
Erucylamide	112-84-5	180	E	BJX
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~4900~~	~~E~~	~~BJ~~ 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB10A**	QC Batch:	90572 -114
Sample #:	**345893**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U	UJc	460	4.48
121-14-2	2,4-Dinitrotoluene	240 U		240	4.41
606-20-2	2,6-Dinitrotoluene	240 U		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	**2-Methylnaphthalene**	**4.0 J**		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	77.6
99-09-2	3-Nitroaniline	240 U		240	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**15 J**		240	7.29
106-47-8	4-Chloroaniline	240 U		240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	**Acenaphthene**	**9.0 J**		240	2.41
208-96-8	**Acenaphthylene**	**4.0 J**		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB10A**	QC Batch:	90572 -114
Sample #:	**345893**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**26 J**	240	6.47
1912-24-9	Atrazine	240 U	240	9.63
100-52-7	Benzaldehyde	240 U	240	5.67
56-55-3	**Benzo (a) Anthracene**	**89 J**	240	18.6
50-32-8	**Benzo (a) Pyrene**	**72 J**	240	7.99
205-99-2	**Benzo (b) Fluoranthene**	**120 J**	240	13.7
191-24-2	**Benzo (g,h,i,) Perylene**	**34 J**	240	12.2
207-08-9	**Benzo (k) Fluoranthene**	**49 J**	240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U	240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U	240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**450**	240	2.90
85-68-7	**Butyl Benzyl Phthalate**	**38 J**	240	6.27
105-60-2	Caprolactam	460 U	460	8.93
86-74-8	Carbazole	240 U	240	8.54
218-01-9	**Chrysene**	**120 J**	240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U	240	8.26
132-64-9	**Dibenzofuran**	**6.0 J**	240	4.42
84-66-2	**Diethylphthalate**	**110 J**	240	2.66
131-11-3	**Dimethylphthalate**	**140 J**	240	4.63
84-74-2	**Di-n-Butylphthalate**	**470**	240	5.35
117-84-0	Di-n-Octylphthalate	240 U	240	4.34
206-44-0	**Fluoranthene**	**350**	240	3.29
86-73-7	**Fluorene**	**12 J**	240	2.35
118-74-1	Hexachlorobenzene	240 U	240	3.51
87-68-3	Hexachlorobutadiene	240 U	240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U	240	2.77
67-72-1	Hexachloroethane	240 U	240	3.27
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**32 J**	240	5.49
78-59-1	Isophorone	240 U	240	2.42
91-20-3	Naphthalene	240 U	240	3.85
98-95-3	Nitrobenzene	240 U	240	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10A**	QC Batch:	90572 -114
Sample #:	**345893**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	**Phenanthrene**	**170 J**	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	**Pyrene**	**260**	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10A**	QC Batch:	90572 -114
Sample #:	**345893**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	2400	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	530	E	NJ,+
4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a,5,6,6a,6b	1000194624 1000019-46-24	710	E	NJ,+
Cholesterol	57-88-5	470	E	NJ,+
Erucylamide	112-84-5	400	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~5000~~	~~E~~	~~dh 2/18/04~~
Vitamin E	10191-41-0	600	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10B**	QC Batch:	90572 -114
Sample #:	**345894**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U UJ,c	430	4.16
121-14-2	**2,4-Dinitrotoluene**	**51 J**	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	**2-Methylnaphthalene**	**4.0 J**	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	**Acenaphthene**	**4.0 J**	220	2.24
208-96-8	**Acenaphthylene**	**6.0 J**	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10B**	QC Batch:	90572 -114
Sample #:	**345894**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**16 J**	220	6.01
1912-24-9	Atrazine	220 U	220	8.94
100-52-7	Benzaldehyde	220 U	220	5.27
56-55-3	**Benzo (a) Anthracene**	**73 J**	220	17.3
50-32-8	**Benzo (a) Pyrene**	**95 J**	220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**150 J**	220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**60 J**	220	11.3
207-08-9	**Benzo (k) Fluoranthene**	**64 J**	220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U	220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U	220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**200 J**	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U	220	5.82
105-60-2	Caprolactam	430 U	430	8.29
86-74-8	Carbazole	220 U	220	7.93
218-01-9	**Chrysene**	**100 J**	220	13.3
53-70-3	**Dibenzo (a,h) Anthracene**	**16 J**	220	7.67
132-64-9	Dibenzofuran	220 U	220	4.11
84-66-2	**Diethylphthalate**	**240**	220	2.47
131-11-3	Dimethylphthalate	220 U	220	4.30
84-74-2	**Di-n-Butylphthalate**	**470**	220	4.97
117-84-0	Di-n-Octylphthalate	220 U	220	4.03
206-44-0	**Fluoranthene**	**90 J**	220	3.06
86-73-7	**Fluorene**	**4.0 J**	220	2.18
118-74-1	Hexachlorobenzene	220 U	220	3.26
87-68-3	Hexachlorobutadiene	220 U	220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	220	2.57
67-72-1	Hexachloroethane	220 U	220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**54 J**	220	5.10
78-59-1	Isophorone	220 U	220	2.25
91-20-3	Naphthalene	220 U	220	3.58
98-95-3	Nitrobenzene	220 U	220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10B**	QC Batch:	90572 -114
Sample #:	**345894**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**120 J**	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**43 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**83 J**	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB10B**	QC Batch:	90572 -114
Sample #:	**345894**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	47	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	150	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	71	E	NJ,+
Erucylamide	112-84-5	900	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~150~~	~~E~~	

AS 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB10C**	QC Batch:	90572 -114
Sample #:	**345895**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	450 U	UJ,C	450	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U		230	7.29
106-47-8	4-Chloroaniline	230 U		230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	450 U		450	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	**Acenaphthylene**	**6.0 J**		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10C**	QC Batch:	90572 -114
Sample #:	**345895**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**22 J**	230	6.47
1912-24-9	Atrazine	230 U	230	9.63
100-52-7	Benzaldehyde	230 U	230	5.67
56-55-3	**Benzo (a) Anthracene**	**50 J**	230	18.6
50-32-8	**Benzo (a) Pyrene**	**82 J**	230	7.99
205-99-2	**Benzo (b) Fluoranthene**	**140 J**	230	13.7
191-24-2	**Benzo (g,h,i,) Perylene**	**46 J**	230	12.2
207-08-9	**Benzo (k) Fluoranthene**	**48 J**	230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U	230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U	230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**31 J**	230	2.90
85-68-7	**Butyl Benzyl Phthalate**	**9.0 J**	230	6.27
105-60-2	Caprolactam	450 U	450	8.93
86-74-8	Carbazole	230 U	230	8.54
218-01-9	**Chrysene**	**83 J**	230	14.3
53-70-3	**Dibenzo (a,h) Anthracene**	**13 J**	230	8.26
132-64-9	Dibenzofuran	230 U	230	4.42
84-66-2	**Diethylphthalate**	**71 J**	230	2.66
131-11-3	Dimethylphthalate	230 U	230	4.63
84-74-2	**Di-n-Butylphthalate**	**450**	230	5.35
117-84-0	Di-n-Octylphthalate	230 U	230	4.34
206-44-0	**Fluoranthene**	**29 J**	230	3.29
86-73-7	Fluorene	230 U	230	2.35
118-74-1	Hexachlorobenzene	230 U	230	3.51
87-68-3	Hexachlorobutadiene	230 U	230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U	230	2.77
67-72-1	Hexachloroethane	230 U	230	3.27
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**45 J**	230	5.49
78-59-1	Isophorone	230 U	230	2.42
91-20-3	Naphthalene	230 U	230	3.85
98-95-3	Nitrobenzene	230 U	230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10C**	QC Batch:	90572 -114
Sample #:	**345895**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	450 U	450	6.15
85-01-8	**Phenanthrene**	**14 J**	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	**Pyrene**	**29 J**	230	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10C**	QC Batch:	90572 -114
Sample #:	**345895**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	530	E	NJ,+
Erucylamide	112-84-5	180	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1800~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB9A**	QC Batch:	90572 -114
Sample #:	**345896**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,C	420	4.16
121-14-2	**2,4-Dinitrotoluene**	**220**		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**25 J**		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	**Acenaphthene**	**10 J**		220	2.24
208-96-8	**Acenaphthylene**	**7.0 J**		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9A**	QC Batch:	90572 -114
Sample #:	**345896**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**25 J**	220	6.01
1912-24-9	Atrazine	220 U	220	8.94
100-52-7	Benzaldehyde	220 U	220	5.27
56-55-3	**Benzo (a) Anthracene**	**200 J**	220	17.3
50-32-8	**Benzo (a) Pyrene**	**140 J**	220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**240**	220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**46 J**	220	11.3
207-08-9	**Benzo (k) Fluoranthene**	**93 J**	220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U	220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U	220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**43 J**	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U	220	5.82
105-60-2	Caprolactam	420 U	420	8.29
86-74-8	Carbazole	220 U	220	7.93
218-01-9	**Chrysene**	**220**	220	13.3
53-70-3	**Dibenzo (a,h) Anthracene**	**13 J**	220	7.67
132-64-9	Dibenzofuran	220 U	220	4.11
84-66-2	**Diethylphthalate**	**230**	220	2.47
131-11-3	**Dimethylphthalate**	**18 J**	220	4.30
84-74-2	**Di-n-Butylphthalate**	**580**	220	4.97
117-84-0	Di-n-Octylphthalate	220 U	220	4.03
206-44-0	**Fluoranthene**	**260**	220	3.06
86-73-7	**Fluorene**	**6.0 J**	220	2.18
118-74-1	Hexachlorobenzene	220 U	220	3.26
87-68-3	Hexachlorobutadiene	220 U	220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	220	2.57
67-72-1	Hexachloroethane	220 U	220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**43 J**	220	5.10
78-59-1	Isophorone	220 U	220	2.25
91-20-3	Naphthalene	220 U	220	3.58
98-95-3	Nitrobenzene	220 U	220	4.16

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9A**	QC Batch:	90572 -114
Sample #:	**345896**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**25 J**	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	**Phenanthrene**	**79 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**230**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9A**	QC Batch:	90572 -114
Sample #:	**345896**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	160	E	NJ+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	670	E	NJ+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	75	E	NJ+
Erucylamide	112-84-5	570	E	NJ+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~780~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD9**	QC Batch:	90572 -114
Sample #:	**345897**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	410 U	UJ,C	410	3.84
121-14-2	**2,4-Dinitrotoluene**	**23 J**		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**8.0 J**		210	6.25
106-47-8	4-Chloroaniline	210 U		210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U		410	3.40
83-32-9	**Acenaphthene**	**7.0 J**		210	2.06
208-96-8	**Acenaphthylene**	**3.0 J**		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD9**	QC Batch:	90572 -114
Sample #:	**345897**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**18 J**		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	**Benzo (a) Anthracene**	**140 J**		210	16.0
50-32-8	**Benzo (a) Pyrene**	**120 J**		210	6.85
205-99-2	**Benzo (b) Fluoranthene**	**170 J**		210	11.7
191-24-2	**Benzo (g,h,i,) Perylene**	**58 J**		210	10.5
207-08-9	**Benzo (k) Fluoranthene**	**85 J**		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**33 J**		210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U		410	7.66
86-74-8	**Carbazole**	**37 J**		210	7.32
218-01-9	**Chrysene**	**160 J**		210	12.2
53-70-3	**Dibenzo (a,h) Anthracene**	**18 J**		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**44 J**		210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**430**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**190 J**		210	2.82
86-73-7	**Fluorene**	**4.0 J**		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U	UJ,C	210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**52 J**		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD9**	QC Batch:	90572 -114
Sample #:	**345897**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	**N-Nitroso-di-Phenylamine**	**46 J**	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	**Phenanthrene**	**60 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**170 J**	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD9**	QC Batch:	90572 -114
Sample #:	**345897**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	45	E	BX
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~820~~	~~E~~	
Stigmasterol, 22,23-dihydro-	1000214207 100021-42-07	160	E	NJ+
Urea, N,N'-dimethyl-N,N'-diphenyl-	611-92-7	48	E	NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB9B**	QC Batch:	90572 -114
Sample #:	**345898**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	450 U	VJC	450	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U		230	7.29
106-47-8	4-Chloroaniline	230 U		230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	450 U		450	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB9B**	QC Batch:	90572 -114
Sample #:	**345898**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	**Benzo (a) Anthracene**	**22 J**		230	18.6
50-32-8	**Benzo (a) Pyrene**	**22 J**		230	7.99
205-99-2	**Benzo (b) Fluoranthene**	**25 J**		230	13.7
191-24-2	**Benzo (g,h,i,) Perylene**	**15 J**		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**24 J**		230	2.90
85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
105-60-2	Caprolactam	450 U		450	8.93
86-74-8	Carbazole	230 U		230	8.54
218-01-9	**Chrysene**	**30 J**		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**8.0 J**		230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**270**		230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	**Fluoranthene**	**37 J**		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U	UJ,c	230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**10 J**		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB9B**	QC Batch:	90572 -114
Sample #:	**345898**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	450 U	450	6.15
85-01-8	**Phenanthrene**	**17 J**	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	**Pyrene**	**33 J**	230	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9B**	QC Batch:	90572 -114
Sample #:	**345898**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	83	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	420	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	45	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1000~~	~~E~~	~~✓~~ 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9C**	QC Batch:	90572 -114
Sample #:	**345899**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,c	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9C**	QC Batch:	90572 -114
Sample #:	**345899**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**15 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**3.0 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**180 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	UJ,c	220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9C**	QC Batch:	90572 -114
Sample #:	**345899**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**3.0 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9C**	QC Batch:	90572 -114
Sample #:	**345899**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	350	E
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~300~~	~~E~~

NJ+

~~AS~~ 2-18-04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8A**	QC Batch:	90572 -114
Sample #:	**345900**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U	UJ,C	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	**2-Methylnaphthalene**	**22 J**		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	**Acenaphthene**	**19 J**		220	2.24
208-96-8	**Acenaphthylene**	**2.0 J**		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8A**	QC Batch:	90572 -114
Sample #:	**345900**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**37 J**		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	**Benzo (a) Anthracene**	**100 J**		220	17.3
50-32-8	**Benzo (a) Pyrene**	**120 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**180 J**		220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**72 J**		220	11.3
207-08-9	**Benzo (k) Fluoranthene**	**68 J**		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**35 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**140 J**		220	13.3
53-70-3	**Dibenzo (a,h) Anthracene**	**18 J**		220	7.67
132-64-9	**Dibenzofuran**	**13 J**		220	4.11
84-66-2	**Diethylphthalate**	**33 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**62 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**370**		220	3.06
86-73-7	**Fluorene**	**20 J**		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	UJ,c	220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**73 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	**Naphthalene**	**10 J**		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB8A**	QC Batch:	90572 -114
Sample #:	**345900**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**21 J**	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**130 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**260**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB8A**	QC Batch:	90572 -114
Sample #:	**345900**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	780	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	120	E	NJ,+
Cholesterol	57-88-5	120	E	NJ,+
Erucylamide	112-84-5	220	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~2600~~	~~E~~	* 2/18/04
Stigmast-4-en-3-one	1058-61-3	240	E	NJ,+
Taraxerol	127-22-0	290	E	NJ,+
Vitamin E	10191-41-0	160	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8B**	QC Batch:	90572 -114
Sample #:	**345901**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,C	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**24 J**		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8B**	QC Batch:	90572 -114
Sample #:	**345901**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**21 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**36 J**		220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**14 J**		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**190 J**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**6.0 J**		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**25 J**		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**40 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**190 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**35 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	UJ/C	220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**12 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB8B**	QC Batch:	90572 -114
Sample #:	**345901**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	**Phenanthrene**	**10 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**32 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8B**	QC Batch:	90572 -114
Sample #:	**345901**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	76	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	320	E	NJ,+
9-Octadecenoic acid, (E)-	112-79-8	74	E	NJ,+
Erucylamide	112-84-5	890	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~990~~	~~E~~	
Tetradecanamide	638-58-4	60	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB2A**	QC Batch:	90834 -115
Sample #:	**345745**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	250 U	250	13.9
120-12-7	Anthracene	25 U	25	0.840
56-55-3	**Benzo (a) Anthracene**	**2.9 J**	25	0.960
50-32-8	Benzo (a) Pyrene	25 U	25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U	25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U	25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U	25	1.20
218-01-9	**Chrysene**	**2.9 J**	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	25	1.68
206-44-0	**Fluoranthene**	**18 J**	25	2.04
86-73-7	Fluorene	25 U	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U	25	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	**Phenanthrene**	**7.2 J**	25	0.720
129-00-0	**Pyrene**	**13 J**	25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB2B**	QC Batch:	90834 -115
Sample #:	**345746**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U VLS	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	Benzo (a) Anthracene	27 U	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	Chrysene	27 U	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	Fluoranthene	27 U	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	27 U	27	0.780
129-00-0	Pyrene	27 U	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**69SB2C**	QC Batch:	90834 -115
Sample #:	**345747**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U VL,S	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB4B**	QC Batch:	90834 -115
Sample #:	**345748**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	280 U	280	16.2
120-12-7	Anthracene	28 U	28	0.980
56-55-3	Benzo (a) Anthracene	28 U	28	1.12
50-32-8	Benzo (a) Pyrene	28 U	28	1.40
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.82
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	17.5
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.40
218-01-9	Chrysene	28 U	28	1.68
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.96
206-44-0	Fluoranthene	28 U	28	2.38
86-73-7	Fluorene	28 U	28	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	28 U	28	0.840
129-00-0	Pyrene	28 U	28	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB7A**	QC Batch:	90834 -115
Sample #:	**345883**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	260 U	260	13.9
120-12-7	Anthracene	26 U	26	0.840
56-55-3	**Benzo (a) Anthracene**	**2.1 J**	26	0.960
50-32-8	Benzo (a) Pyrene	26 U	26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.20
218-01-9	**Chrysene**	**2.6 J**	26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.68
206-44-0	**Fluoranthene**	**5.0 J**	26	2.04
86-73-7	Fluorene	26 U	26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	**Phenanthrene**	**2.1 J**	26	0.720
129-00-0	**Pyrene**	**3.6 J**	26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB7B**	QC Batch:	90834 -115
Sample #:	**345884**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	260 U	260	15.1
120-12-7	**Anthracene**	**1.0 J**	26	0.910
56-55-3	**Benzo (a) Anthracene**	**3.9 J**	26	1.04
50-32-8	Benzo (a) Pyrene	26 U	26	1.30
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.69
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	16.3
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.30
218-01-9	**Chrysene**	**6.5 J**	26	1.56
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.82
206-44-0	**Fluoranthene**	**3.3 J**	26	2.21
86-73-7	Fluorene	26 U	26	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**1.8 J**	26	0.780
129-00-0	**Pyrene**	**3.0 J**	26	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB7C**	QC Batch:	91080 -118
Sample #:	**345885**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	Benzo (a) Anthracene	27 U	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	Chrysene	27 U	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	Fluoranthene	27 U	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	27 U	27	0.780
129-00-0	Pyrene	27 U	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB12A**	QC Batch:	91080 -118
Sample #:	**345886**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	**Benzo (a) Anthracene**	**3.8 J**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**6.5 J**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**4.9 J**	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	**Chrysene**	**2.4 J**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**9.2 J**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**5.9 J**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**2.5 J**	27	0.780
129-00-0	**Pyrene**	**6.4 J**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB12B**	QC Batch:	91080 -118
Sample #:	**345887**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	300 U	300	16.2
120-12-7	Anthracene	30 U	30	0.980
56-55-3	**Benzo (a) Anthracene**	**1.7 J**	30	1.12
50-32-8	Benzo (a) Pyrene	30 U	30	1.40
205-99-2	Benzo (b) Fluoranthene	30 U	30	1.82
191-24-2	Benzo (g,h,i,) Perylene	30 U	30	17.5
207-08-9	Benzo (k) Fluoranthene	30 U	30	1.40
218-01-9	Chrysene	30 U	30	1.68
53-70-3	Dibenzo (a,h) Anthracene	30 U	30	1.96
206-44-0	**Fluoranthene**	**7.4 J**	30	2.38
86-73-7	Fluorene	30 U	30	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U	30	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	**Phenanthrene**	**2.2 J**	30	0.840
129-00-0	**Pyrene**	**3.9 J**	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD8**	QC Batch:	91080 -118
Sample #:	**345888**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	14.1
208-96-8	Acenaphthylene	310 U	310	17.4
120-12-7	Anthracene	31 U	31	1.05
56-55-3	**Benzo (a) Anthracene**	**6.4 J**	31	1.20
50-32-8	**Benzo (a) Pyrene**	**8.0 J**	31	1.50
205-99-2	**Benzo (b) Fluoranthene**	**6.7 J**	31	1.95
191-24-2	**Benzo (g,h,i,) Perylene**	**21 J**	31	18.8
207-08-9	Benzo (k) Fluoranthene	31 U	31	1.50
218-01-9	**Chrysene**	**6.7 J**	31	1.80
53-70-3	Dibenzo (a,h) Anthracene	31 U	31	2.10
206-44-0	**Fluoranthene**	**16 J**	31	2.55
86-73-7	Fluorene	31 U	31	1.95
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**6.8 J**	31	1.05
91-20-3	Naphthalene	150 U	150	11.9
85-01-8	**Phenanthrene**	**2.7 J**	31	0.900
129-00-0	**Pyrene**	**10 J**	31	1.35

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB12C**	QC Batch:	91080 -118
Sample #:	**345889**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	160 U	160	15.0
208-96-8	Acenaphthylene	340 U	340	18.6
120-12-7	**Anthracene**	**11 J**	34	1.12
56-55-3	**Benzo (a) Anthracene**	**32 J**	34	1.28
50-32-8	Benzo (a) Pyrene	34 U	34	1.60
205-99-2	Benzo (b) Fluoranthene	34 U	34	2.08
191-24-2	**Benzo (g,h,i,) Perylene**	**37**	34	20.0
207-08-9	Benzo (k) Fluoranthene	34 U	34	1.60
218-01-9	Chrysene	34 U	34	1.92
53-70-3	Dibenzo (a,h) Anthracene	34 U	34	2.24
206-44-0	**Fluoranthene**	**130**	34	2.72
86-73-7	Fluorene	34 U	34	2.08
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**17 J**	34	1.12
91-20-3	Naphthalene	160 U	160	12.6
85-01-8	**Phenanthrene**	**80**	34	0.960
129-00-0	**Pyrene**	**99**	34	1.44

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB11A**	QC Batch:	91080 -118
Sample #:	**345890**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	**Anthracene**	**6.6 J**	27	0.910
56-55-3	**Benzo (a) Anthracene**	**31**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**45**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**32**	27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**82**	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**20 J**	27	1.30
218-01-9	**Chrysene**	**37**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**73**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**37**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**26 J**	27	0.780
129-00-0	**Pyrene**	**59**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB11B**	QC Batch:	91080 -118
Sample #:	**345891**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U	UL,S	110	10.3
208-96-8	Acenaphthylene	240 U	↓	240	12.8
120-12-7	**Anthracene**	**8.7 J**	L,S	24	0.770
56-55-3	**Benzo (a) Anthracene**	**24**		24	0.880
50-32-8	**Benzo (a) Pyrene**	**33**		24	1.10
205-99-2	**Benzo (b) Fluoranthene**	**21 J**		24	1.43
191-24-2	**Benzo (g,h,i,) Perylene**	**77**		24	13.8
207-08-9	**Benzo (k) Fluoranthene**	**15 J**		24	1.10
218-01-9	**Chrysene**	**40**		24	1.32
53-70-3	Dibenzo (a,h) Anthracene	24 U	UL,S	24	1.54
206-44-0	Fluoranthene	24 U	↓	24	1.87
86-73-7	**Fluorene**	**12 J**	L,S	24	1.43
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**21 J**	↓	24	0.770
91-20-3	Naphthalene	110 U	UL,S	110	8.69
85-01-8	**Phenanthrene**	**110**	L,S	24	0.660
129-00-0	**Pyrene**	**79**	↓	24	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB11C**	QC Batch:	91080 -118
Sample #:	**345892**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	**Anthracene**	**1.1 J**	27	0.910
56-55-3	**Benzo (a) Anthracene**	**4.1 J**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**13 J**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**8.8 J**	27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**46**	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**4.5 J**	27	1.30
218-01-9	**Chrysene**	**7.6 J**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**6.5 J**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**16 J**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**3.4 J**	27	0.780
129-00-0	**Pyrene**	**5.6 J**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB10A**	QC Batch:	91080 -118
Sample #:	**345893**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	**Acenaphthene**	**14 J**	140	13.2
208-96-8	Acenaphthylene	300 U	300	16.2
120-12-7	**Anthracene**	**38**	30	0.980
56-55-3	**Benzo (a) Anthracene**	**140**	30	1.12
50-32-8	**Benzo (a) Pyrene**	**190**	30	1.40
205-99-2	**Benzo (b) Fluoranthene**	**140**	30	1.82
191-24-2	**Benzo (g,h,i,) Perylene**	**260**	30	17.5
207-08-9	**Benzo (k) Fluoranthene**	**80**	30	1.40
218-01-9	**Chrysene**	**150**	30	1.68
53-70-3	**Dibenzo (a,h) Anthracene**	**5.2 J**	30	1.96
206-44-0	**Fluoranthene**	**470**	30	2.38
86-73-7	**Fluorene**	**17 J**	30	1.82
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**130**	30	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	**Phenanthrene**	**210**	30	0.840
129-00-0	**Pyrene**	**320**	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**13SB10B**	QC Batch:	91080 -118
Sample #:	**345894**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	**Anthracene**	**14 J**	27	0.910
56-55-3	**Benzo (a) Anthracene**	**56**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**130**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**91**	27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**290**	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**52**	27	1.30
218-01-9	**Chrysene**	**80**	27	1.56
53-70-3	**Dibenzo (a,h) Anthracene**	**8.0 J**	27	1.82
206-44-0	**Fluoranthene**	**64**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**110**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**27**	27	0.780
129-00-0	**Pyrene**	**50**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB10C**	QC Batch:	91080 -118
Sample #:	**345895**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	290 U	290	16.2
120-12-7	**Anthracene**	**6.1 J**	29	0.980
56-55-3	**Benzo (a) Anthracene**	**18 J**	29	1.12
50-32-8	**Benzo (a) Pyrene**	**59**	29	1.40
205-99-2	**Benzo (b) Fluoranthene**	**47**	29	1.82
191-24-2	**Benzo (g,h,i,) Perylene**	**140**	29	17.5
207-08-9	**Benzo (k) Fluoranthene**	**20 J**	29	1.40
218-01-9	**Chrysene**	**33**	29	1.68
53-70-3	**Dibenzo (a,h) Anthracene**	**5.3 J**	29	1.96
206-44-0	**Fluoranthene**	**12 J**	29	2.38
86-73-7	Fluorene	29 U	29	1.82
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**58**	29	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	**Phenanthrene**	**7.0 J**	29	0.840
129-00-0	**Pyrene**	**9.5 J**	29	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB9A**	QC Batch:	91080 -118
Sample #:	**345896**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	**Acenaphthene**	**17**	**J**	130	12.2
208-96-8	Acenaphthylene	270	U	270	15.1
120-12-7	**Anthracene**	**38**		27	0.910
56-55-3	**Benzo (a) Anthracene**	**130**		27	1.04
50-32-8	**Benzo (a) Pyrene**	**170**		27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**120**		27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**540**	J,f	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**77**		27	1.30
218-01-9	**Chrysene**	**150**		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27	U	27	1.82
206-44-0	**Fluoranthene**	**290**	J,f	27	2.21
86-73-7	**Fluorene**	**11**	**J**	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**100**		27	0.910
91-20-3	Naphthalene	130	U	130	10.3
85-01-8	**Phenanthrene**	**130**		27	0.780
129-00-0	**Pyrene**	**240**	J,f	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD9**	QC Batch:	91080 -118
Sample #:	**345897**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U		130	12.2
208-96-8	Acenaphthylene	260 U		260	15.1
120-12-7	**Anthracene**	**15 J**		26	0.910
56-55-3	**Benzo (a) Anthracene**	**61**		26	1.04
50-32-8	**Benzo (a) Pyrene**	**73**		26	1.30
205-99-2	**Benzo (b) Fluoranthene**	**56**		26	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**240**	J,f	26	16.3
207-08-9	**Benzo (k) Fluoranthene**	**36**		26	1.30
218-01-9	**Chrysene**	**74**		26	1.56
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.82
206-44-0	**Fluoranthene**	**120**	J,f	26	2.21
86-73-7	Fluorene	26 U		26	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**46**		26	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	**Phenanthrene**	**50**		26	0.780
129-00-0	**Pyrene**	**110**	J,f	26	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB9B**	QC Batch:	91080 -118
Sample #:	**345898**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	290 U	290	16.2
120-12-7	**Anthracene**	**4.2 J**	29	0.980
56-55-3	**Benzo (a) Anthracene**	**12 J**	29	1.12
50-32-8	**Benzo (a) Pyrene**	**15 J**	29	1.40
205-99-2	**Benzo (b) Fluoranthene**	**10 J**	29	1.82
191-24-2	Benzo (g,h,i,) Perylene	29 U	29	17.5
207-08-9	**Benzo (k) Fluoranthene**	**6.0 J**	29	1.40
218-01-9	**Chrysene**	**15 J**	29	1.68
53-70-3	Dibenzo (a,h) Anthracene	29 U	29	1.96
206-44-0	**Fluoranthene**	**30**	29	2.38
86-73-7	Fluorene	29 U	29	1.82
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**9.4 J**	29	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	**Phenanthrene**	**14 J**	29	0.840
129-00-0	**Pyrene**	**27 J**	29	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB9C**	QC Batch:	91080 -118
Sample #:	**345899**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	**Benzo (a) Anthracene**	**1.4 J**	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	**Chrysene**	**1.7 J**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**3.8 J**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**1.8 J**	27	0.780
129-00-0	**Pyrene**	**5.1 J**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB8A**	QC Batch:	91080 -118
Sample #:	**345900**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	**Anthracene**	**12 J**	27	0.910
56-55-3	**Benzo (a) Anthracene**	**49**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**71**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**54**	27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**120**	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**32**	27	1.30
218-01-9	**Chrysene**	**57**	27	1.56
53-70-3	**Dibenzo (a,h) Anthracene**	**2.3 J**	27	1.82
206-44-0	**Fluoranthene**	**120**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**53**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**43**	27	0.780
129-00-0	**Pyrene**	**97**	27	1.17

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB8B**	QC Batch:	91080 -118
Sample #:	**345901**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	**Benzo (a) Anthracene**	**3.1 J**	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	**Chrysene**	**3.5 J**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**7.9 J**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**2.9 J**	27	0.780
129-00-0	**Pyrene**	**8.8 J**	27	1.17

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB2A**	QC Batch:	90508 -116
Sample #:	**345745**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	83
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**69SB2B**	QC Batch:	90508 -116
Sample #:	**345746**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	79
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB2C**	QC Batch:	90508 -116
Sample #:	**345747**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	VJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**57SB4B**	QC Batch:	90508 -116
Sample #:	**345748**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	74
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB7A**	QC Batch:	90508 -116
Sample #:	**345883**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB7B**	QC Batch:	90508 -116
Sample #:	**345884**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB7C**	QC Batch:	90908 -121
Sample #:	**345885**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	79
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB12A**	QC Batch:	90908 -121
Sample #:	**345886**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.27 J**		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.39 J**		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB12B**	QC Batch:	90908 -121
Sample #:	**345887**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.55**		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.19 J**		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ/C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	**Hexahydro-1,3,5-trinitro-1,3,5-triazine**	**0.29 J**	J/C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**SBD8**	QC Batch:	90908 -121
Sample #:	**345888**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	67
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	**1,3-Dinitrobenzene**	**0.32 J**		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.56**		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB12C**	QC Batch:	90908 -121
Sample #:	**345889**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	62
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.54**		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB11A**	QC Batch:	90908 -121
Sample #:	**345890**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.43 J**		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB11B**	QC Batch:	90908 -121
Sample #:	**345891**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	88
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB11C**	QC Batch:	90908 -121
Sample #:	**345892**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB10A**	QC Batch:	90908 -121
Sample #:	**345893**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB10B**	QC Batch:	90908 -121
Sample #:	**345894**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB10C**	QC Batch:	90908 -121
Sample #:	**345895**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	73
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB9A**	QC Batch:	90908 -121
Sample #:	**345896**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD9**	QC Batch:	90908 -121
Sample #:	**345897**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB9B**	QC Batch:	90908 -121
Sample #:	**345898**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	73
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB9C**	QC Batch:	90908 -121
Sample #:	**345899**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB8A**	QC Batch:	90908 -121
Sample #:	**345900**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB8B**	QC Batch:	90908 -121
Sample #:	**345901**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**69SB2A**	QC Batch:	90181 -116
Sample #:	**345745**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	24 U	24	0.286
72-55-9	4,4'-DDE	24 U	24	0.210
50-29-3	4,4'-DDT	24 U	24	0.216
309-00-2	**Aldrin**	**0.11 J**	24	0.365
319-84-6	Alpha-BHC	24 U	24	0.364
57-74-9	A-Chlordane	24 U	24	0.521
5103-74-2	G-Chlordane	24 U	24	0.844
319-85-7	Beta-BHC	24 U	24	1.36
319-86-8	**Delta-BHC**	**2.5 J**	24	0.982
60-57-1	Dieldrin	24 U	24	0.371
115-29-7	Endosulfan I	24 U	24	1.09
33213-65-9	Endosulfan II	24 U	24	0.257
1031-07-8	Endosulfan Sulfate	24 U	24	0.604
72-20-8	Endrin	24 U	24	0.358
7421-93-4	Endrin Aldehyde	24 U	24	1.33
53494-70-5	Endrin Ketone	24 U	24	0.330
58-89-9	Lindane	24 U	24	0.233
76-44-8	Heptachlor	24 U	24	0.846
1024-57-3	Heptachlor Epoxide	24 U	24	0.546
72-43-5	Methoxychlor	24 U	24	0.336
8001-35-2	Toxaphene	200 U	200	28.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**13SB9A**	QC Batch:	90181 -116
Sample #:	**345896**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	26 U	26	0.309
72-55-9	4,4'-DDE	26 U	26	0.228
50-29-3	4,4'-DDT	26 U	26	0.234
309-00-2	Aldrin	26 U	26	0.395
319-84-6	Alpha-BHC	26 U	26	0.394
57-74-9	A-Chlordane	26 U	26	0.564
5103-74-2	G-Chlordane	26 U	26	0.914
319-85-7	Beta-BHC	26 U	26	1.47
319-86-8	Delta-BHC	26 U	26	1.06
60-57-1	Dieldrin	26 U	26	0.402
115-29-7	Endosulfan I	26 U	26	1.18
33213-65-9	Endosulfan II	26 U	26	0.278
1031-07-8	Endosulfan Sulfate	26 U	26	0.654
72-20-8	Endrin	26 U	26	0.387
7421-93-4	Endrin Aldehyde	26 U	26	1.44
53494-70-5	Endrin Ketone	26 U	26	0.358
58-89-9	Lindane	26 U	26	0.252
76-44-8	Heptachlor	26 U	26	0.917
1024-57-3	Heptachlor Epoxide	26 U	26	0.592
72-43-5	Methoxychlor	26 U	26	0.364
8001-35-2	Toxaphene	220 U	220	30.3

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**SBD9**	QC Batch:	90181 -116
Sample #:	**345897**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	24 U	24	0.286
72-55-9	4,4'-DDE	24 U	24	0.210
50-29-3	4,4'-DDT	24 U	24	0.216
309-00-2	Aldrin	24 U	24	0.365
319-84-6	Alpha-BHC	24 U	24	0.364
57-74-9	A-Chlordane	24 U	24	0.521
5103-74-2	G-Chlordane	24 U	24	0.844
319-85-7	Beta-BHC	24 U	24	1.36
319-86-8	Delta-BHC	24 U	24	0.982
60-57-1	Dieldrin	24 U	24	0.371
115-29-7	Endosulfan I	24 U	24	1.09
33213-65-9	Endosulfan II	24 U	24	0.257
1031-07-8	Endosulfan Sulfate	24 U	24	0.604
72-20-8	Endrin	24 U	24	0.358
7421-93-4	Endrin Aldehyde	24 U	24	1.33
53494-70-5	Endrin Ketone	24 U	24	0.330
58-89-9	Lindane	24 U	24	0.233
76-44-8	Heptachlor	24 U	24	0.846
1024-57-3	Heptachlor Epoxide	24 U	24	0.546
72-43-5	Methoxychlor	24 U	24	0.336
8001-35-2	Toxaphene	200 U	200	28.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JLRM
		Anal. Method:	USEPA-8082
Sample ID:	**69SB2A**	QC Batch:	89881 -116
Sample #:	**345745**	Anal. Batch:	207923
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	80 U	80	19.2
11104-28-2	PCB-1221	40 U	40	2.40
11141-16-5	PCB-1232	40 U	40	6.00
53469-21-9	PCB-1242	40 U	40	3.60
12672-29-6	PCB-1248	40 U	40	6.00
11097-69-1	**PCB-1254**	**220**	40	3.60
11096-82-5	PCB-1260	40 U	40	8.40

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**13SB9A**	QC Batch:	89881 -116
Sample #:	**345896**	Anal. Batch:	207924
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	85 U	85	20.8
11104-28-2	PCB-1221	42 U	42	2.60
11141-16-5	PCB-1232	42 U	42	6.50
53469-21-9	PCB-1242	42 U	42	3.90
12672-29-6	PCB-1248	42 U	42	6.50
11097-69-1	PCB-1254	42 U	42	3.90
11096-82-5	PCB-1260	42 U	42	9.10

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**SBD9**	QC Batch:	89881 -116
Sample #:	**345897**	Anal. Batch:	207924
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	82 U	82	19.2
11104-28-2	PCB-1221	41 U	41	2.40
11141-16-5	PCB-1232	41 U	41	6.00
53469-21-9	PCB-1242	41 U	41	3.60
12672-29-6	PCB-1248	41 U	41	6.00
11097-69-1	PCB-1254	41 U	41	3.60
11096-82-5	PCB-1260	41 U	41	8.40

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**69SB2A**	QC Batch:	90218 -110
Sample #:	**345745**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	60 U	60	2.40
93-72-1	2,4,5-TP (Silvex)	60 U	60	4.80
94-75-7	2,4-D	240 U	240	19.2
94-82-6	2,4-DB	240 U	240	74.4
75-99-0	Dalapon	300 U	300	68.4
1918-00-9	Dicamba	240 U	240	2.40
120-36-5	Dichlorprop	240 U	240	20.4
~~88-85-7~~	~~* Dinoseb~~	~~240 R~~ R,1	~~240~~	~~25.2~~ AZ, 2/18/04
94-74-6	MCPA	24000 U	24000	1680
93-65-2	MCPP	24000 U	24000	6070

* See attached Statement of Data Qualifications.

See re-extraction, AZ 2/18/04

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ANALYTICAL REPORT

VALUE CHANGES

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/17/03 ~~10/10/03~~ by DJM ~~RS~~ 2/18/04
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**69SB2A**	QC Batch:	90218 -110
Sample #:	**345745DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	60 U	60	~~2.40~~
93-72-1	2,4,5-TP (Silvex)	60 U	60	4.80
94-75-7	2,4-D	~~240~~ U	240	19.2
94-82-6	2,4-DB	240 U	240	74.4
75-99-0	Dalapon	300 U	300	68.4
1918-00-9	Dicamba	240 U	240	2.40
~~120-36-5~~	Dichlorprop	240 U	240	20.4
88-85-7	Dinoseb	240 U	240	25.2
94-74-6	MCPA	24000 U	24000	~~1680~~
~~93-65-2~~	MCPP	24000 U	24000	6070

Use only Dinoseb, RS 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**13SB9A**	QC Batch:	90218 -110
Sample #:	**345896**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	64 U	64	2.60
93-72-1	2,4,5-TP (Silvex)	64 U	64	5.20
94-75-7	2,4-D	260 U	260	20.8
94-82-6	2,4-DB	260 U	260	80.6
75-99-0	Dalapon	320 U	320	74.1
1918-00-9	Dicamba	260 U	260	2.60
120-36-5	Dichlorprop	260 U	260	22.1
~~88-85-7~~	~~* Dinoseb~~	~~260 R~~ R,1	~~260~~	~~27.3~~ * 2/18/04
94-74-6	MCPA	26000 U	26000	1810
93-65-2	MCPP	26000 U	26000	6570

* See attached Statement of Data Qualifications.

See re-extraction for Dinoseb * 2/18/04

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ANALYTICAL REPORT

VALUE CHANGES

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/17/03 ~~10/10/03~~ by DJM ✱ 2/18/03
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**13SB9A**	QC Batch:	90218 -110
Sample #:	**345896DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	64 U	64	~~2.60~~
93-72-1	2,4,5-TP (Silvex)	64 U	~~64~~	5.20
94-75-7	2,4-D	~~260 U~~	260	20.8
94-82-6	2,4-DB	260 U	260	80.6
75-99-0	Dalapon	320 U	320	74.1
1918-00-9	Dicamba	260 U	260	2.60
~~120-36-5~~	Dichlorprop	~~260 U~~	260	22.1
88-85-7	Dinoseb	260 U	260	27.3
94-74-6	MCPA	~~26000 U~~	~~26000~~	~~1810~~
~~93-65-2~~	MCPP	26000 U	26000	6570

Use only Dinoseb, ✱ 2/18/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**SBD9**	QC Batch:	90218 -110
Sample #:	**345897**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	62 U	62	2.40
93-72-1	2,4,5-TP (Silvex)	62 U	62	4.80
94-75-7	2,4-D	250 U	250	19.2
94-82-6	2,4-DB	250 U	250	74.4
75-99-0	Dalapon	310 U	310	68.4
1918-00-9	Dicamba	250 U	250	2.40
120-36-5	Dichlorprop	250 U	250	20.4
~~88-85-7~~	~~*Dinoseb~~	~~250 R~~ R,1	~~250~~	~~25.2~~ AS 2/18/04
94-74-6	MCPA	25000 U	25000	1680
93-65-2	MCPP	25000 U	25000	6070

* See attached Statement of Data Qualifications.

See re-extraction for dinoseb, AS 2/18/04

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ANALYTICAL REPORT

VALUE CHANGES

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**	Prepared:	10/17/03 ~~10/10/03~~ by DJM AS 2/18/04
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8151A
		Analyzed:	10/27/03 by JLRM
Sample ID:	**SBD9**	Anal. Method:	USEPA-8151A
Sample #:	**345897DL**	QC Batch:	90218 -110
Matrix:	Soil	Anal. Batch:	208365
Unit:	ug/kg dry	Percent Solids:	80
		Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	62 U	62	~~2.40~~
93-72-1	2,4,5-TP (Silvex)	62 U	62	4.80
94-75-7	2,4-D	~~250~~ U	250	19.2
94-82-6	2,4-DB	250 U	250	74.4
75-99-0	Dalapon	310 U	310	68.4
1918-00-9	Dicamba	250 U	250	2.40
~~120-36-5~~	Dichlorprop	250 U	250	20.4
88-85-7	Dinoseb	250 U	250	25.2
94-74-6	MCPA	~~25000~~ U	~~25000~~	~~1680~~
~~93-65-2~~	MCPP	25000 U	25000	6070

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 15:00
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB2A**
Sample #: **345745**
Matrix: Soil

Percent Solids: 83

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	24600	250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	9.5	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.64	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	65	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.62 J	1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.57 J	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	840 J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	50 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	16 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	17 J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	32700	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	1.0 U	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2270 J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	894	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.091 J	0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	0.50 U	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1580	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	1.0 U	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.085 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	114	100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.33 J B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	54	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	51	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 15:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB2B**
Sample #: **345746**
Matrix: Soil

Percent Solids: 79

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	34800		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	8.8		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	6.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	70		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.91 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	568	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	50	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	23	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	42400		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	14		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	6020	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	303		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.070 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	30		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	3680		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.47 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.10 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	353		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.37 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	71		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	54		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 15:30
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB2C**
Sample #: **345747**
Matrix: Soil

Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	31400		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	7.2		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	9.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	63		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.90 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	483	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	41	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	16	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	24	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	41200		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	15		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	8790	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	585		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.077 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	25		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	4720		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.45 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	434		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.39 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	57		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	45		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 16:00
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB4B**
Sample #: **345748**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	33300		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	9.7		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.0		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	51		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.45 J		1.0	0.0333	mg/kg dry	10/29/03	DSC	USEPA-6010B
Cadmium, Total	1.6		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	372	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	45	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	18	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	59000		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	18		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	971	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	273		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.041 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1080		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.40 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.063 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	497		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.18 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	66		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	88		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 09:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB7A**
Sample #: **345883**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14000		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	170		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.3		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2290	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	28	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.0	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	13	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	31000		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	141		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3370	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1040		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.027 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1670		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.57 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.084 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	58 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.52	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	24		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	471		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 10:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB7B**
Sample #: **345884**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	13900		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.12 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	199		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.98 J		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2650	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	30	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	16	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	41600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	235		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3140	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1650		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.038 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	13		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1320		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.70 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.096 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	46 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.69	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	24		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	688		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 10:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB7C**
Sample #: **345885**
Matrix: Soil

Percent Solids: 79

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21400		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.085 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	208		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.3		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.3		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
* Calcium, Total	2310	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
* Chromium, Total	37	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	19	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	41900		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	239		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
* Magnesium, Total	3940	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1380		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.034 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	19		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1890		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.84 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	53 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.86	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	36		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	847		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 10:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB12A**
Sample #: **345886**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	6630		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.1		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	78		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.1		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	12400	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	18	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	5.1	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	45	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	14800		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	176		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	5330	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	301		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.016 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	8.3		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1050		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.32 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.059 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	102		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.13 J	B,X	0.50	0.0270	mg/kg dry	10/30/03	DWJ	USEPA-6020
Vanadium, Total	14		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	214		20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 11:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB12B**
Sample #: **345887**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	9910		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.1		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.2		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	106		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.4		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	4820	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	27	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	6.4	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	37	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	15000		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	325		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3270	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	280		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.041 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1420		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.39 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.027 J	B,P	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	252		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J	B,X	0.50	0.0270	mg/kg dry	10/30/03	DWJ	USEPA-6020
Vanadium, Total	17		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	377		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD8**
Sample #: **345888**
Matrix: Soil

Percent Solids: 67

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	8930		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.3		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.2		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	102		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.6		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	4640	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	26	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	6.3	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	36	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	14700		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	318		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3050	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	291		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.035 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	9.6		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1290		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.41 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.030 J	B,P	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	88 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.15 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	17		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	426		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 11:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB12C**
Sample #: **345889**
Matrix: Soil

Percent Solids: 62

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	15000		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.5		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.2		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	161		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	2.3		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	3840	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	34	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.9	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	94	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	18700		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	1140		200	4.36	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3980	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	272		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.13		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	17		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	2150		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.063 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	95 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.29 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	26		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	476		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11A**
Sample #: **345890**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	19800		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.27 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.2		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	171		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.2		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	4020	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	38	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	26	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	32600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	111		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	4650	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1140		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.052 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	17		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	2680		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.86 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.10 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	51 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.42 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	34		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	294		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11B**
Sample #: **345891**
Matrix: Soil

Percent Solids: 88

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	10800		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	4.7		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.8		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	143		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.65 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.2		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2120	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	29	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.4	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	98	J,S	5.0	1.84	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Iron, Total	33800		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	26500		5000	109	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	2520	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	942		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.045 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1280		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.53 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.26 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	63 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.45 J	B,X	0.50	0.0270	mg/kg dry	10/30/03	DWJ	USEPA-6020
Vanadium, Total	18		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	502		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11C**
Sample #: **345892**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20900		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.62		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.7		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	211		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.2		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	2.7		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2970	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	39	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	16	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	33	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	48600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	295		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3940	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1700		125	6.60	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.071 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	21		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1720		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	1.5		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	64 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.68	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	34		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	1070		100	12.9	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB10A**
Sample #: **345893**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	10900		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.19 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	111		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.85 J		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.1		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	4570	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	27	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	11	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	16	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	25700		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	111		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3850	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	853		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.040 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1540		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.085 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	36 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.32 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	22		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	287		20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 13:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB10B**
Sample #: **345894**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14100		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	3.0		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	160		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.97 J		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2240	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	35	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	44	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	37500		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	320		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	2890	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1310		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.089 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	16		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1200		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.77 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.18 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	52 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.45 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	25		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	578		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 13:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB10C**
Sample #: **345895**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17500		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.78		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	142		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.89 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.0		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1820	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	35	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	14	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	34	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	39600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	204		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3230	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1150		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.083 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	16		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1410		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.96 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	48 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.50	B,Y	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	30		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	540		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9A**
Sample #: **345896**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20400	50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.095 J B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.7	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	175	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.2	1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	2.2	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1890 J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	36 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	25 J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	36500	200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	434	50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3690 J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1240	25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.043 J	0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	19	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1980	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.93 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	44 J	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.78 B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	37	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	1010	100	12.9	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD9**
Sample #: **345897**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	18600		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.10 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	178		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.1		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	2.4		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2070	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	34	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	26	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	35900		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	396		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3690	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1390		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.043 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	17		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1910		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.84 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	45 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.95	B,P	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	35		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	969		100	12.9	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9B**
Sample #: **345898**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	16200	50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.1	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	121	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U	1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.2	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1490 J,m	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	31 J,m	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.8 J,s	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	13 J,s	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	20400	200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	113	25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	2970 J,m	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	689	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.027 J	0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	17	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1490	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.72 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.060 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	54 J	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.25 J B,x	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	30	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	194	20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9C**
Sample #: **345899**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	4250	50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.12 J	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	29	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U	1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.1	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1300 J,m	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	11 B,x	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	3.9 J,s	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	2.5 J,s	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	5330	20	4.24	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	12	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1210 J,m	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	59	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.10 U	0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	3.8	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	548	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.23 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.023 J B,p	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	69 J	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.047 J B,x	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	11	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	46	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 15:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB8A**
Sample #: **345900**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	12600		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.069 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	124		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.66 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.91 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	3290	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	28	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	10	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	18	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	29200		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	8620		1000	21.8	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3240	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1160		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.033 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1480		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.66 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.14 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	40 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.36 J	B,P	0.50	0.0270	mg/kg dry	10/30/03	DWJ	USEPA-6020
Vanadium, Total	23		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	363		20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 15:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB8B**
Sample #: **345901**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	7650		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.65		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	66		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	0.72 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1750	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	19	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	6.0	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	8.3	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	12400		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	46		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2160	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	270		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.0087 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	7.8		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	939		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.35 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.45 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	63 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.14 J	B,J	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	15		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	154		20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**69SB2A**		
Sample #:	**345745**		
Matrix:	Soil	Percent Solids:	83

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	83	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.14 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**69SB2B**		
Sample #:	**345746**		
Matrix:	Soil	Percent Solids:	79

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	79	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**69SB2C**		
Sample #:	**345747**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.05 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**57SB4B**		
Sample #:	**345748**		
Matrix:	Soil	Percent Solids:	74

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	74	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB7A**		
Sample #:	**345883**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.07 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB7B**		
Sample #:	**345884**		
Matrix:	Soil	Percent Solids:	80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.18 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**13SB7C**		
Sample #:	**345885**		
Matrix:	Soil	Percent Solids:	79

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	79	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 10:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB12A**
Sample #: **345886**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.18 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB12B**		
Sample #:	**345887**		
Matrix:	Soil	Percent Solids:	71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.39 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD8**		
Sample #:	**345888**		
Matrix:	Soil	Percent Solids:	67

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	67	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.23 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB12C**		
Sample #:	**345889**		
Matrix:	Soil	Percent Solids:	62

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	62	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB11A**		
Sample #:	**345890**		
Matrix:	Soil	Percent Solids:	77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.22 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11B**
Sample #: **345891**
Matrix: Soil

Percent Solids: 88

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	88	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.35 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11C**
Sample #: **345892**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.25 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB10A**		
Sample #:	**345893**		
Matrix:	Soil	Percent Solids:	71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.17 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 13:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB10B**
Sample #: **345894**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.22 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB10C**		
Sample #:	**345895**		
Matrix:	Soil	Percent Solids:	73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB9A**		
Sample #:	**345896**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.35 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD9**		
Sample #:	**345897**		
Matrix:	Soil	Percent Solids:	80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.26 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9B**
Sample #: **345898**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.12 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9C**
Sample #: **345899**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 15:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB8A**
Sample #: **345900**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.25 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB8B**		
Sample #:	**345901**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: *The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.*

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?	x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.			x
	1 or more <10% / 1 high/low / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / J / L / K Non-detects: R / UJ / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).		x	
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes: *13SB12C*

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively identified and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 23			
	Number of target compounds in each analysis:50			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{O}C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentrationof the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration

		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD ≤ 15%, ICV %D < 30%, and CCV %D ≤ 20%.		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ±50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine,hexachlorocyclopentadiene,2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes: ***1,2,4,5-tetrachlorobenzene was not in the ICV for the 10/31/03 calibration. It is found in the LCS, MS, and MSD from a second source.***

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	x		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?	x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			x
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			x
	1 or more <10% / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / L / K Non-detects: R / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 10-150%?	x		
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 10-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		x	

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentativelyidenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".	x		

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 23			
	Number of target compounds in each analysis:66			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: February-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
_____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		x	

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	23			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	23			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
___ CLP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: PEST/PCB
Method No.: 8081A/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Preservation/ Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	x		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	x		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?			x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			x

	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
	1 out	high/low	No action	No action
	2 out	2 high same column	K	No action
		2 low same column	L, UL	No action
		mixed same column	J, UJ	No action
		2 high diff columns	J	Not applicable
		2 low diff columns	J, UJ	Not applicable
		mixed diff columns	Professional judgement	Not applicable
	3 out	All high	K	Not applicable
		All low	L, UL	Not applicable
		2 high, 1 low	K (2 high)	J (1 low 2nd column)
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
		other mixed	J, UJ	Not applicable
	4 out	All high	K	Not applicable
		All low	L, UL	Not applicable
		Mixed	J, UJ	Not applicable
	If any recovery is >0% and <10% then L(+)/R(-).			
	If any recovery is 0% then R(+/-).			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).	x		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

Florisil cleanup was performed, no laboratory submission for these CLP descriptors was provided.

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	3	3			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
__X__ Region III Modified for National Functional Guidelines
_____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		x	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		x	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD see SDG 36440-1

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	3			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-5
Project No.: 15291974.30000

Project Name: Radford SSP
Reviewer: AS
Date: February-04

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C $\pm$ 2 ^{o}C)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x			x			x	

Note:

3.0 Instrument Calibration

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7 + BLK			4 + BLK			5 + BLK			6 + BLK		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (labelled LCS by TriMatrix) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	x					x	x			x		
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K							passed within 70-130%			passed within 80-120%		

Note: ***A high point added to Al, Ba, Ca, Fe, Mg, Mn, & K curves and the RLs were elevated by 5.***

4.0 Blanks		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes: < -IDL L(+)/UL(-); > IDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x			x			x			x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x			x			x			x	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note:

7.0 Laboratory Duplicates (MSD)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	x			x			x			x		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	x			x			x			x		

Note:

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous and lab limits for soil?												
	%R > 125% 30%< %R < 74% < 30%	x				x		x			x		
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x			x					x

Note: ***13SB7C Ca 129%/133% (121%), Cr 114%/119% (112%), Mg 127%/142% (111%)***

9.0 Instrument Detection Limits (IDL)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	x				x							

Note: ***Serial Dilution: 13SB7C - Co 53.8% and Cu 21.1%; post digestion spike recovery passes for Co and Cu***

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	x				x		x			x		

Note: _____

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: *6010B: Several samples displayed yttrium out high. The samples were reanalyzed at DF5 elevating Be MDL but not RL as MDLx3 is still <RL.*

6020: high lead interfered with internal used to quantitate Th concentrations in samples 13SB11B and 13SB8A. Lab used a different internal.

New MDL could not be inserted into EDD.

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples: 23												
13.1.2	Number of target compounds in each analysis: various												
13.1.3	Number of results rejected and not reported: 0												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%	100%			100%			100%			100%		

Note: _____

TM0301 Cart, 5 Volatile Soil

№ 1149

Radford Army Ammunition Plant
Chain Of Custody Record

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Fenne (804)965-9060

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No: 0000063

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330[redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) (ILM)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] HERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
675B2A	10/8/03 1500	5		X	5	F	/	7	X	X	X	X	X	X		X						X	
675B2B	10/8/03 1515	5		X	5	F	/	5	X	X	X			X		X							
675B2C	10/8/03 1530	5		X	5	F	/	5	X	X	X			X		X							
SF [redacted]5784B	10/8/03 1600	5		X	5	F	/	5	X	X	X			X		X							

2 2 2

TM0360 Cart 2 Volatile Soil

№ 1144

Radford Army Ammunition Plant
Chain Of Custody Record

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Rowe (804) 765 9100

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

00000967

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /cN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	NETB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135B7A	10/9/03 945	5		X	5	F	/	5	X	X	X			X		X							
135B7B	10/9/03 1000	5		X	5	F	/	5	X	X	X			X		X							
135B7C	10/9/03 1015	5		X	5	F	/	5	X	X	X			X		X							
135B7CMS	10/9/03 1015	5		X	5	F	/	5	X	X	X			X		X							—
135B7CMSD	10/9/03 1015	5		X	5	F	/	5	X	X	X			X		X							—
135B12A	10/9/03 1045	5		X	5	F	/	5	X	X	X			X		X							
135B12B	10/9/03 1100	5		X	5	F	/	5	X	X	X			X		X							
DBDP	10/9/03	5		X	5	F	/	5	X	X	X			X		X							
135B12C	10/9/03 1115	5		X	5	F	/	5	X	X	X			X		X							
135B11A	10/9/03 1215	5		X	5	F	/	5	X	X	X			X		X							
135B11B	10/9/03 1230	5		X	5	F	/	5	X	X	X			X		X							
135B11C	10/9/03 1245	5		X	5	F	/	5	X	X	X			X		X							

TC 21-2 21-1

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/9/03 1800				
Relinquished by:	Date/time	Received by: (for lab) John Parker	Date/Time 10/10/03 8:40	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-5

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Volatile Cart 4
Soil TM0341
№ 1147

Radford Army Ammunition Plant
Chain Of Custody Record

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Rayne (804) 965 7000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No: 000068

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330 [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] NERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135B10A	10/9/03 1300	5		X	5	F	/	5	X	X	X			X		X							TC
135B10B	10/9/03 1315	5		X	5	F	/	5	X	X	X			X		X							2
135B10C	10/9/03 1330	5		X	5	F	/	5	X	X	X			X		X							↓
135B9A	10/9/03 1400	5		X	5	F	/	7	X	X	X	X	X	X		X						X	2
[redacted]5BD9	10/9/03 —	5		X	5	F	/	7	X	X	X	X	X	X		X						X	2
135B9B	10/9/03 1415	5		X	5	F	/	5	X	X	X			X		X							2
135B9C	10/9/03 1430	5		X	5	F	/	5	X	X	X			X		X							↓
135B8A	10/9/03 1515	5		X	5	F	/	5	X	X	X			X		X							2
135B8B	10/9/03 1530	5		X	5	F	/	5	X	X	X			X		X							N/C for 135B8
~~135B8C~~	~~10/9/03 1545~~	~~5~~		X	5	F	/	6	X	X	X			X		X	BT						

Box #1			Box #2			Box #3	Box #4	
1. Surface Water	6. Trip Blank		A. HCl + Ice	F. Ice Only		F. Filtered	R. Rush - 3 Day	
2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other _____		U. Unfiltered	S. Standard 28 Day	
3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice			T. Timely 14 Day	
4. Rinsate	9. Other _____		D. H2SO4 + Ice	I. ZnAc + NaOH + Ice			O. Other _____	
5. Soil Sediment/Sludge			E. Unpreserved					

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/9/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/10/03 8:40	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

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36440-5

APPENDIX H.2.2
RCRA FACILITY INVESTIGATION SAMPLING
2007-2008

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DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-46 **Fraction:** VOCs, Metals, & TOC

Lab: TriMatrix **Project Name** Radford SWMU 57

Reviewer: RA **Date:** February 19, 2008

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the Region III Modifications to the USEPA National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical method employed and provisions of the approved project-specific QAPP.

Major Anomalies: None.

Minor Anomalies: For the VOCs analyses, samples 57SB11A, 57SB11B, and DUP-2 were received by the laboratory two hours after the 48 hour holding time for the encore samples had expired. Positive results were flagged "L,h" and non-detects were flagged "UL,h" for these samples.

One soil method blank displayed positive detections for 1,4-dichlorobenzene at 8.5 ug/Kg and methylene chloride at 16 ug/Kg. The associated field sample results for 1,4-dichlorobenzene were non-detects and no data qualifying action was taken. Positive associated field sample results less than ten times the method blank concentration were flagged "B,z" for methylene chloride. The aqueous method blank displayed a positive detection for acetone at 1.68 ug/L. Positive associated equipment and trip blank results less than ten times the method blank concentration for acetone were flagged "B,z". The trip blanks displayed positive detections for methylene chloride and toluene. The associated positive field sample results less than ten times the trip blank concentration for methylene chloride and less than five times the trip blank concentration for toluene were flagged "B,y".

The continuing calibration analyzed for sequence 8011648 displayed a percent difference (%D) greater than the control limit (i.e., 20%) with a positive bias for carbon disulfide at 88%; and a %D greater than the control limit with a negative bias for acetone at 20.6%. The continuing calibration analyzed for sequence 8011652 displayed %Ds greater than the control limit with a negative bias for acetone at 21.8% and dichlorodifluoromethane at 25.4%. The continuing calibration analyzed for sequence 8011722 displayed a %D greater than the control limit with a negative bias for 1,2-dibromo-3-chloropropane at 21%. Positive associated field sample results were flagged "J,c" for the compounds that displayed a positive bias. Positive associated field sample results were flagged "J,c" and non-detects were flagged "UJ,c" for the

compounds that displayed a negative bias, unless previously flagged for a holding time anomaly.

Sample 57SB16A displayed a percent recovery (%R) less than the lower control limit of 85% for surrogate 4-bromofluorobenzene at 84%. Positive associated field sample results were flagged "J,s" and non-detects were flagged "UJ,s", unless previously flagged for a calibration anomaly.

The matrix spike pair analyzed for sample 57SB12A displayed %Rs and/or relative percent differences (RPDs) greater than the upper control limits for acetone, chloroform, 1,2-dibromo-3-chloropropane, 1,2-dichloropropane, isopropylbenzene, methyl tert-butyl ether, 1,1,2-trichloroethene, trichlorofluoromethane, and 2-butanone. The associated parent sample result for 2-butanone was positive and was flagged "J,d". This matrix spike pair also displayed %Rs less than the lower control limits for methyl acetate and styrene. The associated parent sample result for methyl acetate was positive and was flagged "J,m"; the associated parent sample result for styrene was non-detect and was flagged "UJ,m".

Sample 57SB16A displayed an area less than the lower control limit of 50% for the internal standard 1,4-dichlorobenzene-d4 at 45%. The associated field sample results were previously flagged for a surrogate anomaly, and no further data qualifying action was required.

Acetone exceeded the calibration range of the instrument for samples 57SB16A and 57SB17A. These results were flagged "J,q".

For the metals analyses by method 6010, the soil method blanks displayed positive detections for beryllium, calcium, iron, sodium, and cadmium. The aqueous method blank displayed a positive detection for sodium. The associated positive field sample results less than five times the method blank concentrations were flagged "B,p". The equipment blanks displayed positive detections for calcium and iron. The associated field sample results were greater than five times the equipment blank concentrations and no data qualifying action was taken.

For method 6020, the soil method blanks displayed positive detections for lead, copper, and vanadium. The associated field sample results were greater than five times the method blank concentrations and no data qualifying action was taken. The aqueous method blank displayed positive detections for chromium and lead. The associated positive field sample results less than five times the method blank concentrations were flagged "B,p" in the equipment blanks. The equipment blanks displayed positive detections for antimony, copper, manganese, nickel, lead, and zinc. The associated field sample results were greater than five times the equipment blank concentrations and no data qualifying action was taken.

The equipment blank, EQBK-1 displayed a positive detection for mercury at 0.05 ug/L. The associated field sample results were greater than five times the equipment blank concentration and no data qualifying action was taken.

For method 6010, the matrix spike analyzed for sample 57SB12A displayed %Rs greater than the upper control limit of 125% for manganese at 135% and zinc at 130% and 131%. Positive associated field sample results were flagged "K,m".

For method 6020, the matrix spike pair analyzed for sample 57SB12A displayed a %R greater than the upper control limit of 125% for vanadium at 126%. Positive associated field sample results were flagged "K,m". This matrix spike pair also displayed %Rs less than the lower control limit of 75% for arsenic at 72% and selenium at 70%. Positive associated field sample results were flagged "L,m" and non-detects were flagged "UL,m".

For method 6020, the serial dilution analyzed for sample 57SB10C displayed percent differences (%Ds) greater than the control limit of 10% for copper at 17%, nickel at 15%, and vanadium at 12%. The serial dilution analyzed for sample 57SB12A displayed %Ds greater than the control limit for copper at 16% and nickel at 14%. Positive associated field sample results were flagged "J,s", unless previously flagged for a matrix spike anomaly.

For method 6010, the field duplicate pair (57SB11A/DUP-2) displayed results outside the control limits for barium and manganese. The barium results were flagged "J,f" in these two samples. The manganese results were previously flagged for a matrix spike anomaly, and no further data qualifying action was required.

Correctable Anomalies: None.

Comments: On the basis of this evaluation, the laboratory appears to have followed the specified method. All data are usable, as qualified, for their intended purpose based on the data reviewed. It should be noted that detection limits were raised in several samples due to dilutions. All quality control criteria were met for the TOC analyses.

Signed: Rayan

SAMPLE ID SUMMARY

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46

Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB17A	0801083-01
57SB17B	0801083-02
57SB17C	0801135-01
57SB15A	0801135-02
57SB15B	0801135-03
57SB15C	0801135-04
DUP-1	0801135-05
EQBK-1	0801135-06
Trip Blank	0801135-07
57SB16A	0801135-08
57SB16B	0801135-09
57SB16C	0801135-10
57SB10A	0801135-11
57SB10B	0801135-12
57SB10C	0801135-13
57SB11A	0801212-01
57SB11B	0801212-02
57SB11C	0801212-03
DUP-2	0801212-04
57SB2AB	0801212-05
57SB12A	0801212-06
57SB12B	0801212-07
57SB12C	0801212-08
EQBK-2	0801212-09
Trip Blank	0801212-10
57SB18A	0801212-11
57SB18B	0801212-12
57SB18C	0801212-13
57SB13A	0801212-14
57SB13B	0801212-15
57SB13C	0801212-16
DUP-3	0801212-17
57SB19A	0801212-18
57SB19B	0801212-19
57SB19C	0801212-20

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB17A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801083-01 File ID: 08301.D

Sampled: 01/07/08 14:25 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 11:11

Solids: 85.86 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	320	23	4.9	E J7
71-43-2	Benzene	1	5.8	5.8	0.15	U
74-97-5	Bromochloromethane	1	23	23	0.15	U
75-27-4	Bromodichloromethane	1	5.8	5.8	0.29	U
75-25-2	Bromoform	1	5.8	5.8	0.56	U
74-83-9	Bromomethane	1	5.8	5.8	1.4	U
75-15-0	Carbon Disulfide	1	0.36	5.8	0.31	J J, C
56-23-5	Carbon Tetrachloride	1	5.8	5.8	0.33	U
108-90-7	Chlorobenzene	1	5.8	5.8	0.24	U
75-00-3	Chloroethane	1	23	23	0.41	U
67-66-3	Chloroform	1	5.8	5.8	0.17	U
74-87-3	Chloromethane	1	5.8	5.8	0.28	U
110-82-7	Cyclohexane	1	12	12	0.80	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.95	U
124-48-1	Dibromochloromethane	1	5.8	5.8	0.41	U
106-93-4	1,2-Dibromoethane	1	5.8	5.8	0.98	U
95-50-1	1,2-Dichlorobenzene	1	5.8	5.8	0.29	U
541-73-1	1,3-Dichlorobenzene	1	5.8	5.8	0.28	U
106-46-7	1,4-Dichlorobenzene	1	5.8	5.8	0.25	U
75-71-8	Dichlorodifluoromethane	1	5.8	5.8	0.38	U
75-34-3	1,1-Dichloroethane	1	5.8	5.8	0.23	U
107-06-2	1,2-Dichloroethane	1	5.8	5.8	0.34	U
75-35-4	1,1-Dichloroethene	1	5.8	5.8	0.43	U
156-59-2	cis-1,2-Dichloroethene	1	5.8	5.8	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	5.8	5.8	0.26	U
78-87-5	1,2-Dichloropropane	1	5.8	5.8	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	5.8	5.8	0.29	U
10061-02-6	trans-1,3-Dichloropropene	1	5.8	5.8	0.97	U
100-41-4	Ethylbenzene	1	5.8	5.8	0.15	U
591-78-6	2-Hexanone	1	12	12	3.5	U
98-82-8	Isopropylbenzene	1	5.8	5.8	0.14	U
79-20-9	Methyl Acetate	1	11	23	0.97	J
1634-04-4	Methyl tert-Butyl Ether	1	5.8	5.8	0.27	U
108-87-2	Methylcyclohexane	1	12	12	0.93	U

00288

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB17A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801083-01 File ID: 08301.D

Sampled: 01/07/08 14:25 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 11:11

Solids: 85.86 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	23	23	4.6	U
78-93-3	2-Butanone (MEK)	1	31	23	2.8	
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	5.8	5.8	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.8	5.8	0.24	U
127-18-4	Tetrachloroethene	1	5.8	5.8	0.51	U
108-88-3	Toluene	1	5.8	5.8	0.47	U
87-61-6	1,2,3-Trichlorobenzene	1	23	23	0.24	U
120-82-1	1,2,4-Trichlorobenzene	1	5.8	5.8	0.28	U
71-55-6	1,1,1-Trichloroethane	1	5.8	5.8	0.24	U
79-00-5	1,1,2-Trichloroethane	1	5.8	5.8	0.80	U
79-01-6	Trichloroethene	1	5.8	5.8	0.65	U
75-69-4	Trichlorofluoromethane	1	5.8	5.8	0.25	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.8	5.8	0.39	U
75-01-4	Vinyl Chloride	1	5.8	5.8	0.53	U
1330-20-7	Xylene (Total)	1	5.8	5.8	0.68	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.4	103	78 - 121	
1,2-Dichloroethane-d4	40.0	43.6	109	66 - 124	
Toluene-d8	40.0	39.4	98	85 - 115	
4-Bromofluorobenzene	40.0	34.2	85	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	829442	7.44	962634	7.45	
Chlorobenzene-d5	333352	17.47	414856	17.48	
1,4-Dichlorobenzene-d4	272998	22.49	459239	22.49	

* Values outside of QC limits

00269

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB17B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801083-02 File ID: 08302.D

Sampled: 01/07/08 14:38 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 11:44

Solids: 85.20 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	7.3	23	5.0	J J,C
71-43-2	Benzene	1	5.9	5.9	0.15	U
74-97-5	Bromochloromethane	1	23	23	0.15	U
75-27-4	Bromodichloromethane	1	5.9	5.9	0.29	U
75-25-2	Bromoform	1	5.9	5.9	0.57	U
74-83-9	Bromomethane	1	5.9	5.9	1.4	U
75-15-0	Carbon Disulfide	1	5.9	5.9	0.31	U
56-23-5	Carbon Tetrachloride	1	5.9	5.9	0.34	U
108-90-7	Chlorobenzene	1	5.9	5.9	0.24	U
75-00-3	Chloroethane	1	23	23	0.41	U
67-66-3	Chloroform	1	5.9	5.9	0.17	U
74-87-3	Chloromethane	1	5.9	5.9	0.29	U
110-82-7	Cyclohexane	1	12	12	0.81	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.96	U
124-48-1	Dibromochloromethane	1	5.9	5.9	0.41	U
106-93-4	1,2-Dibromoethane	1	5.9	5.9	0.99	U
95-50-1	1,2-Dichlorobenzene	1	5.9	5.9	0.29	U
541-73-1	1,3-Dichlorobenzene	1	5.9	5.9	0.28	U
106-46-7	1,4-Dichlorobenzene	1	5.9	5.9	0.25	U
75-71-8	Dichlorodifluoromethane	1	5.9	5.9	0.39	U
75-34-3	1,1-Dichloroethane	1	5.9	5.9	0.23	U
107-06-2	1,2-Dichloroethane	1	5.9	5.9	0.35	U
75-35-4	1,1-Dichloroethene	1	5.9	5.9	0.44	U
156-59-2	cis-1,2-Dichloroethene	1	5.9	5.9	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	5.9	5.9	0.27	U
78-87-5	1,2-Dichloropropane	1	5.9	5.9	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	5.9	5.9	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	5.9	5.9	0.98	U
100-41-4	Ethylbenzene	1	5.9	5.9	0.15	U
591-78-6	2-Hexanone	1	12	12	3.5	U
98-82-8	Isopropylbenzene	1	5.9	5.9	0.14	U
79-20-9	Methyl Acetate	1	23	23	0.98	U
1634-04-4	Methyl tert-Butyl Ether	1	5.9	5.9	0.27	U
108-87-2	Methylcyclohexane	1	12	12	0.93	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB17B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801083-02 File ID: 08302.D

Sampled: 01/07/08 14:38 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 11:44

Solids: 85.20 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	23	23	4.6	U
78-93-3	2-Butanone (MEK)	1	23	23	2.8	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	5.9	5.9	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.9	5.9	0.24	U
127-18-4	Tetrachloroethene	1	5.9	5.9	0.52	U
108-88-3	Toluene	1	5.9	5.9	0.47	U
87-61-6	1,2,3-Trichlorobenzene	1	23	23	0.24	U
120-82-1	1,2,4-Trichlorobenzene	1	5.9	5.9	0.28	U
71-55-6	1,1,1-Trichloroethane	1	5.9	5.9	0.24	U
79-00-5	1,1,2-Trichloroethane	1	5.9	5.9	0.81	U
79-01-6	Trichloroethene	1	5.9	5.9	0.66	U
75-69-4	Trichlorofluoromethane	1	5.9	5.9	0.25	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.9	5.9	0.39	U
75-01-4	Vinyl Chloride	1	5.9	5.9	0.54	U
1330-20-7	Xylene (Total)	1	5.9	5.9	0.69	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.6	104	78 - 121	
1,2-Dichloroethane-d4	40.0	42.5	106	66 - 124	
Toluene-d8	40.0	40.2	101	85 - 115	
4-Bromofluorobenzene	40.0	40.2	101	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	851140	7.45	962634	7.45	
Chlorobenzene-d5	343606	17.48	414856	17.48	
1,4-Dichlorobenzene-d4	395076	22.49	459239	22.49	

* Values outside of QC limits

0021?

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB17C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-01 File ID: 13501.D

Sampled: 01/08/08 08:20 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 12:16

Solids: 77.70 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	26	26	5.4	U UJ1C
71-43-2	Benzene	1	6.4	6.4	0.16	U
74-97-5	Bromochloromethane	1	26	26	0.16	U
75-27-4	Bromodichloromethane	1	6.4	6.4	0.32	U
75-25-2	Bromoform	1	6.4	6.4	0.62	U
74-83-9	Bromomethane	1	6.4	6.4	1.6	U
75-15-0	Carbon Disulfide	1	6.4	6.4	0.34	U
56-23-5	Carbon Tetrachloride	1	6.4	6.4	0.37	U
108-90-7	Chlorobenzene	1	6.4	6.4	0.26	U
75-00-3	Chloroethane	1	26	26	0.45	U
67-66-3	Chloroform	1	5.1	6.4	0.19	J
74-87-3	Chloromethane	1	6.4	6.4	0.31	U
110-82-7	Cyclohexane	1	13	13	0.88	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.0	U
124-48-1	Dibromochloromethane	1	6.4	6.4	0.45	U
106-93-4	1,2-Dibromoethane	1	6.4	6.4	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.4	6.4	0.32	U
541-73-1	1,3-Dichlorobenzene	1	6.4	6.4	0.31	U
106-46-7	1,4-Dichlorobenzene	1	6.4	6.4	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.4	6.4	0.42	U
75-34-3	1,1-Dichloroethane	1	6.4	6.4	0.25	U
107-06-2	1,2-Dichloroethane	1	6.4	6.4	0.38	U
75-35-4	1,1-Dichloroethene	1	6.4	6.4	0.48	U
156-59-2	cis-1,2-Dichloroethene	1	6.4	6.4	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.4	6.4	0.29	U
78-87-5	1,2-Dichloropropane	1	6.4	6.4	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.4	6.4	0.33	U
10061-02-6	trans-1,3-Dichloropropene	1	6.4	6.4	1.1	U
100-41-4	Ethylbenzene	1	6.4	6.4	0.16	U
591-78-6	2-Hexanone	1	13	13	3.8	U
98-82-8	Isopropylbenzene	1	6.4	6.4	0.16	U
79-20-9	Methyl Acetate	1	26	26	1.1	U
1634-04-4	Methyl tert-Butyl Ether	1	6.4	6.4	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U

: 8022B

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB17C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-01 File ID: 13501.D

Sampled: 01/08/08 08:20 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 12:16

Solids: 77.70 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	26	26	5.1	U
78-93-3	2-Butanone (MEK)	1	26	26	3.1	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U
100-42-5	Styrene	1	6.4	6.4	0.28	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.4	6.4	0.26	U
127-18-4	Tetrachloroethene	1	6.4	6.4	0.57	U
108-88-3	Toluene	1	6.4	6.4	0.52	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.4	6.4	0.31	U
71-55-6	1,1,1-Trichloroethane	1	6.4	6.4	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.4	6.4	0.88	U
79-01-6	Trichloroethene	1	6.4	6.4	0.72	U
75-69-4	Trichlorofluoromethane	1	6.4	6.4	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.4	6.4	0.43	U
75-01-4	Vinyl Chloride	1	6.4	6.4	0.59	U
1330-20-7	Xylene (Total)	1	6.4	6.4	0.75	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.1	103	78 - 121	
1,2-Dichloroethane-d4	40.0	42.0	105	66 - 124	
Toluene-d8	40.0	39.0	98	85 - 115	
4-Bromofluorobenzene	40.0	39.8	100	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	822166	7.46	962634	7.45	
Chlorobenzene-d5	335204	17.48	414856	17.48	
1,4-Dichlorobenzene-d4	367468	22.49	459239	22.49	

* Values outside of QC limits

66225

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB15A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-02 File ID: 13502.D

Sampled: 01/08/08 10:40 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 12:49

Solids: 86.55 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	94	23	4.9	J,C
71-43-2	Benzene	1	5.8	5.8	0.15	U
74-97-5	Bromochloromethane	1	23	23	0.15	U
75-27-4	Bromodichloromethane	1	5.8	5.8	0.29	U
75-25-2	Bromoform	1	5.8	5.8	0.56	U
74-83-9	Bromomethane	1	5.8	5.8	1.4	U
75-15-0	Carbon Disulfide	1	5.8	5.8	0.30	U
56-23-5	Carbon Tetrachloride	1	5.8	5.8	0.33	U
108-90-7	Chlorobenzene	1	5.8	5.8	0.23	U
75-00-3	Chloroethane	1	23	23	0.41	U
67-66-3	Chloroform	1	5.8	5.8	0.17	U
74-87-3	Chloromethane	1	5.8	5.8	0.28	U
110-82-7	Cyclohexane	1	12	12	0.79	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.94	U
124-48-1	Dibromochloromethane	1	5.8	5.8	0.40	U
106-93-4	1,2-Dibromoethane	1	5.8	5.8	0.97	U
95-50-1	1,2-Dichlorobenzene	1	5.8	5.8	0.28	U
541-73-1	1,3-Dichlorobenzene	1	5.8	5.8	0.27	U
106-46-7	1,4-Dichlorobenzene	1	5.8	5.8	0.25	U
75-71-8	Dichlorodifluoromethane	1	5.8	5.8	0.38	U
75-34-3	1,1-Dichloroethane	1	5.8	5.8	0.22	U
107-06-2	1,2-Dichloroethane	1	5.8	5.8	0.34	U
75-35-4	1,1-Dichloroethene	1	5.8	5.8	0.43	U
156-59-2	cis-1,2-Dichloroethene	1	5.8	5.8	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	5.8	5.8	0.26	U
78-87-5	1,2-Dichloropropane	1	5.8	5.8	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	5.8	5.8	0.29	U
10061-02-6	trans-1,3-Dichloropropene	1	5.8	5.8	0.96	U
100-41-4	Ethylbenzene	1	5.8	5.8	0.14	U
591-78-6	2-Hexanone	1	12	12	3.5	U
98-82-8	Isopropylbenzene	1	5.8	5.8	0.14	U
79-20-9	Methyl Acetate	1	4.2	23	0.96	J
1634-04-4	Methyl tert-Butyl Ether	1	5.8	5.8	0.27	U
108-87-2	Methylcyclohexane	1	12	12	0.92	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB15A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-02 File ID: 13502.D

Sampled: 01/08/08 10:40 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 12:49

Solids: 86.55 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	23	23	4.6	U
78-93-3	2-Butanone (MEK)	1	11	23	2.8	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	5.8	5.8	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.8	5.8	0.23	U
127-18-4	Tetrachloroethene	1	5.8	5.8	0.51	U
108-88-3	Toluene	1	5.8	5.8	0.46	U
87-61-6	1,2,3-Trichlorobenzene	1	23	23	0.24	U
120-82-1	1,2,4-Trichlorobenzene	1	5.8	5.8	0.28	U
71-55-6	1,1,1-Trichloroethane	1	5.8	5.8	0.24	U
79-00-5	1,1,2-Trichloroethane	1	5.8	5.8	0.79	U
79-01-6	Trichloroethene	1	5.8	5.8	0.65	U
75-69-4	Trichlorofluoromethane	1	5.8	5.8	0.25	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.8	5.8	0.38	U
75-01-4	Vinyl Chloride	1	5.8	5.8	0.53	U
1330-20-7	Xylene (Total)	1	5.8	5.8	0.68	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.0	107	78 - 121	
1,2-Dichloroethane-d4	40.0	44.3	111	66 - 124	
Toluene-d8	40.0	39.4	98	85 - 115	
4-Bromofluorobenzene	40.0	38.3	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	828453	7.45	962634	7.45	
Chlorobenzene-d5	335445	17.48	414856	17.48	
1,4-Dichlorobenzene-d4	339696	22.49	459239	22.49	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB15B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-03 File ID: 13503.D

Sampled: 01/08/08 10:50 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 13:22

Solids: 78.96 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	24	25	5.4	J JIC
71-43-2	Benzene	1	6.3	6.3	0.16	U
74-97-5	Bromochloromethane	1	25	25	0.16	U
75-27-4	Bromodichloromethane	1	6.3	6.3	0.31	U
75-25-2	Bromoform	1	6.3	6.3	0.61	U
74-83-9	Bromomethane	1	6.3	6.3	1.5	U
75-15-0	Carbon Disulfide	1	6.3	6.3	0.33	U
56-23-5	Carbon Tetrachloride	1	6.3	6.3	0.36	U
108-90-7	Chlorobenzene	1	6.3	6.3	0.26	U
75-00-3	Chloroethane	1	25	25	0.44	U
67-66-3	Chloroform	1	6.3	6.3	0.19	U
74-87-3	Chloromethane	1	6.3	6.3	0.31	U
110-82-7	Cyclohexane	1	13	13	0.87	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.0	U
124-48-1	Dibromochloromethane	1	6.3	6.3	0.44	U
106-93-4	1,2-Dibromoethane	1	6.3	6.3	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.3	6.3	0.31	U
541-73-1	1,3-Dichlorobenzene	1	6.3	6.3	0.30	U
106-46-7	1,4-Dichlorobenzene	1	6.3	6.3	0.27	U
75-71-8	Dichlorodifluoromethane	1	6.3	6.3	0.42	U
75-34-3	1,1-Dichloroethane	1	6.3	6.3	0.25	U
107-06-2	1,2-Dichloroethane	1	6.3	6.3	0.37	U
75-35-4	1,1-Dichloroethene	1	6.3	6.3	0.47	U
156-59-2	cis-1,2-Dichloroethene	1	6.3	6.3	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.3	6.3	0.29	U
78-87-5	1,2-Dichloropropane	1	6.3	6.3	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.3	6.3	0.32	U
10061-02-6	trans-1,3-Dichloropropene	1	6.3	6.3	1.1	U
100-41-4	Ethylbenzene	1	6.3	6.3	0.16	U
591-78-6	2-Hexanone	1	13	13	3.8	U
98-82-8	Isopropylbenzene	1	6.3	6.3	0.16	U
79-20-9	Methyl Acetate	1	25	25	1.1	U
1634-04-4	Methyl tert-Butyl Ether	1	6.3	6.3	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U

60239

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB15B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-03 File ID: 13503.D

Sampled: 01/08/08 10:50 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 13:22

Solids: 78.96 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	25	25	5.0	U
78-93-3	2-Butanone (MEK)	1	25	25	3.1	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U
100-42-5	Styrene	1	6.3	6.3	0.28	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.3	6.3	0.26	U
127-18-4	Tetrachloroethene	1	6.3	6.3	0.56	U
108-88-3	Toluene	1	6.3	6.3	0.51	U
87-61-6	1,2,3-Trichlorobenzene	1	25	25	0.26	U
120-82-1	1,2,4-Trichlorobenzene	1	6.3	6.3	0.31	U
71-55-6	1,1,1-Trichloroethane	1	6.3	6.3	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.3	6.3	0.87	U
79-01-6	Trichloroethene	1	6.3	6.3	0.71	U
75-69-4	Trichlorofluoromethane	1	6.3	6.3	0.27	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.3	6.3	0.42	U
75-01-4	Vinyl Chloride	1	6.3	6.3	0.58	U
1330-20-7	Xylene (Total)	1	6.3	6.3	0.74	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.5	106	78 - 121	
1,2-Dichloroethane-d4	40.0	42.6	106	66 - 124	
Toluene-d8	40.0	40.1	100	85 - 115	
4-Bromofluorobenzene	40.0	39.7	99	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	842323	7.44	962634	7.45	
Chlorobenzene-d5	350247	17.47	414856	17.48	
1,4-Dichlorobenzene-d4	391152	22.48	459239	22.49	

* Values outside of QC limits

00246

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB15C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-04 File ID: 13504.D

Sampled: 01/08/08 11:40 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 13:55

Solids: 70.08 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	87	29	6.0	J JC
71-43-2	Benzene	1	7.1	7.1	0.18	U
74-97-5	Bromochloromethane	1	29	29	0.18	U
75-27-4	Bromodichloromethane	1	7.1	7.1	0.35	U
75-25-2	Bromoform	1	7.1	7.1	0.69	U
74-83-9	Bromomethane	1	7.1	7.1	1.7	U
75-15-0	Carbon Disulfide	1	0.44	7.1	0.38	J JC
56-23-5	Carbon Tetrachloride	1	7.1	7.1	0.41	U
108-90-7	Chlorobenzene	1	7.1	7.1	0.29	U
75-00-3	Chloroethane	1	29	29	0.50	U
67-66-3	Chloroform	1	0.36	7.1	0.21	J
74-87-3	Chloromethane	1	7.1	7.1	0.35	U
110-82-7	Cyclohexane	1	14	14	0.98	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.2	U
124-48-1	Dibromochloromethane	1	7.1	7.1	0.50	U
106-93-4	1,2-Dibromoethane	1	7.1	7.1	1.2	U
95-50-1	1,2-Dichlorobenzene	1	7.1	7.1	0.35	U
541-73-1	1,3-Dichlorobenzene	1	7.1	7.1	0.34	U
106-46-7	1,4-Dichlorobenzene	1	7.1	7.1	0.31	U
75-71-8	Dichlorodifluoromethane	1	7.1	7.1	0.47	U
75-34-3	1,1-Dichloroethane	1	7.1	7.1	0.28	U
107-06-2	1,2-Dichloroethane	1	7.1	7.1	0.42	U
75-35-4	1,1-Dichloroethene	1	7.1	7.1	0.53	U
156-59-2	cis-1,2-Dichloroethene	1	7.1	7.1	0.23	U
156-60-5	trans-1,2-Dichloroethene	1	7.1	7.1	0.32	U
78-87-5	1,2-Dichloropropane	1	7.1	7.1	1.3	U
10061-01-5	cis-1,3-Dichloropropene	1	7.1	7.1	0.36	U
10061-02-6	trans-1,3-Dichloropropene	1	7.1	7.1	1.2	U
100-41-4	Ethylbenzene	1	7.1	7.1	0.18	U
591-78-6	2-Hexanone	1	14	14	4.3	U
98-82-8	Isopropylbenzene	1	7.1	7.1	0.18	U
79-20-9	Methyl Acetate	1	4.4	29	1.2	J
1634-04-4	Methyl tert-Butyl Ether	1	7.1	7.1	0.33	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB15C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-04 File ID: 13504.D

Sampled: 01/08/08 11:40 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 13:55

Solids: 70.08 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	29	29	5.6	U
78-93-3	2-Butanone (MEK)	1	17	29	3.5	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.7	U
100-42-5	Styrene	1	7.1	7.1	0.32	U
79-34-5	1,1,2,2-Tetrachloroethane	1	7.1	7.1	0.29	U
127-18-4	Tetrachloroethene	1	7.1	7.1	0.63	U
108-88-3	Toluene	1	7.1	7.1	0.57	U
87-61-6	1,2,3-Trichlorobenzene	1	29	29	0.29	U
120-82-1	1,2,4-Trichlorobenzene	1	7.1	7.1	0.34	U
71-55-6	1,1,1-Trichloroethane	1	7.1	7.1	0.29	U
79-00-5	1,1,2-Trichloroethane	1	7.1	7.1	0.98	U
79-01-6	Trichloroethene	1	7.1	7.1	0.80	U
75-69-4	Trichlorofluoromethane	1	7.1	7.1	0.31	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	7.1	7.1	0.47	U
75-01-4	Vinyl Chloride	1	7.1	7.1	0.65	U
1330-20-7	Xylene (Total)	1	7.1	7.1	0.83	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.6	107	78 - 121	
1,2-Dichloroethane-d4	40.0	45.5	114	66 - 124	
Toluene-d8	40.0	39.7	99	85 - 115	
4-Bromofluorobenzene	40.0	39.2	98	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	768087	7.44	962634	7.45	
Chlorobenzene-d5	316097	17.48	414856	17.48	
1,4-Dichlorobenzene-d4	320805	22.48	459239	22.49	

* Values outside of QC limits

: 66217

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-05 File ID: 13505.D

Sampled: 01/08/08 00:00 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 14:27

Solids: 85.56 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	110	23	4.9	J JC
71-43-2	Benzene	1	5.8	5.8	0.15	U
74-97-5	Bromochloromethane	1	23	23	0.15	U
75-27-4	Bromodichloromethane	1	5.8	5.8	0.29	U
75-25-2	Bromoform	1	5.8	5.8	0.57	U
74-83-9	Bromomethane	1	5.8	5.8	1.4	U
75-15-0	Carbon Disulfide	1	0.36	5.8	0.31	J JC
56-23-5	Carbon Tetrachloride	1	5.8	5.8	0.34	U
108-90-7	Chlorobenzene	1	5.8	5.8	0.24	U
75-00-3	Chloroethane	1	23	23	0.41	U
67-66-3	Chloroform	1	5.8	5.8	0.17	U
74-87-3	Chloromethane	1	5.8	5.8	0.28	U
110-82-7	Cyclohexane	1	12	12	0.80	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.95	U
124-48-1	Dibromochloromethane	1	5.8	5.8	0.41	U
106-93-4	1,2-Dibromoethane	1	5.8	5.8	0.99	U
95-50-1	1,2-Dichlorobenzene	1	5.8	5.8	0.29	U
541-73-1	1,3-Dichlorobenzene	1	5.8	5.8	0.28	U
106-46-7	1,4-Dichlorobenzene	1	5.8	5.8	0.25	U
75-71-8	Dichlorodifluoromethane	1	5.8	5.8	0.39	U
75-34-3	1,1-Dichloroethane	1	5.8	5.8	0.23	U
107-06-2	1,2-Dichloroethane	1	5.8	5.8	0.34	U
75-35-4	1,1-Dichloroethene	1	5.8	5.8	0.43	U
156-59-2	cis-1,2-Dichloroethene	1	5.8	5.8	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	5.8	5.8	0.26	U
78-87-5	1,2-Dichloropropane	1	5.8	5.8	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	5.8	5.8	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	5.8	5.8	0.97	U
100-41-4	Ethylbenzene	1	5.8	5.8	0.15	U
591-78-6	2-Hexanone	1	12	12	3.5	U
98-82-8	Isopropylbenzene	1	5.8	5.8	0.14	U
79-20-9	Methyl Acetate	1	5.5	23	0.97	J
1634-04-4	Methyl tert-Butyl Ether	1	5.8	5.8	0.27	U
108-87-2	Methylcyclohexane	1	12	12	0.93	U

00255

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-05 File ID: 13505.D

Sampled: 01/08/08 00:00 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 14:27

Solids: 85.56 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	23	23	4.6	U
78-93-3	2-Butanone (MEK)	1	15	23	2.8	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	5.8	5.8	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.8	5.8	0.24	U
127-18-4	Tetrachloroethene	1	5.8	5.8	0.52	U
108-88-3	Toluene	1	5.8	5.8	0.47	U
87-61-6	1,2,3-Trichlorobenzene	1	23	23	0.24	U
120-82-1	1,2,4-Trichlorobenzene	1	5.8	5.8	0.28	U
71-55-6	1,1,1-Trichloroethane	1	5.8	5.8	0.24	U
79-00-5	1,1,2-Trichloroethane	1	5.8	5.8	0.80	U
79-01-6	Trichloroethene	1	5.8	5.8	0.66	U
75-69-4	Trichlorofluoromethane	1	5.8	5.8	0.25	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.8	5.8	0.39	U
75-01-4	Vinyl Chloride	1	5.8	5.8	0.53	U
1330-20-7	Xylene (Total)	1	5.8	5.8	0.68	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.5	106	78 - 121	
1,2-Dichloroethane-d4	40.0	42.4	106	66 - 124	
Toluene-d8	40.0	39.1	98	85 - 115	
4-Bromofluorobenzene	40.0	36.0	90	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	831289	7.45	962634	7.45	
Chlorobenzene-d5	331826	17.47	414856	17.48	
1,4-Dichlorobenzene-d4	290113	22.48	459239	22.49	

* Values outside of QC limits

00256

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801135-06 File ID: 13503.D

Sampled: 01/08/08 12:45 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 12:38

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	2.7	20	1.2	J B7 Z
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801135-06 File ID: 13503.D

Sampled: 01/08/08 12:45 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 12:38

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	0.51	5.0	0.051	J B1 Y
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.080	1.0	0.072	J B1 Y
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.9	102	85 - 115	
1,2-Dichloroethane-d4	40.0	43.4	109	70 - 120	
Toluene-d8	40.0	40.2	100	85 - 120	
4-Bromofluorobenzene	40.0	36.3	91	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	1038277	5.16	1106369	5.15	
Chlorobenzene-d5	883283	8.09	945467	8.09	
1,4-Dichlorobenzene-d4	319556	10.38	442622	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801135-07 File ID: 13507.D

Sampled: 01/08/08 00:00 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 13:15

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	4.1	20	1.2	J B3E
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801135-07 File ID: 13507.D

Sampled: 01/08/08 00:00 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 13:15

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	0.69	5.0	0.051	J
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.15	1.0	0.072	J
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.5	101	85 - 115	
1,2-Dichloroethane-d4	40.0	42.9	107	70 - 120	
Toluene-d8	40.0	40.2	101	85 - 120	
4-Bromofluorobenzene	40.0	36.2	91	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	1030442	5.16	1106369	5.15	
Chlorobenzene-d5	877705	8.09	945467	8.09	
1,4-Dichlorobenzene-d4	316496	10.39	442622	10.38	

* Values outside of QC limits

: 66271

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB16A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-08 File ID: 13508.D

Sampled: 01/08/08 12:50 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 12:57

Solids: 80.00 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	380	25	5.3	E J,S
71-43-2	Benzene	1	6.3	6.3	0.16	U UJ,S
74-97-5	Bromochloromethane	1	25	25	0.16	U
75-27-4	Bromodichloromethane	1	6.3	6.3	0.31	U
75-25-2	Bromoform	1	6.3	6.3	0.61	U
74-83-9	Bromomethane	1	6.3	6.3	1.5	U UJ,S
75-15-0	Carbon Disulfide	1	0.68	6.3	0.33	J J,S
56-23-5	Carbon Tetrachloride	1	6.3	6.3	0.36	U UJ,S
108-90-7	Chlorobenzene	1	6.3	6.3	0.25	U
75-00-3	Chloroethane	1	25	25	0.44	U
67-66-3	Chloroform	1	6.3	6.3	0.18	U
74-87-3	Chloromethane	1	6.3	6.3	0.30	U
110-82-7	Cyclohexane	1	13	13	0.86	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.0	U
124-48-1	Dibromochloromethane	1	6.3	6.3	0.44	U
106-93-4	1,2-Dibromoethane	1	6.3	6.3	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.3	6.3	0.31	U
541-73-1	1,3-Dichlorobenzene	1	6.3	6.3	0.30	U
106-46-7	1,4-Dichlorobenzene	1	6.3	6.3	0.27	U UJ,S
75-71-8	Dichlorodifluoromethane	1	6.3	6.3	0.41	U UJ,C
75-34-3	1,1-Dichloroethane	1	6.3	6.3	0.24	U UJ,S
107-06-2	1,2-Dichloroethane	1	6.3	6.3	0.37	U
75-35-4	1,1-Dichloroethene	1	6.3	6.3	0.46	U
156-59-2	cis-1,2-Dichloroethene	1	6.3	6.3	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.3	6.3	0.28	U
78-87-5	1,2-Dichloropropane	1	6.3	6.3	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.3	6.3	0.32	U
10061-02-6	trans-1,3-Dichloropropene	1	6.3	6.3	1.0	U
100-41-4	Ethylbenzene	1	6.3	6.3	0.16	U
591-78-6	2-Hexanone	1	13	13	3.7	U
98-82-8	Isopropylbenzene	1	6.3	6.3	0.15	U UJ,S
79-20-9	Methyl Acetate	1	9.3	25	1.0	J J,S
1634-04-4	Methyl tert-Butyl Ether	1	6.3	6.3	0.29	U UJ,S
108-87-2	Methylcyclohexane	1	13	13	1.0	U UJ,S

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB16A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-08 File ID: 13508.D

Sampled: 01/08/08 12:50 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 12:57

Solids: 80.00 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	25	25	4.9	U UJ,S
78-93-3	2-Butanone (MEK)	1	47	25	3.0	J,S
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.3	U UJ,S
100-42-5	Styrene	1	6.3	6.3	0.28	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.3	6.3	0.25	U
127-18-4	Tetrachloroethene	1	6.3	6.3	0.55	U UJ,S
108-88-3	Toluene	1	1.0	6.3	0.50	J J,S
87-61-6	1,2,3-Trichlorobenzene	1	25	25	0.26	U UJ,S
120-82-1	1,2,4-Trichlorobenzene	1	6.3	6.3	0.30	U
71-55-6	1,1,1-Trichloroethane	1	6.3	6.3	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.3	6.3	0.86	U
79-01-6	Trichloroethene	1	6.3	6.3	0.70	U
75-69-4	Trichlorofluoromethane	1	6.3	6.3	0.27	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.3	6.3	0.41	U
75-01-4	Vinyl Chloride	1	6.3	6.3	0.57	U
1330-20-7	Xylene (Total)	1	6.3	6.3	0.73	U UJ,S

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	45.1	113	78 - 121	
1,2-Dichloroethane-d4	40.0	43.4	108	66 - 124	
Toluene-d8	40.0	37.0	92	85 - 115	
4-Bromofluorobenzene	40.0	33.7	84	85 - 120	*

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	754161	7.39	939926	7.38	
Chlorobenzene-d5	260112	17.43	386242	17.42	
1,4-Dichlorobenzene-d4	203543	22.46	454579	22.45	*

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB16B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-09 File ID: 13509.D

Sampled: 01/08/08 13:00 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 15:33

Solids: 76.59 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	87	26	5.5	JC
71-43-2	Benzene	1	6.5	6.5	0.17	U
74-97-5	Bromochloromethane	1	26	26	0.17	U
75-27-4	Bromodichloromethane	1	6.5	6.5	0.32	U
75-25-2	Bromoform	1	6.5	6.5	0.63	U
74-83-9	Bromomethane	1	6.5	6.5	1.6	U
75-15-0	Carbon Disulfide	1	6.5	6.5	0.34	U
56-23-5	Carbon Tetrachloride	1	6.5	6.5	0.37	U
108-90-7	Chlorobenzene	1	6.5	6.5	0.26	U
75-00-3	Chloroethane	1	26	26	0.46	U
67-66-3	Chloroform	1	6.5	6.5	0.19	U
74-87-3	Chloromethane	1	6.5	6.5	0.32	U
110-82-7	Cyclohexane	1	13	13	0.90	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.5	6.5	0.46	U
106-93-4	1,2-Dibromoethane	1	6.5	6.5	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.5	6.5	0.32	U
541-73-1	1,3-Dichlorobenzene	1	6.5	6.5	0.31	U
106-46-7	1,4-Dichlorobenzene	1	6.5	6.5	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.5	6.5	0.43	U
75-34-3	1,1-Dichloroethane	1	6.5	6.5	0.25	U
107-06-2	1,2-Dichloroethane	1	6.5	6.5	0.39	U
75-35-4	1,1-Dichloroethene	1	6.5	6.5	0.48	U
156-59-2	cis-1,2-Dichloroethene	1	6.5	6.5	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.5	6.5	0.30	U
78-87-5	1,2-Dichloropropane	1	6.5	6.5	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.5	6.5	0.33	U
10061-02-6	trans-1,3-Dichloropropene	1	6.5	6.5	1.1	U
100-41-4	Ethylbenzene	1	6.5	6.5	0.16	U
591-78-6	2-Hexanone	1	13	13	3.9	U
98-82-8	Isopropylbenzene	1	6.5	6.5	0.16	U
79-20-9	Methyl Acetate	1	4.8	26	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.5	6.5	0.31	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U

00286

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB16B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-09 File ID: 13509.D

Sampled: 01/08/08 13:00 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 15:33

Solids: 76.59 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	26	26	5.2	U
78-93-3	2-Butanone (MEK)	1	26	26	3.2	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U
100-42-5	Styrene	1	6.5	6.5	0.29	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.5	6.5	0.26	U
127-18-4	Tetrachloroethene	1	6.5	6.5	0.58	U
108-88-3	Toluene	1	6.5	6.5	0.52	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.5	6.5	0.31	U
71-55-6	1,1,1-Trichloroethane	1	6.5	6.5	0.27	U
79-00-5	1,1,2-Trichloroethane	1	6.5	6.5	0.90	U
79-01-6	Trichloroethene	1	6.5	6.5	0.73	U
75-69-4	Trichlorofluoromethane	1	6.5	6.5	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.5	6.5	0.43	U
75-01-4	Vinyl Chloride	1	6.5	6.5	0.60	U
1330-20-7	Xylene (Total)	1	6.5	6.5	0.76	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.7	104	78 - 121	
1,2-Dichloroethane-d4	40.0	42.7	107	66 - 124	
Toluene-d8	40.0	39.4	99	85 - 115	
4-Bromofluorobenzene	40.0	38.4	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	803146	7.44	962634	7.45	
Chlorobenzene-d5	341198	17.46	414856	17.48	
1,4-Dichlorobenzene-d4	365217	22.48	459239	22.49	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB16C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-10 File ID: 13510.D

Sampled: 01/08/08 15:20 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 16:06

Solids: 76.05 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	58	26	5.6	J JC
71-43-2	Benzene	1	6.6	6.6	0.17	U
74-97-5	Bromochloromethane	1	26	26	0.17	U
75-27-4	Bromodichloromethane	1	6.6	6.6	0.33	U
75-25-2	Bromoform	1	6.6	6.6	0.64	U
74-83-9	Bromomethane	1	6.6	6.6	1.6	U
75-15-0	Carbon Disulfide	1	0.39	6.6	0.35	J JC
56-23-5	Carbon Tetrachloride	1	6.6	6.6	0.38	U
108-90-7	Chlorobenzene	1	6.6	6.6	0.27	U
75-00-3	Chloroethane	1	26	26	0.46	U
67-66-3	Chloroform	1	0.38	6.6	0.19	J
74-87-3	Chloromethane	1	6.6	6.6	0.32	U
110-82-7	Cyclohexane	1	13	13	0.90	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.6	6.6	0.46	U
106-93-4	1,2-Dibromoethane	1	6.6	6.6	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.6	6.6	0.32	U
541-73-1	1,3-Dichlorobenzene	1	6.6	6.6	0.31	U
106-46-7	1,4-Dichlorobenzene	1	6.6	6.6	0.29	U
75-71-8	Dichlorodifluoromethane	1	6.6	6.6	0.43	U
75-34-3	1,1-Dichloroethane	1	6.6	6.6	0.26	U
107-06-2	1,2-Dichloroethane	1	6.6	6.6	0.39	U
75-35-4	1,1-Dichloroethene	1	6.6	6.6	0.49	U
156-59-2	cis-1,2-Dichloroethene	1	6.6	6.6	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.6	6.6	0.30	U
78-87-5	1,2-Dichloropropane	1	6.6	6.6	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.6	6.6	0.33	U
10061-02-6	trans-1,3-Dichloropropene	1	6.6	6.6	1.1	U
100-41-4	Ethylbenzene	1	6.6	6.6	0.16	U
591-78-6	2-Hexanone	1	13	13	3.9	U
98-82-8	Isopropylbenzene	1	6.6	6.6	0.16	U
79-20-9	Methyl Acetate	1	3.8	26	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.6	6.6	0.31	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB16C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-10 File ID: 13510.D

Sampled: 01/08/08 15:20 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 16:06

Solids: 76.05 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	26	26	5.2	U
78-93-3	2-Butanone (MEK)	1	26	26	3.2	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.5	U
100-42-5	Styrene	1	6.6	6.6	0.29	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.6	6.6	0.27	U
127-18-4	Tetrachloroethene	1	6.6	6.6	0.58	U
108-88-3	Toluene	1	6.6	6.6	0.53	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.6	6.6	0.32	U
71-55-6	1,1,1-Trichloroethane	1	6.6	6.6	0.27	U
79-00-5	1,1,2-Trichloroethane	1	6.6	6.6	0.90	U
79-01-6	Trichloroethene	1	6.6	6.6	0.74	U
75-69-4	Trichlorofluoromethane	1	6.6	6.6	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.6	6.6	0.44	U
75-01-4	Vinyl Chloride	1	6.6	6.6	0.60	U
1330-20-7	Xylene (Total)	1	6.6	6.6	0.77	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.2	106	78 - 121	
1,2-Dichloroethane-d4	40.0	44.6	112	66 - 124	
Toluene-d8	40.0	38.6	97	85 - 115	
4-Bromofluorobenzene	40.0	38.5	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	815240	7.43	962634	7.45	
Chlorobenzene-d5	328534	17.46	414856	17.48	
1,4-Dichlorobenzene-d4	318497	22.47	459239	22.49	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-11 File ID: 13511.D

Sampled: 01/08/08 15:35 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 16:39

Solids: 82.52 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	39	24	5.1	J,C
71-43-2	Benzene	1	6.1	6.1	0.16	U
74-97-5	Bromochloromethane	1	24	24	0.16	U
75-27-4	Bromodichloromethane	1	6.1	6.1	0.30	U
75-25-2	Bromoform	1	6.1	6.1	0.59	U
74-83-9	Bromomethane	1	6.1	6.1	1.5	U
75-15-0	Carbon Disulfide	1	6.1	6.1	0.32	U
56-23-5	Carbon Tetrachloride	1	6.1	6.1	0.35	U
108-90-7	Chlorobenzene	1	6.1	6.1	0.24	U
75-00-3	Chloroethane	1	24	24	0.43	U
67-66-3	Chloroform	1	6.1	6.1	0.18	U
74-87-3	Chloromethane	1	6.1	6.1	0.29	U
110-82-7	Cyclohexane	1	12	12	0.83	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.99	U
124-48-1	Dibromochloromethane	1	6.1	6.1	0.42	U
106-93-4	1,2-Dibromoethane	1	6.1	6.1	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.1	6.1	0.30	U
541-73-1	1,3-Dichlorobenzene	1	6.1	6.1	0.29	U
106-46-7	1,4-Dichlorobenzene	1	6.1	6.1	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.1	6.1	0.40	U
75-34-3	1,1-Dichloroethane	1	6.1	6.1	0.24	U
107-06-2	1,2-Dichloroethane	1	6.1	6.1	0.36	U
75-35-4	1,1-Dichloroethene	1	6.1	6.1	0.45	U
156-59-2	cis-1,2-Dichloroethene	1	6.1	6.1	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.1	6.1	0.27	U
78-87-5	1,2-Dichloropropane	1	6.1	6.1	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.1	6.1	0.31	U
10061-02-6	trans-1,3-Dichloropropene	1	6.1	6.1	1.0	U
100-41-4	Ethylbenzene	1	6.1	6.1	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.1	6.1	0.15	U
79-20-9	Methyl Acetate	1	4.7	24	1.0	J
1634-04-4	Methyl tert-Butyl Ether	1	6.1	6.1	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.96	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-11 File ID: 13511.D

Sampled: 01/08/08 15:35 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 16:39

Solids: 82.52 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.8	U
78-93-3	2-Butanone (MEK)	1	24	24	2.9	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U
100-42-5	Styrene	1	6.1	6.1	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.1	6.1	0.24	U
127-18-4	Tetrachloroethene	1	6.1	6.1	0.54	U
108-88-3	Toluene	1	6.1	6.1	0.49	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.1	6.1	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.1	6.1	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.1	6.1	0.83	U
79-01-6	Trichloroethene	1	6.1	6.1	0.68	U
75-69-4	Trichlorofluoromethane	1	6.1	6.1	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.1	6.1	0.40	U
75-01-4	Vinyl Chloride	1	6.1	6.1	0.55	U
1330-20-7	Xylene (Total)	1	6.1	6.1	0.71	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.5	109	78 - 121	
1,2-Dichloroethane-d4	40.0	45.7	114	66 - 124	
Toluene-d8	40.0	39.6	99	85 - 115	
4-Bromofluorobenzene	40.0	36.9	92	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	784553	7.43	962634	7.45	
Chlorobenzene-d5	319955	17.46	414856	17.48	
1,4-Dichlorobenzene-d4	304631	22.47	459239	22.49	

* Values outside of QC limits

: 66363

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-12 File ID: 13512.D

Sampled: 01/08/08 16:00 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 17:11

Solids: 70.27 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	20	28	6.0	J J,C
71-43-2	Benzene	1	7.1	7.1	0.18	U
74-97-5	Bromochloromethane	1	28	28	0.18	U
75-27-4	Bromodichloromethane	1	7.1	7.1	0.35	U
75-25-2	Bromoform	1	7.1	7.1	0.69	U
74-83-9	Bromomethane	1	7.1	7.1	1.7	U
75-15-0	Carbon Disulfide	1	7.1	7.1	0.37	U
56-23-5	Carbon Tetrachloride	1	7.1	7.1	0.41	U
108-90-7	Chlorobenzene	1	7.1	7.1	0.29	U
75-00-3	Chloroethane	1	28	28	0.50	U
67-66-3	Chloroform	1	7.1	7.1	0.21	U
74-87-3	Chloromethane	1	7.1	7.1	0.35	U
110-82-7	Cyclohexane	1	14	14	0.98	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.2	U
124-48-1	Dibromochloromethane	1	7.1	7.1	0.50	U
106-93-4	1,2-Dibromoethane	1	7.1	7.1	1.2	U
95-50-1	1,2-Dichlorobenzene	1	7.1	7.1	0.35	U
541-73-1	1,3-Dichlorobenzene	1	7.1	7.1	0.34	U
106-46-7	1,4-Dichlorobenzene	1	7.1	7.1	0.31	U
75-71-8	Dichlorodifluoromethane	1	7.1	7.1	0.47	U
75-34-3	1,1-Dichloroethane	1	7.1	7.1	0.28	U
107-06-2	1,2-Dichloroethane	1	7.1	7.1	0.42	U
75-35-4	1,1-Dichloroethene	1	7.1	7.1	0.53	U
156-59-2	cis-1,2-Dichloroethene	1	7.1	7.1	0.23	U
156-60-5	trans-1,2-Dichloroethene	1	7.1	7.1	0.32	U
78-87-5	1,2-Dichloropropane	1	7.1	7.1	1.3	U
10061-01-5	cis-1,3-Dichloropropene	1	7.1	7.1	0.36	U
10061-02-6	trans-1,3-Dichloropropene	1	7.1	7.1	1.2	U
100-41-4	Ethylbenzene	1	7.1	7.1	0.18	U
591-78-6	2-Hexanone	1	14	14	4.3	U
98-82-8	Isopropylbenzene	1	7.1	7.1	0.18	U
79-20-9	Methyl Acetate	1	28	28	1.2	U
1634-04-4	Methyl tert-Butyl Ether	1	7.1	7.1	0.33	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-12 File ID: 13512.D

Sampled: 01/08/08 16:00 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 17:11

Solids: 70.27 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	28	28	5.6	U
78-93-3	2-Butanone (MEK)	1	28	28	3.4	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.7	U
100-42-5	Styrene	1	7.1	7.1	0.31	U
79-34-5	1,1,2,2-Tetrachloroethane	1	7.1	7.1	0.29	U
127-18-4	Tetrachloroethene	1	7.1	7.1	0.63	U
108-88-3	Toluene	1	7.1	7.1	0.57	U
87-61-6	1,2,3-Trichlorobenzene	1	28	28	0.29	U
120-82-1	1,2,4-Trichlorobenzene	1	7.1	7.1	0.34	U
71-55-6	1,1,1-Trichloroethane	1	7.1	7.1	0.29	U
79-00-5	1,1,2-Trichloroethane	1	7.1	7.1	0.98	U
79-01-6	Trichloroethene	1	7.1	7.1	0.80	U
75-69-4	Trichlorofluoromethane	1	7.1	7.1	0.30	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	7.1	7.1	0.47	U
75-01-4	Vinyl Chloride	1	7.1	7.1	0.65	U
1330-20-7	Xylene (Total)	1	7.1	7.1	0.83	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	45.3	113	78 - 121	
1,2-Dichloroethane-d4	40.0	48.0	120	66 - 124	
Toluene-d8	40.0	40.2	100	85 - 115	
4-Bromofluorobenzene	40.0	37.1	93	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	673996	7.42	962634	7.45	
Chlorobenzene-d5	284432	17.45	414856	17.48	
1,4-Dichlorobenzene-d4	289873	22.47	459239	22.49	

* Values outside of QC limits

00311

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-13 File ID: 13513.D

Sampled: 01/08/08 16:45 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 17:44

Solids: 77.00 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	26	26	5.5	U
71-43-2	Benzene	1	6.5	6.5	0.17	U
74-97-5	Bromochloromethane	1	26	26	0.17	U
75-27-4	Bromodichloromethane	1	6.5	6.5	0.32	U
75-25-2	Bromoform	1	6.5	6.5	0.63	U
74-83-9	Bromomethane	1	6.5	6.5	1.6	U
75-15-0	Carbon Disulfide	1	6.5	6.5	0.34	U
56-23-5	Carbon Tetrachloride	1	6.5	6.5	0.37	U
108-90-7	Chlorobenzene	1	6.5	6.5	0.26	U
75-00-3	Chloroethane	1	26	26	0.46	U
67-66-3	Chloroform	1	0.23	6.5	0.19	J
74-87-3	Chloromethane	1	6.5	6.5	0.32	U
110-82-7	Cyclohexane	1	13	13	0.89	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.5	6.5	0.45	U
106-93-4	1,2-Dibromoethane	1	6.5	6.5	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.5	6.5	0.32	U
541-73-1	1,3-Dichlorobenzene	1	6.5	6.5	0.31	U
106-46-7	1,4-Dichlorobenzene	1	6.5	6.5	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.5	6.5	0.43	U
75-34-3	1,1-Dichloroethane	1	6.5	6.5	0.25	U
107-06-2	1,2-Dichloroethane	1	6.5	6.5	0.38	U
75-35-4	1,1-Dichloroethene	1	6.5	6.5	0.48	U
156-59-2	cis-1,2-Dichloroethene	1	6.5	6.5	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.5	6.5	0.29	U
78-87-5	1,2-Dichloropropane	1	6.5	6.5	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.5	6.5	0.33	U
10061-02-6	trans-1,3-Dichloropropene	1	6.5	6.5	1.1	U
100-41-4	Ethylbenzene	1	6.5	6.5	0.16	U
591-78-6	2-Hexanone	1	13	13	3.9	U
98-82-8	Isopropylbenzene	1	6.5	6.5	0.16	U
79-20-9	Methyl Acetate	1	26	26	1.1	U
1634-04-4	Methyl tert-Butyl Ether	1	6.5	6.5	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801135-13 File ID: 13513.D

Sampled: 01/08/08 16:45 Prepared: 01/11/08 07:00 Analyzed: 01/11/08 17:44

Solids: 77.00 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011648 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	26	26	5.1	U
78-93-3	2-Butanone (MEK)	1	26	26	3.1	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U
100-42-5	Styrene	1	6.5	6.5	0.29	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.5	6.5	0.26	U
127-18-4	Tetrachloroethene	1	6.5	6.5	0.57	U
108-88-3	Toluene	1	6.5	6.5	0.52	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.5	6.5	0.31	U
71-55-6	1,1,1-Trichloroethane	1	6.5	6.5	0.27	U
79-00-5	1,1,2-Trichloroethane	1	6.5	6.5	0.89	U
79-01-6	Trichloroethene	1	6.5	6.5	0.73	U
75-69-4	Trichlorofluoromethane	1	6.5	6.5	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.5	6.5	0.43	U
75-01-4	Vinyl Chloride	1	6.5	6.5	0.59	U
1330-20-7	Xylene (Total)	1	6.5	6.5	0.76	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.6	107	78 - 121	
1,2-Dichloroethane-d4	40.0	44.1	110	66 - 124	
Toluene-d8	40.0	39.7	99	85 - 115	
4-Bromofluorobenzene	40.0	36.2	91	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	765553	7.41	962634	7.45	
Chlorobenzene-d5	324315	17.45	414856	17.48	
1,4-Dichlorobenzene-d4	326104	22.47	459239	22.49	

* Values outside of QC limits

00315

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB11A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-01 File ID: 21201.D

Sampled: 01/09/08 07:48 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 13:29

Solids: 84.02 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	64	24	5.0	L, h
71-43-2	Benzene	1	6.0	6.0	0.15	U UL, h
74-97-5	Bromochloromethane	1	24	24	0.15	U
75-27-4	Bromodichloromethane	1	6.0	6.0	0.30	U
75-25-2	Bromoform	1	6.0	6.0	0.58	U
74-83-9	Bromomethane	1	6.0	6.0	1.5	U
75-15-0	Carbon Disulfide	1	6.0	6.0	0.31	U
56-23-5	Carbon Tetrachloride	1	6.0	6.0	0.34	U
108-90-7	Chlorobenzene	1	6.0	6.0	0.24	U
75-00-3	Chloroethane	1	24	24	0.42	U
67-66-3	Chloroform	1	6.0	6.0	0.17	U
74-87-3	Chloromethane	1	6.0	6.0	0.29	U
110-82-7	Cyclohexane	1	12	12	0.82	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.97	U
124-48-1	Dibromochloromethane	1	6.0	6.0	0.42	U
106-93-4	1,2-Dibromoethane	1	6.0	6.0	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.0	6.0	0.29	U
541-73-1	1,3-Dichlorobenzene	1	6.0	6.0	0.28	U
106-46-7	1,4-Dichlorobenzene	1	6.0	6.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.0	6.0	0.39	U
75-34-3	1,1-Dichloroethane	1	6.0	6.0	0.23	U
107-06-2	1,2-Dichloroethane	1	6.0	6.0	0.35	U
75-35-4	1,1-Dichloroethene	1	6.0	6.0	0.44	U
156-59-2	cis-1,2-Dichloroethene	1	6.0	6.0	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	6.0	6.0	0.27	U
78-87-5	1,2-Dichloropropane	1	6.0	6.0	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.0	6.0	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	6.0	6.0	0.99	U
100-41-4	Ethylbenzene	1	6.0	6.0	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.0	6.0	0.15	U UL, h
79-20-9	Methyl Acetate	1	4.6	24	0.99	J L, h
1634-04-4	Methyl tert-Butyl Ether	1	6.0	6.0	0.28	U UL, h
108-87-2	Methylcyclohexane	1	12	12	0.95	U UL, h

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB11A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-01 File ID: 21201.D

Sampled: 01/09/08 07:48 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 13:29

Solids: 84.02 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.7	U UL,h
78-93-3	2-Butanone (MEK)	1	9.2	24	2.9	J L,h
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U UL,h
100-42-5	Styrene	1	6.0	6.0	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.0	6.0	0.24	U
127-18-4	Tetrachloroethene	1	6.0	6.0	0.53	U
108-88-3	Toluene	1	6.0	6.0	0.48	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.0	6.0	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.0	6.0	0.24	U
79-00-5	1,1,2-Trichloroethane	1	6.0	6.0	0.82	U
79-01-6	Trichloroethene	1	6.0	6.0	0.67	U
75-69-4	Trichlorofluoromethane	1	6.0	6.0	0.25	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.0	6.0	0.39	U
75-01-4	Vinyl Chloride	1	6.0	6.0	0.54	U
1330-20-7	Xylene (Total)	1	6.0	6.0	0.70	U UL,h

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.9	102	78 - 121	
1,2-Dichloroethane-d4	40.0	40.4	101	66 - 124	
Toluene-d8	40.0	39.8	99	85 - 115	
4-Bromofluorobenzene	40.0	38.6	97	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	831809	7.39	939926	7.38	
Chlorobenzene-d5	329277	17.43	386242	17.42	
1,4-Dichlorobenzene-d4	345213	22.46	454579	22.45	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB11B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-02 File ID: 21202.D

Sampled: 01/09/08 07:55 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 14:02

Solids: 83.53 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	24	24	5.1	U UL,h
71-43-2	Benzene	1	6.0	6.0	0.15	U
74-97-5	Bromochloromethane	1	24	24	0.15	U
75-27-4	Bromodichloromethane	1	6.0	6.0	0.30	U
75-25-2	Bromoform	1	6.0	6.0	0.58	U
74-83-9	Bromomethane	1	6.0	6.0	1.5	U
75-15-0	Carbon Disulfide	1	6.0	6.0	0.31	U
56-23-5	Carbon Tetrachloride	1	6.0	6.0	0.34	U
108-90-7	Chlorobenzene	1	6.0	6.0	0.24	U
75-00-3	Chloroethane	1	24	24	0.42	U
67-66-3	Chloroform	1	6.0	6.0	0.18	U
74-87-3	Chloromethane	1	6.0	6.0	0.29	U
110-82-7	Cyclohexane	1	12	12	0.82	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.98	U
124-48-1	Dibromochloromethane	1	6.0	6.0	0.42	U
106-93-4	1,2-Dibromoethane	1	6.0	6.0	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.0	6.0	0.29	U
541-73-1	1,3-Dichlorobenzene	1	6.0	6.0	0.28	U
106-46-7	1,4-Dichlorobenzene	1	6.0	6.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.0	6.0	0.40	U U
75-34-3	1,1-Dichloroethane	1	6.0	6.0	0.23	U
107-06-2	1,2-Dichloroethane	1	6.0	6.0	0.35	U
75-35-4	1,1-Dichloroethene	1	6.0	6.0	0.44	U
156-59-2	cis-1,2-Dichloroethene	1	6.0	6.0	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	6.0	6.0	0.27	U
78-87-5	1,2-Dichloropropane	1	6.0	6.0	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.0	6.0	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	6.0	6.0	1.0	U
100-41-4	Ethylbenzene	1	6.0	6.0	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.0	6.0	0.15	U
79-20-9	Methyl Acetate	1	24	24	1.0	U
1634-04-4	Methyl tert-Butyl Ether	1	6.0	6.0	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.95	U UL,h

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB11B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-02 File ID: 21202.D

Sampled: 01/09/08 07:55 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 14:02

Solids: 83.53 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.7	U UL,h
78-93-3	2-Butanone (MEK)	1	24	24	2.9	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	6.0	6.0	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.0	6.0	0.24	U
127-18-4	Tetrachloroethene	1	6.0	6.0	0.53	U
108-88-3	Toluene	1	6.0	6.0	0.48	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.0	6.0	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.0	6.0	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.0	6.0	0.82	U
79-01-6	Trichloroethene	1	6.0	6.0	0.67	U
75-69-4	Trichlorofluoromethane	1	6.0	6.0	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.0	6.0	0.40	U
75-01-4	Vinyl Chloride	1	6.0	6.0	0.55	U
1330-20-7	Xylene (Total)	1	6.0	6.0	0.70	U UL,h

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.1	105	78 - 121	
1,2-Dichloroethane-d4	40.0	42.7	107	66 - 124	
Toluene-d8	40.0	40.2	100	85 - 115	
4-Bromofluorobenzene	40.0	39.3	98	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	827242	7.39	939926	7.38	
Chlorobenzene-d5	347381	17.43	386242	17.42	
1,4-Dichlorobenzene-d4	375775	22.45	454579	22.45	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB11C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-03 File ID: 21203.D

Sampled: 01/09/08 10:30 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 14:35

Solids: 75.60 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	26	26	5.6	U UJ|C
71-43-2	Benzene	1	6.6	6.6	0.17	U
74-97-5	Bromochloromethane	1	26	26	0.17	U
75-27-4	Bromodichloromethane	1	6.6	6.6	0.33	U
75-25-2	Bromoform	1	6.6	6.6	0.64	U
74-83-9	Bromomethane	1	6.6	6.6	1.6	U
75-15-0	Carbon Disulfide	1	6.6	6.6	0.35	U
56-23-5	Carbon Tetrachloride	1	6.6	6.6	0.38	U
108-90-7	Chlorobenzene	1	6.6	6.6	0.27	U
75-00-3	Chloroethane	1	26	26	0.46	U
67-66-3	Chloroform	1	6.6	6.6	0.19	U
74-87-3	Chloromethane	1	6.6	6.6	0.32	U
110-82-7	Cyclohexane	1	13	13	0.91	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.6	6.6	0.46	U
106-93-4	1,2-Dibromoethane	1	6.6	6.6	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.6	6.6	0.32	U
541-73-1	1,3-Dichlorobenzene	1	6.6	6.6	0.31	U
106-46-7	1,4-Dichlorobenzene	1	6.6	6.6	0.29	U
75-71-8	Dichlorodifluoromethane	1	6.6	6.6	0.44	U UJ|C
75-34-3	1,1-Dichloroethane	1	6.6	6.6	0.26	U
107-06-2	1,2-Dichloroethane	1	6.6	6.6	0.39	U
75-35-4	1,1-Dichloroethene	1	6.6	6.6	0.49	U
156-59-2	cis-1,2-Dichloroethene	1	6.6	6.6	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.6	6.6	0.30	U
78-87-5	1,2-Dichloropropane	1	6.6	6.6	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.6	6.6	0.33	U
10061-02-6	trans-1,3-Dichloropropene	1	6.6	6.6	1.1	U
100-41-4	Ethylbenzene	1	6.6	6.6	0.17	U
591-78-6	2-Hexanone	1	13	13	4.0	U
98-82-8	Isopropylbenzene	1	6.6	6.6	0.16	U
79-20-9	Methyl Acetate	1	26	26	1.1	U
1634-04-4	Methyl tert-Butyl Ether	1	6.6	6.6	0.31	U
108-87-2	Methylcyclohexane	1	13	13	1.1	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB11C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-03 File ID: 21203.D

Sampled: 01/09/08 10:30 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 14:35

Solids: 75.60 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	26	26	5.2	U
78-93-3	2-Butanone (MEK)	1	26	26	3.2	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.5	U
100-42-5	Styrene	1	6.6	6.6	0.29	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.6	6.6	0.27	U
127-18-4	Tetrachloroethene	1	1.8	6.6	0.58	J
108-88-3	Toluene	1	6.6	6.6	0.53	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.6	6.6	0.32	U
71-55-6	1,1,1-Trichloroethane	1	6.6	6.6	0.27	U
79-00-5	1,1,2-Trichloroethane	1	6.6	6.6	0.91	U
79-01-6	Trichloroethene	1	6.6	6.6	0.74	U
75-69-4	Trichlorofluoromethane	1	6.6	6.6	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.6	6.6	0.44	U
75-01-4	Vinyl Chloride	1	6.6	6.6	0.60	U
1330-20-7	Xylene (Total)	1	6.6	6.6	0.77	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.1	103	78 - 121	
1,2-Dichloroethane-d4	40.0	41.5	104	66 - 124	
Toluene-d8	40.0	40.1	100	85 - 115	
4-Bromofluorobenzene	40.0	40.5	101	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	828998	7.39	939926	7.38	
Chlorobenzene-d5	345071	17.43	386242	17.42	
1,4-Dichlorobenzene-d4	386054	22.46	454579	22.45	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-04 File ID: 21204.D

Sampled: 01/09/08 11:30 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 15:08

Solids: 83.29 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	87	24	5.1	L, h
71-43-2	Benzene	1	0.40	6.0	0.15	J L, h
74-97-5	Bromochloromethane	1	24	24	0.15	U UL, h
75-27-4	Bromodichloromethane	1	6.0	6.0	0.30	U
75-25-2	Bromoform	1	6.0	6.0	0.58	U
74-83-9	Bromomethane	1	6.0	6.0	1.5	U
75-15-0	Carbon Disulfide	1	6.0	6.0	0.32	U
56-23-5	Carbon Tetrachloride	1	6.0	6.0	0.34	U
108-90-7	Chlorobenzene	1	6.0	6.0	0.24	U
75-00-3	Chloroethane	1	24	24	0.42	U
67-66-3	Chloroform	1	6.0	6.0	0.18	U
74-87-3	Chloromethane	1	6.0	6.0	0.29	U
110-82-7	Cyclohexane	1	12	12	0.82	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.98	U
124-48-1	Dibromochloromethane	1	6.0	6.0	0.42	U
106-93-4	1,2-Dibromoethane	1	6.0	6.0	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.0	6.0	0.29	U
541-73-1	1,3-Dichlorobenzene	1	6.0	6.0	0.29	U
106-46-7	1,4-Dichlorobenzene	1	6.0	6.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.0	6.0	0.40	U
75-34-3	1,1-Dichloroethane	1	6.0	6.0	0.23	U
107-06-2	1,2-Dichloroethane	1	6.0	6.0	0.35	U
75-35-4	1,1-Dichloroethene	1	6.0	6.0	0.45	U
156-59-2	cis-1,2-Dichloroethene	1	6.0	6.0	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	6.0	6.0	0.27	U
78-87-5	1,2-Dichloropropane	1	6.0	6.0	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.0	6.0	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	6.0	6.0	1.0	U
100-41-4	Ethylbenzene	1	6.0	6.0	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.0	6.0	0.15	U UL, h
79-20-9	Methyl Acetate	1	3.5	24	1.0	J L, h
1634-04-4	Methyl tert-Butyl Ether	1	6.0	6.0	0.28	U UL, h
108-87-2	Methylcyclohexane	1	12	12	0.96	U UL, h

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-04 File ID: 21204.D

Sampled: 01/09/08 11:30 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 15:08

Solids: 83.29 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.7	U UL,h
78-93-3	2-Butanone (MEK)	1	24	24	2.9	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	6.0	6.0	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.0	6.0	0.24	U
127-18-4	Tetrachloroethene	1	6.0	6.0	0.53	U
108-88-3	Toluene	1	6.0	6.0	0.48	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.0	6.0	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.0	6.0	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.0	6.0	0.82	U
79-01-6	Trichloroethene	1	6.0	6.0	0.67	U
75-69-4	Trichlorofluoromethane	1	6.0	6.0	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.0	6.0	0.40	U
75-01-4	Vinyl Chloride	1	6.0	6.0	0.55	U
1330-20-7	Xylene (Total)	1	6.0	6.0	0.70	U UL,h

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.3	101	78 - 121	
1,2-Dichloroethane-d4	40.0	41.6	104	66 - 124	
Toluene-d8	40.0	38.3	96	85 - 115	
4-Bromofluorobenzene	40.0	37.6	94	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	789042	7.39	939926	7.38	
Chlorobenzene-d5	307523	17.43	386242	17.42	
1,4-Dichlorobenzene-d4	294022	22.46	454579	22.45	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB2AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-05 File ID: 21205.D

Sampled: 01/09/08 09:56 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 15:41

Solids: 75.24 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	160	27	5.6	J,C
71-43-2	Benzene	1	6.6	6.6	0.17	U
74-97-5	Bromochloromethane	1	27	27	0.17	U
75-27-4	Bromodichloromethane	1	6.6	6.6	0.33	U
75-25-2	Bromoform	1	6.6	6.6	0.64	U
74-83-9	Bromomethane	1	6.6	6.6	1.6	U
75-15-0	Carbon Disulfide	1	0.65	6.6	0.35	J
56-23-5	Carbon Tetrachloride	1	6.6	6.6	0.38	U
108-90-7	Chlorobenzene	1	6.6	6.6	0.27	U
75-00-3	Chloroethane	1	27	27	0.47	U
67-66-3	Chloroform	1	6.6	6.6	0.20	U
74-87-3	Chloromethane	1	6.6	6.6	0.32	U
110-82-7	Cyclohexane	1	13	13	0.91	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.6	6.6	0.47	U
106-93-4	1,2-Dibromoethane	1	6.6	6.6	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.6	6.6	0.33	U
541-73-1	1,3-Dichlorobenzene	1	6.6	6.6	0.32	U
106-46-7	1,4-Dichlorobenzene	1	6.6	6.6	0.29	U
75-71-8	Dichlorodifluoromethane	1	6.6	6.6	0.44	U UJ,C
75-34-3	1,1-Dichloroethane	1	6.6	6.6	0.26	U
107-06-2	1,2-Dichloroethane	1	6.6	6.6	0.39	U
75-35-4	1,1-Dichloroethene	1	6.6	6.6	0.49	U
156-59-2	cis-1,2-Dichloroethene	1	6.6	6.6	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.6	6.6	0.30	U
78-87-5	1,2-Dichloropropane	1	6.6	6.6	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.6	6.6	0.34	U
10061-02-6	trans-1,3-Dichloropropene	1	6.6	6.6	1.1	U
100-41-4	Ethylbenzene	1	6.6	6.6	0.17	U
591-78-6	2-Hexanone	1	13	13	4.0	U
98-82-8	Isopropylbenzene	1	6.6	6.6	0.16	U
79-20-9	Methyl Acetate	1	7.6	27	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.6	6.6	0.31	U
108-87-2	Methylcyclohexane	1	13	13	1.1	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB2AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-05 File ID: 21205.D

Sampled: 01/09/08 09:56 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 15:41

Solids: 75.24 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	27	27	5.3	U
78-93-3	2-Butanone (MEK)	1	28	27	3.2	
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.5	U
100-42-5	Styrene	1	6.6	6.6	0.29	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.6	6.6	0.27	U
127-18-4	Tetrachloroethene	1	6.6	6.6	0.59	U
108-88-3	Toluene	1	6.6	6.6	0.53	U
87-61-6	1,2,3-Trichlorobenzene	1	27	27	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.6	6.6	0.32	U
71-55-6	1,1,1-Trichloroethane	1	6.6	6.6	0.27	U
79-00-5	1,1,2-Trichloroethane	1	6.6	6.6	0.91	U
79-01-6	Trichloroethene	1	6.6	6.6	0.75	U
75-69-4	Trichlorofluoromethane	1	6.6	6.6	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.6	6.6	0.44	U
75-01-4	Vinyl Chloride	1	6.6	6.6	0.61	U
1330-20-7	Xylene (Total)	1	6.6	6.6	0.78	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.1	105	78 - 121	
1,2-Dichloroethane-d4	40.0	42.1	105	66 - 124	
Toluene-d8	40.0	39.1	98	85 - 115	
4-Bromofluorobenzene	40.0	37.5	94	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	752397	7.39	939926	7.38	
Chlorobenzene-d5	309534	17.43	386242	17.42	
1,4-Dichlorobenzene-d4	292288	22.45	454579	22.45	

* Values outside of QC limits

00356

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB12A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-06 File ID: 21206.D

Sampled: 01/09/08 11:00 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 16:14

Solids: 83.95 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	70	24	5.0	J C
71-43-2	Benzene	1	6.0	6.0	0.15	U
74-97-5	Bromochloromethane	1	24	24	0.15	U
75-27-4	Bromodichloromethane	1	6.0	6.0	0.30	U
75-25-2	Bromoform	1	6.0	6.0	0.58	U
74-83-9	Bromomethane	1	6.0	6.0	1.5	U
75-15-0	Carbon Disulfide	1	6.0	6.0	0.31	U
56-23-5	Carbon Tetrachloride	1	6.0	6.0	0.34	U
108-90-7	Chlorobenzene	1	6.0	6.0	0.24	U
75-00-3	Chloroethane	1	24	24	0.42	U
67-66-3	Chloroform	1	6.0	6.0	0.18	U
74-87-3	Chloromethane	1	6.0	6.0	0.29	U
110-82-7	Cyclohexane	1	12	12	0.82	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.97	U
124-48-1	Dibromochloromethane	1	6.0	6.0	0.42	U
106-93-4	1,2-Dibromoethane	1	6.0	6.0	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.0	6.0	0.29	U
541-73-1	1,3-Dichlorobenzene	1	6.0	6.0	0.28	U
106-46-7	1,4-Dichlorobenzene	1	6.0	6.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.0	6.0	0.39	U UJ C
75-34-3	1,1-Dichloroethane	1	6.0	6.0	0.23	U
107-06-2	1,2-Dichloroethane	1	6.0	6.0	0.35	U
75-35-4	1,1-Dichloroethene	1	6.0	6.0	0.44	U
156-59-2	cis-1,2-Dichloroethene	1	6.0	6.0	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	6.0	6.0	0.27	U
78-87-5	1,2-Dichloropropane	1	6.0	6.0	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.0	6.0	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	6.0	6.0	0.99	U
100-41-4	Ethylbenzene	1	6.0	6.0	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.0	6.0	0.15	U
79-20-9	Methyl Acetate	1	16	24	0.99	J JM
1634-04-4	Methyl tert-Butyl Ether	1	6.0	6.0	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.95	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB12A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-06 File ID: 21206.D

Sampled: 01/09/08 11:00 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 16:14

Solids: 83.95 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.7	U
78-93-3	2-Butanone (MEK)	1	6.4	24	2.9	J J,a
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	6.0	6.0	0.26	U UJ,M
79-34-5	1,1,2,2-Tetrachloroethane	1	6.0	6.0	0.24	U
127-18-4	Tetrachloroethene	1	6.0	6.0	0.53	U
108-88-3	Toluene	1	6.0	6.0	0.48	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.0	6.0	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.0	6.0	0.24	U
79-00-5	1,1,2-Trichloroethane	1	6.0	6.0	0.82	U
79-01-6	Trichloroethene	1	6.0	6.0	0.67	U
75-69-4	Trichlorofluoromethane	1	6.0	6.0	0.25	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.0	6.0	0.39	U
75-01-4	Vinyl Chloride	1	6.0	6.0	0.54	U
1330-20-7	Xylene (Total)	1	6.0	6.0	0.70	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	45.8	114	78 - 121	
1,2-Dichloroethane-d4	40.0	44.2	110	66 - 124	
Toluene-d8	40.0	38.0	95	85 - 115	
4-Bromofluorobenzene	40.0	35.2	88	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	707976	7.39	939926	7.38	
Chlorobenzene-d5	271785	17.43	386242	17.42	
1,4-Dichlorobenzene-d4	230147	22.46	454579	22.45	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB12B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-07 File ID: 21207.D

Sampled: 01/09/08 11:20 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 16:46

Solids: 84.20 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	13	24	5.0	J J,C
71-43-2	Benzene	1	5.9	5.9	0.15	U
74-97-5	Bromochloromethane	1	24	24	0.15	U
75-27-4	Bromodichloromethane	1	5.9	5.9	0.29	U
75-25-2	Bromoform	1	5.9	5.9	0.57	U
74-83-9	Bromomethane	1	5.9	5.9	1.4	U
75-15-0	Carbon Disulfide	1	5.9	5.9	0.31	U
56-23-5	Carbon Tetrachloride	1	5.9	5.9	0.34	U
108-90-7	Chlorobenzene	1	5.9	5.9	0.24	U
75-00-3	Chloroethane	1	24	24	0.42	U
67-66-3	Chloroform	1	5.9	5.9	0.17	U
74-87-3	Chloromethane	1	5.9	5.9	0.29	U
110-82-7	Cyclohexane	1	12	12	0.82	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.97	U
124-48-1	Dibromochloromethane	1	5.9	5.9	0.42	U
106-93-4	1,2-Dibromoethane	1	5.9	5.9	1.0	U
95-50-1	1,2-Dichlorobenzene	1	5.9	5.9	0.29	U
541-73-1	1,3-Dichlorobenzene	1	5.9	5.9	0.28	U
106-46-7	1,4-Dichlorobenzene	1	5.9	5.9	0.26	U
75-71-8	Dichlorodifluoromethane	1	5.9	5.9	0.39	U UJ,C
75-34-3	1,1-Dichloroethane	1	5.9	5.9	0.23	U
107-06-2	1,2-Dichloroethane	1	5.9	5.9	0.35	U
75-35-4	1,1-Dichloroethene	1	5.9	5.9	0.44	U
156-59-2	cis-1,2-Dichloroethene	1	5.9	5.9	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	5.9	5.9	0.27	U
78-87-5	1,2-Dichloropropane	1	5.9	5.9	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	5.9	5.9	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	5.9	5.9	0.99	U
100-41-4	Ethylbenzene	1	5.9	5.9	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	5.9	5.9	0.15	U
79-20-9	Methyl Acetate	1	24	24	0.99	U
1634-04-4	Methyl tert-Butyl Ether	1	5.9	5.9	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.95	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB12B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-07 File ID: 21207.D

Sampled: 01/09/08 11:20 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 16:46

Solids: 84.20 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800551 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.7	U
78-93-3	2-Butanone (MEK)	1	24	24	2.9	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	5.9	5.9	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.9	5.9	0.24	U
127-18-4	Tetrachloroethene	1	5.9	5.9	0.52	U
108-88-3	Toluene	1	5.9	5.9	0.48	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.24	U
120-82-1	1,2,4-Trichlorobenzene	1	5.9	5.9	0.29	U
71-55-6	1,1,1-Trichloroethane	1	5.9	5.9	0.24	U
79-00-5	1,1,2-Trichloroethane	1	5.9	5.9	0.82	U
79-01-6	Trichloroethene	1	5.9	5.9	0.67	U
75-69-4	Trichlorofluoromethane	1	5.9	5.9	0.25	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.9	5.9	0.39	U
75-01-4	Vinyl Chloride	1	5.9	5.9	0.54	U
1330-20-7	Xylene (Total)	1	5.9	5.9	0.69	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.6	112	78 - 121	
1,2-Dichloroethane-d4	40.0	44.3	111	66 - 124	
Toluene-d8	40.0	39.3	98	85 - 115	
4-Bromofluorobenzene	40.0	38.1	95	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	608922	7.39	939926	7.38	
Chlorobenzene-d5	251036	17.43	386242	17.42	
1,4-Dichlorobenzene-d4	256333	22.45	454579	22.45	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB12C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-08 File ID: 21208.D

Sampled: 01/09/08 12:00 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 17:19

Solids: 77.36 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	160	26	5.5	J,C
71-43-2	Benzene	1	6.5	6.5	0.17	U
74-97-5	Bromochloromethane	1	26	26	0.17	U
75-27-4	Bromodichloromethane	1	6.5	6.5	0.32	U
75-25-2	Bromoform	1	6.5	6.5	0.63	U
74-83-9	Bromomethane	1	6.5	6.5	1.6	U
75-15-0	Carbon Disulfide	1	0.61	6.5	0.34	J
56-23-5	Carbon Tetrachloride	1	6.5	6.5	0.37	U
108-90-7	Chlorobenzene	1	6.5	6.5	0.26	U
75-00-3	Chloroethane	1	26	26	0.45	U
67-66-3	Chloroform	1	1.6	6.5	0.19	J
74-87-3	Chloromethane	1	6.5	6.5	0.31	U
110-82-7	Cyclohexane	1	13	13	0.89	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.5	6.5	0.45	U
106-93-4	1,2-Dibromoethane	1	6.5	6.5	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.5	6.5	0.32	U
541-73-1	1,3-Dichlorobenzene	1	6.5	6.5	0.31	U
106-46-7	1,4-Dichlorobenzene	1	6.5	6.5	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.5	6.5	0.43	U UJ,C
75-34-3	1,1-Dichloroethane	1	6.5	6.5	0.25	U
107-06-2	1,2-Dichloroethane	1	6.5	6.5	0.38	U
75-35-4	1,1-Dichloroethene	1	6.5	6.5	0.48	U
156-59-2	cis-1,2-Dichloroethene	1	6.5	6.5	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.5	6.5	0.29	U
78-87-5	1,2-Dichloropropane	1	6.5	6.5	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.5	6.5	0.33	U
10061-02-6	trans-1,3-Dichloropropene	1	6.5	6.5	1.1	U
100-41-4	Ethylbenzene	1	6.5	6.5	0.16	U
591-78-6	2-Hexanone	1	13	13	3.9	U
98-82-8	Isopropylbenzene	1	6.5	6.5	0.16	U
79-20-9	Methyl Acetate	1	8.2	26	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.5	6.5	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB12C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-08 File ID: 21208.D

Sampled: 01/09/08 12:00 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 17:19

Solids: 77.36 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	26	26	5.1	U
78-93-3	2-Butanone (MEK)	1	19	26	3.1	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U
100-42-5	Styrene	1	6.5	6.5	0.29	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.5	6.5	0.26	U
127-18-4	Tetrachloroethene	1	6.5	6.5	0.57	U
108-88-3	Toluene	1	6.5	6.5	0.52	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.5	6.5	0.31	U
71-55-6	1,1,1-Trichloroethane	1	6.5	6.5	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.5	6.5	0.89	U
79-01-6	Trichloroethene	1	6.5	6.5	0.73	U
75-69-4	Trichlorofluoromethane	1	6.5	6.5	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.5	6.5	0.43	U
75-01-4	Vinyl Chloride	1	6.5	6.5	0.59	U
1330-20-7	Xylene (Total)	1	6.5	6.5	0.76	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.4	108	78 - 121	
1,2-Dichloroethane-d4	40.0	44.7	112	66 - 124	
Toluene-d8	40.0	39.5	99	85 - 115	
4-Bromofluorobenzene	40.0	36.4	91	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	721082	7.39	939926	7.38	
Chlorobenzene-d5	287411	17.43	386242	17.42	
1,4-Dichlorobenzene-d4	275373	22.46	454579	22.45	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801212-09 File ID: 21209.D

Sampled: 01/09/08 15:25 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 13:52

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	2.8	20	1.2	J B2 Z
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801212-09 File ID: 21209.D

Sampled: 01/09/08 15:25 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 13:52

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	0.46	5.0	0.051	J B1
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.080	1.0	0.072	J B1
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.1	103	85 - 115	
1,2-Dichloroethane-d4	40.0	43.2	108	70 - 120	
Toluene-d8	40.0	40.2	100	85 - 120	
4-Bromofluorobenzene	40.0	35.9	90	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	998058	5.16	1106369	5.15	
Chlorobenzene-d5	846539	8.09	945467	8.09	
1,4-Dichlorobenzene-d4	306418	10.39	442622	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801212-10 File ID: 21210.D

Sampled: 01/09/08 15:25 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 14:29

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	3.3	20	1.2	J B7Z
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801212-10 File ID: 21210.D

Sampled: 01/09/08 15:25 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 14:29

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	0.69	5.0	0.051	J
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.16	1.0	0.072	J
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.3	103	85 - 115	
1,2-Dichloroethane-d4	40.0	43.6	109	70 - 120	
Toluene-d8	40.0	40.4	101	85 - 120	
4-Bromofluorobenzene	40.0	35.2	88	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	990213	5.16	1106369	5.15	
Chlorobenzene-d5	851296	8.09	945467	8.09	
1,4-Dichlorobenzene-d4	304478	10.38	442622	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB18A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-11 File ID: 21211A.D

Sampled: 01/09/08 13:05 Prepared: 01/18/08 12:00 Analyzed: 01/18/08 18:01

Solids: 78.61 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0800703 Sequence: 8012120 Calibration: 8A21004 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	150	950	76	J
71-43-2	Benzene	1	64	64	7.5	U
74-97-5	Bromochloromethane	1	64	64	12	U
75-27-4	Bromodichloromethane	1	64	64	12	U
75-25-2	Bromoform	1	64	64	15	U
74-83-9	Bromomethane	1	64	64	12	U
75-15-0	Carbon Disulfide	1	320	320	18	U
56-23-5	Carbon Tetrachloride	1	64	64	9.7	U
108-90-7	Chlorobenzene	1	64	64	7.6	U
75-00-3	Chloroethane	1	64	64	13	U
67-66-3	Chloroform	1	64	64	3.9	U
74-87-3	Chloromethane	1	18	64	3.8	J
110-82-7	Cyclohexane	1	320	320	8.8	U
96-12-8	1,2-Dibromo-3-chloropropane	1	320	320	18	U
124-48-1	Dibromochloromethane	1	64	64	8.8	U
106-93-4	1,2-Dibromoethane	1	64	64	14	U
95-50-1	1,2-Dichlorobenzene	1	64	64	4.2	U
541-73-1	1,3-Dichlorobenzene	1	64	64	7.6	U
106-46-7	1,4-Dichlorobenzene	1	64	64	8.5	U
75-71-8	Dichlorodifluoromethane	1	64	64	11	U
75-34-3	1,1-Dichloroethane	1	64	64	4.8	U
107-06-2	1,2-Dichloroethane	1	64	64	9.8	U
75-35-4	1,1-Dichloroethene	1	64	64	8.8	U
156-59-2	cis-1,2-Dichloroethene	1	64	64	11	U
156-60-5	trans-1,2-Dichloroethene	1	64	64	10	U
78-87-5	1,2-Dichloropropane	1	64	64	6.6	U
10061-01-5	cis-1,3-Dichloropropene	1	64	64	9.0	U
10061-02-6	trans-1,3-Dichloropropene	1	64	64	9.9	U
100-41-4	Ethylbenzene	1	64	64	8.4	U
591-78-6	2-Hexanone	1	3200	3200	27	U
98-82-8	Isopropylbenzene	1	64	64	7.9	U
79-20-9	Methyl Acetate	1	95	320	11	J
1634-04-4	Methyl tert-Butyl Ether	1	64	64	6.1	U
108-87-2	Methylcyclohexane	1	320	320	9.4	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB18A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-11 File ID: 21211A.D

Sampled: 01/09/08 13:05 Prepared: 01/18/08 12:00 Analyzed: 01/18/08 18:01

Solids: 78.61 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0800703 Sequence: 8012120 Calibration: 8A21004 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	320	10	J B7 E
78-93-3	2-Butanone (MEK)	1	3200	3200	21	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	3200	3200	24	U
100-42-5	Styrene	1	64	64	6.9	U
79-34-5	1,1,2,2-Tetrachloroethane	1	64	64	6.4	U
127-18-4	Tetrachloroethene	1	64	64	9.5	U
108-88-3	Toluene	1	64	64	4.6	U
87-61-6	1,2,3-Trichlorobenzene	1	130	130	8.5	U
120-82-1	1,2,4-Trichlorobenzene	1	130	130	10	U
71-55-6	1,1,1-Trichloroethane	1	64	64	7.0	U
79-00-5	1,1,2-Trichloroethane	1	64	64	13	U
79-01-6	Trichloroethene	1	64	64	11	U
75-69-4	Trichlorofluoromethane	1	64	64	11	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	320	320	9.2	U
75-01-4	Vinyl Chloride	1	64	64	11	U
1330-20-7	Xylene (Total)	1	190	190	23	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	39.7	99	78 - 121	
1,2-Dichloroethane-d4	40.0	44.3	111	66 - 124	
Toluene-d8	40.0	39.8	99	85 - 115	
4-Bromofluorobenzene	40.0	38.5	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	953256	5.14	1098591	5.14	
Chlorobenzene-d5	810784	8.08	933741	8.08	
1,4-Dichlorobenzene-d4	450414	10.38	536532	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB18B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-12 File ID: 21212.D

Sampled: 01/09/08 13:15 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 18:24

Solids: 78.45 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	40	25	5.4	J, C
71-43-2	Benzene	1	6.4	6.4	0.16	U
74-97-5	Bromochloromethane	1	25	25	0.16	U
75-27-4	Bromodichloromethane	1	6.4	6.4	0.32	U
75-25-2	Bromoform	1	6.4	6.4	0.62	U
74-83-9	Bromomethane	1	6.4	6.4	1.6	U
75-15-0	Carbon Disulfide	1	6.4	6.4	0.34	U
56-23-5	Carbon Tetrachloride	1	6.4	6.4	0.37	U
108-90-7	Chlorobenzene	1	6.4	6.4	0.26	U
75-00-3	Chloroethane	1	25	25	0.45	U
67-66-3	Chloroform	1	6.4	6.4	0.19	U
74-87-3	Chloromethane	1	6.4	6.4	0.31	U
110-82-7	Cyclohexane	1	13	13	0.88	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.0	U
124-48-1	Dibromochloromethane	1	6.4	6.4	0.45	U
106-93-4	1,2-Dibromoethane	1	6.4	6.4	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.4	6.4	0.31	U
541-73-1	1,3-Dichlorobenzene	1	6.4	6.4	0.30	U
106-46-7	1,4-Dichlorobenzene	1	6.4	6.4	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.4	6.4	0.42	U UJ, C
75-34-3	1,1-Dichloroethane	1	6.4	6.4	0.25	U
107-06-2	1,2-Dichloroethane	1	6.4	6.4	0.38	U
75-35-4	1,1-Dichloroethene	1	6.4	6.4	0.47	U
156-59-2	cis-1,2-Dichloroethene	1	6.4	6.4	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.4	6.4	0.29	U
78-87-5	1,2-Dichloropropane	1	6.4	6.4	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.4	6.4	0.32	U
10061-02-6	trans-1,3-Dichloropropene	1	6.4	6.4	1.1	U
100-41-4	Ethylbenzene	1	6.4	6.4	0.16	U
591-78-6	2-Hexanone	1	13	13	3.8	U
98-82-8	Isopropylbenzene	1	6.4	6.4	0.16	U
79-20-9	Methyl Acetate	1	3.7	25	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.4	6.4	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB18B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-12 File ID: 21212.D

Sampled: 01/09/08 13:15 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 18:24

Solids: 78.45 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	25	25	5.0	U
78-93-3	2-Butanone (MEK)	1	10	25	3.1	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U
100-42-5	Styrene	1	6.4	6.4	0.28	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.4	6.4	0.26	U
127-18-4	Tetrachloroethene	1	6.4	6.4	0.56	U
108-88-3	Toluene	1	6.4	6.4	0.51	U
87-61-6	1,2,3-Trichlorobenzene	1	25	25	0.26	U
120-82-1	1,2,4-Trichlorobenzene	1	6.4	6.4	0.31	U
71-55-6	1,1,1-Trichloroethane	1	6.4	6.4	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.4	6.4	0.88	U
79-01-6	Trichloroethene	1	6.4	6.4	0.72	U
75-69-4	Trichlorofluoromethane	1	6.4	6.4	0.27	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.4	6.4	0.42	U
75-01-4	Vinyl Chloride	1	6.4	6.4	0.58	U
1330-20-7	Xylene (Total)	1	6.4	6.4	0.75	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.8	104	78 - 121	
1,2-Dichloroethane-d4	40.0	43.9	110	66 - 124	
Toluene-d8	40.0	39.8	100	85 - 115	
4-Bromofluorobenzene	40.0	40.3	101	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	726093	7.38	939926	7.38	
Chlorobenzene-d5	297933	17.42	386242	17.42	
1,4-Dichlorobenzene-d4	322306	22.45	454579	22.45	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB18C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-13 File ID: 21213.D

Sampled: 01/09/08 13:38 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 18:57

Solids: 69.92 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	120	29	6.1	J1C
71-43-2	Benzene	1	0.34	7.2	0.18	J
74-97-5	Bromochloromethane	1	29	29	0.18	U
75-27-4	Bromodichloromethane	1	7.2	7.2	0.35	U
75-25-2	Bromoform	1	7.2	7.2	0.69	U
74-83-9	Bromomethane	1	7.2	7.2	1.7	U
75-15-0	Carbon Disulfide	1	7.2	7.2	0.38	U
56-23-5	Carbon Tetrachloride	1	7.2	7.2	0.41	U
108-90-7	Chlorobenzene	1	7.2	7.2	0.29	U
75-00-3	Chloroethane	1	29	29	0.50	U
67-66-3	Chloroform	1	7.2	7.2	0.21	U
74-87-3	Chloromethane	1	7.2	7.2	0.35	U
110-82-7	Cyclohexane	1	14	14	0.98	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.2	U
124-48-1	Dibromochloromethane	1	7.2	7.2	0.50	U
106-93-4	1,2-Dibromoethane	1	7.2	7.2	1.2	U
95-50-1	1,2-Dichlorobenzene	1	7.2	7.2	0.35	U
541-73-1	1,3-Dichlorobenzene	1	7.2	7.2	0.34	U
106-46-7	1,4-Dichlorobenzene	1	7.2	7.2	0.31	U
75-71-8	Dichlorodifluoromethane	1	7.2	7.2	0.47	U UJ1C
75-34-3	1,1-Dichloroethane	1	7.2	7.2	0.28	U
107-06-2	1,2-Dichloroethane	1	7.2	7.2	0.42	U
75-35-4	1,1-Dichloroethene	1	7.2	7.2	0.53	U
156-59-2	cis-1,2-Dichloroethene	1	7.2	7.2	0.23	U
156-60-5	trans-1,2-Dichloroethene	1	7.2	7.2	0.32	U
78-87-5	1,2-Dichloropropane	1	7.2	7.2	1.3	U
10061-01-5	cis-1,3-Dichloropropene	1	7.2	7.2	0.36	U
10061-02-6	trans-1,3-Dichloropropene	1	7.2	7.2	1.2	U
100-41-4	Ethylbenzene	1	7.2	7.2	0.18	U
591-78-6	2-Hexanone	1	14	14	4.3	U
98-82-8	Isopropylbenzene	1	7.2	7.2	0.18	U
79-20-9	Methyl Acetate	1	4.5	29	1.2	J
1634-04-4	Methyl tert-Butyl Ether	1	7.2	7.2	0.33	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U

: 08427

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB18C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-13 File ID: 21213.D

Sampled: 01/09/08 13:38 Prepared: 01/14/08 09:00 Analyzed: 01/14/08 18:57

Solids: 69.92 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011652 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	29	29	5.6	U
78-93-3	2-Butanone (MEK)	1	30	29	3.5	
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.7	U
100-42-5	Styrene	1	7.2	7.2	0.32	U
79-34-5	1,1,2,2-Tetrachloroethane	1	7.2	7.2	0.29	U
127-18-4	Tetrachloroethene	1	7.2	7.2	0.63	U
108-88-3	Toluene	1	7.2	7.2	0.57	U
87-61-6	1,2,3-Trichlorobenzene	1	29	29	0.29	U
120-82-1	1,2,4-Trichlorobenzene	1	7.2	7.2	0.34	U
71-55-6	1,1,1-Trichloroethane	1	7.2	7.2	0.29	U
79-00-5	1,1,2-Trichloroethane	1	7.2	7.2	0.98	U
79-01-6	Trichloroethene	1	7.2	7.2	0.80	U
75-69-4	Trichlorofluoromethane	1	7.2	7.2	0.31	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	7.2	7.2	0.47	U
75-01-4	Vinyl Chloride	1	7.2	7.2	0.65	U
1330-20-7	Xylene (Total)	1	7.2	7.2	0.84	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.0	110	78 - 121	
1,2-Dichloroethane-d4	40.0	44.5	111	66 - 124	
Toluene-d8	40.0	40.5	101	85 - 115	
4-Bromofluorobenzene	40.0	39.6	99	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	723912	7.37	939926	7.38	
Chlorobenzene-d5	303703	17.42	386242	17.42	
1,4-Dichlorobenzene-d4	317430	22.45	454579	22.45	

* Values outside of QC limits

GB428

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB13A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-14 File ID: 21214.D

Sampled: 01/09/08 14:19 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 12:34

Solids: 83.07 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	150	24	5.1	
71-43-2	Benzene	1	6.0	6.0	0.15	U
74-97-5	Bromochloromethane	1	24	24	0.15	U
75-27-4	Bromodichloromethane	1	6.0	6.0	0.30	U
75-25-2	Bromoform	1	6.0	6.0	0.58	U
74-83-9	Bromomethane	1	6.0	6.0	1.5	U
75-15-0	Carbon Disulfide	1	6.0	6.0	0.32	U
56-23-5	Carbon Tetrachloride	1	6.0	6.0	0.35	U
108-90-7	Chlorobenzene	1	6.0	6.0	0.24	U
75-00-3	Chloroethane	1	24	24	0.42	U
67-66-3	Chloroform	1	6.0	6.0	0.18	U
74-87-3	Chloromethane	1	6.0	6.0	0.29	U
110-82-7	Cyclohexane	1	12	12	0.83	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.98	U
124-48-1	Dibromochloromethane	1	6.0	6.0	0.42	U
106-93-4	1,2-Dibromoethane	1	6.0	6.0	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.0	6.0	0.29	U
541-73-1	1,3-Dichlorobenzene	1	6.0	6.0	0.29	U
106-46-7	1,4-Dichlorobenzene	1	6.0	6.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.0	6.0	0.40	U
75-34-3	1,1-Dichloroethane	1	6.0	6.0	0.23	U
107-06-2	1,2-Dichloroethane	1	6.0	6.0	0.36	U
75-35-4	1,1-Dichloroethene	1	6.0	6.0	0.45	U
156-59-2	cis-1,2-Dichloroethene	1	6.0	6.0	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	6.0	6.0	0.27	U
78-87-5	1,2-Dichloropropane	1	6.0	6.0	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.0	6.0	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	6.0	6.0	1.0	U
100-41-4	Ethylbenzene	1	6.0	6.0	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.0	6.0	0.15	U
79-20-9	Methyl Acetate	1	6.9	24	1.0	J
1634-04-4	Methyl tert-Butyl Ether	1	6.0	6.0	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.96	U

: 66435

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB13A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-14 File ID: 21214.D

Sampled: 01/09/08 14:19 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 12:34

Solids: 83.07 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.8	U
78-93-3	2-Butanone (MEK)	1	15	24	2.9	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U
100-42-5	Styrene	1	6.0	6.0	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.0	6.0	0.24	U
127-18-4	Tetrachloroethene	1	6.0	6.0	0.53	U
108-88-3	Toluene	1	6.0	6.0	0.48	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.0	6.0	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.0	6.0	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.0	6.0	0.83	U
79-01-6	Trichloroethene	1	6.0	6.0	0.68	U
75-69-4	Trichlorofluoromethane	1	6.0	6.0	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.0	6.0	0.40	U
75-01-4	Vinyl Chloride	1	6.0	6.0	0.55	U
1330-20-7	Xylene (Total)	1	6.0	6.0	0.70	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.3	111	78 - 121	
1,2-Dichloroethane-d4	40.0	45.8	114	66 - 124	
Toluene-d8	40.0	39.2	98	85 - 115	
4-Bromofluorobenzene	40.0	37.8	94	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	750294	7.36	831188	7.35	
Chlorobenzene-d5	299056	17.41	359521	17.4	
1,4-Dichlorobenzene-d4	293429	22.44	421770	22.44	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB13B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-15 File ID: 21215.D

Sampled: 01/09/08 14:30 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 13:07

Solids: 80.83 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	25	25	5.2	U
71-43-2	Benzene	1	6.2	6.2	0.16	U
74-97-5	Bromochloromethane	1	25	25	0.16	U
75-27-4	Bromodichloromethane	1	6.2	6.2	0.31	U
75-25-2	Bromoform	1	6.2	6.2	0.60	U
74-83-9	Bromomethane	1	6.2	6.2	1.5	U
75-15-0	Carbon Disulfide	1	6.2	6.2	0.33	U
56-23-5	Carbon Tetrachloride	1	6.2	6.2	0.36	U
108-90-7	Chlorobenzene	1	6.2	6.2	0.25	U
75-00-3	Chloroethane	1	25	25	0.43	U
67-66-3	Chloroform	1	6.2	6.2	0.18	U
74-87-3	Chloromethane	1	6.2	6.2	0.30	U
110-82-7	Cyclohexane	1	12	12	0.85	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	1.0	U
124-48-1	Dibromochloromethane	1	6.2	6.2	0.43	U
106-93-4	1,2-Dibromoethane	1	6.2	6.2	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.2	6.2	0.30	U
541-73-1	1,3-Dichlorobenzene	1	6.2	6.2	0.29	U
106-46-7	1,4-Dichlorobenzene	1	6.2	6.2	0.27	U
75-71-8	Dichlorodifluoromethane	1	6.2	6.2	0.41	U
75-34-3	1,1-Dichloroethane	1	6.2	6.2	0.24	U
107-06-2	1,2-Dichloroethane	1	6.2	6.2	0.36	U
75-35-4	1,1-Dichloroethene	1	6.2	6.2	0.46	U
156-59-2	cis-1,2-Dichloroethene	1	6.2	6.2	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.2	6.2	0.28	U
78-87-5	1,2-Dichloropropane	1	6.2	6.2	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.2	6.2	0.31	U
10061-02-6	trans-1,3-Dichloropropene	1	6.2	6.2	1.0	U
100-41-4	Ethylbenzene	1	6.2	6.2	0.15	U
591-78-6	2-Hexanone	1	12	12	3.7	U
98-82-8	Isopropylbenzene	1	6.2	6.2	0.15	U
79-20-9	Methyl Acetate	1	25	25	1.0	U
1634-04-4	Methyl tert-Butyl Ether	1	6.2	6.2	0.29	U
108-87-2	Methylcyclohexane	1	12	12	0.98	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB13B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-15 File ID: 21215.D

Sampled: 01/09/08 14:30 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 13:07

Solids: 80.83 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	25	25	4.9	U
78-93-3	2-Butanone (MEK)	1	25	25	3.0	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U
100-42-5	Styrene	1	6.2	6.2	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.2	6.2	0.25	U
127-18-4	Tetrachloroethene	1	6.2	6.2	0.55	U
108-88-3	Toluene	1	6.2	6.2	0.50	U
87-61-6	1,2,3-Trichlorobenzene	1	25	25	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.2	6.2	0.30	U
71-55-6	1,1,1-Trichloroethane	1	6.2	6.2	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.2	6.2	0.85	U
79-01-6	Trichloroethene	1	6.2	6.2	0.69	U
75-69-4	Trichlorofluoromethane	1	6.2	6.2	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.2	6.2	0.41	U
75-01-4	Vinyl Chloride	1	6.2	6.2	0.56	U
1330-20-7	Xylene (Total)	1	6.2	6.2	0.72	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.1	105	78 - 121	
1,2-Dichloroethane-d4	40.0	41.8	104	66 - 124	
Toluene-d8	40.0	40.2	100	85 - 115	
4-Bromofluorobenzene	40.0	38.0	95	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	781247	7.36	831188	7.35	
Chlorobenzene-d5	326033	17.41	359521	17.4	
1,4-Dichlorobenzene-d4	344596	22.44	421770	22.44	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB13C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-16 File ID: 21216.D

Sampled: 01/09/08 15:10 Prepared: 01/14/08 12:00 Analyzed: 01/15/08 00:53

Solids: 72.18 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011722 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	39	28	5.9	
71-43-2	Benzene	1	6.9	6.9	0.18	U
74-97-5	Bromochloromethane	1	28	28	0.18	U
75-27-4	Bromodichloromethane	1	6.9	6.9	0.34	U
75-25-2	Bromoform	1	6.9	6.9	0.67	U
74-83-9	Bromomethane	1	6.9	6.9	1.7	U
75-15-0	Carbon Disulfide	1	6.9	6.9	0.36	U
56-23-5	Carbon Tetrachloride	1	6.9	6.9	0.40	U
108-90-7	Chlorobenzene	1	6.9	6.9	0.28	U
75-00-3	Chloroethane	1	28	28	0.49	U
67-66-3	Chloroform	1	6.9	6.9	0.20	U
74-87-3	Chloromethane	1	6.9	6.9	0.34	U
110-82-7	Cyclohexane	1	14	14	0.95	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.1	U UJ,C
124-48-1	Dibromochloromethane	1	6.9	6.9	0.48	U
106-93-4	1,2-Dibromoethane	1	6.9	6.9	1.2	U
95-50-1	1,2-Dichlorobenzene	1	6.9	6.9	0.34	U
541-73-1	1,3-Dichlorobenzene	1	6.9	6.9	0.33	U
106-46-7	1,4-Dichlorobenzene	1	6.9	6.9	0.30	U
75-71-8	Dichlorodifluoromethane	1	6.9	6.9	0.46	U
75-34-3	1,1-Dichloroethane	1	6.9	6.9	0.27	U
107-06-2	1,2-Dichloroethane	1	6.9	6.9	0.41	U
75-35-4	1,1-Dichloroethene	1	6.9	6.9	0.51	U
156-59-2	cis-1,2-Dichloroethene	1	6.9	6.9	0.22	U
156-60-5	trans-1,2-Dichloroethene	1	6.9	6.9	0.31	U
78-87-5	1,2-Dichloropropane	1	6.9	6.9	1.3	U
10061-01-5	cis-1,3-Dichloropropene	1	6.9	6.9	0.35	U
10061-02-6	trans-1,3-Dichloropropene	1	6.9	6.9	1.2	U
100-41-4	Ethylbenzene	1	6.9	6.9	0.17	U
591-78-6	2-Hexanone	1	14	14	4.1	U
98-82-8	Isopropylbenzene	1	6.9	6.9	0.17	U
79-20-9	Methyl Acetate	1	1.9	28	1.2	J
1634-04-4	Methyl tert-Butyl Ether	1	6.9	6.9	0.32	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U

: 88458

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB13C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-16 File ID: 21216.D

Sampled: 01/09/08 15:10 Prepared: 01/14/08 12:00 Analyzed: 01/15/08 00:53

Solids: 72.18 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011722 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	28	28	5.5	U
78-93-3	2-Butanone (MEK)	1	28	28	3.4	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.6	U
100-42-5	Styrene	1	6.9	6.9	0.31	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.9	6.9	0.28	U
127-18-4	Tetrachloroethene	1	6.9	6.9	0.61	U
108-88-3	Toluene	1	6.9	6.9	0.56	U
87-61-6	1,2,3-Trichlorobenzene	1	28	28	0.29	U
120-82-1	1,2,4-Trichlorobenzene	1	6.9	6.9	0.33	U
71-55-6	1,1,1-Trichloroethane	1	6.9	6.9	0.28	U
79-00-5	1,1,2-Trichloroethane	1	6.9	6.9	0.95	U
79-01-6	Trichloroethene	1	6.9	6.9	0.78	U
75-69-4	Trichlorofluoromethane	1	6.9	6.9	0.30	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.9	6.9	0.46	U
75-01-4	Vinyl Chloride	1	6.9	6.9	0.63	U
1330-20-7	Xylene (Total)	1	6.9	6.9	0.81	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.1	105	78 - 121	
1,2-Dichloroethane-d4	40.0	41.9	105	66 - 124	
Toluene-d8	40.0	40.5	101	85 - 115	
4-Bromofluorobenzene	40.0	36.7	92	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	766155	7.38	855152	7.36	
Chlorobenzene-d5	344528	17.43	355254	17.41	
1,4-Dichlorobenzene-d4	359072	22.45	409194	22.44	

* Values outside of QC limits

: 00451

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-17 File ID: 21217.D

Sampled: 01/09/08 15:00 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 13:39

Solids: 83.09 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	160	24	5.1	
71-43-2	Benzene	1	6.0	6.0	0.15	U
74-97-5	Bromochloromethane	1	24	24	0.15	U
75-27-4	Bromodichloromethane	1	6.0	6.0	0.30	U
75-25-2	Bromoform	1	6.0	6.0	0.58	U
74-83-9	Bromomethane	1	6.0	6.0	1.5	U
75-15-0	Carbon Disulfide	1	6.0	6.0	0.32	U
56-23-5	Carbon Tetrachloride	1	6.0	6.0	0.35	U
108-90-7	Chlorobenzene	1	6.0	6.0	0.24	U
75-00-3	Chloroethane	1	24	24	0.42	U
67-66-3	Chloroform	1	6.0	6.0	0.18	U
74-87-3	Chloromethane	1	6.0	6.0	0.29	U
110-82-7	Cyclohexane	1	12	12	0.83	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.98	U
124-48-1	Dibromochloromethane	1	6.0	6.0	0.42	U
106-93-4	1,2-Dibromoethane	1	6.0	6.0	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.0	6.0	0.29	U
541-73-1	1,3-Dichlorobenzene	1	6.0	6.0	0.29	U
106-46-7	1,4-Dichlorobenzene	1	6.0	6.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.0	6.0	0.40	U
75-34-3	1,1-Dichloroethane	1	6.0	6.0	0.23	U
107-06-2	1,2-Dichloroethane	1	6.0	6.0	0.36	U
75-35-4	1,1-Dichloroethene	1	6.0	6.0	0.45	U
156-59-2	cis-1,2-Dichloroethene	1	6.0	6.0	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	6.0	6.0	0.27	U
78-87-5	1,2-Dichloropropane	1	6.0	6.0	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.0	6.0	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	6.0	6.0	1.0	U
100-41-4	Ethylbenzene	1	6.0	6.0	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.0	6.0	0.15	U
79-20-9	Methyl Acetate	1	9.9	24	1.0	J
1634-04-4	Methyl tert-Butyl Ether	1	6.0	6.0	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.96	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-17 File ID: 21217.D

Sampled: 01/09/08 15:00 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 13:39

Solids: 83.09 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.8	U
78-93-3	2-Butanone (MEK)	1	17	24	2.9	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U
100-42-5	Styrene	1	6.0	6.0	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.0	6.0	0.24	U
127-18-4	Tetrachloroethene	1	6.0	6.0	0.53	U
108-88-3	Toluene	1	6.0	6.0	0.48	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.0	6.0	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.0	6.0	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.0	6.0	0.83	U
79-01-6	Trichloroethene	1	6.0	6.0	0.68	U
75-69-4	Trichlorofluoromethane	1	6.0	6.0	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.0	6.0	0.40	U
75-01-4	Vinyl Chloride	1	6.0	6.0	0.55	U
1330-20-7	Xylene (Total)	1	6.0	6.0	0.70	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.0	108	78 - 121	
1,2-Dichloroethane-d4	40.0	41.1	103	66 - 124	
Toluene-d8	40.0	39.3	98	85 - 115	
4-Bromofluorobenzene	40.0	34.2	85	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	809365	7.36	831188	7.35	
Chlorobenzene-d5	318400	17.41	359521	17.4	
1,4-Dichlorobenzene-d4	285335	22.44	421770	22.44	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB19A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-18 File ID: 21218.D

Sampled: 01/09/08 15:30 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 14:12

Solids: 88.35 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	190	23	4.8	
71-43-2	Benzene	1	5.7	5.7	0.14	U
74-97-5	Bromochloromethane	1	23	23	0.14	U
75-27-4	Bromodichloromethane	1	5.7	5.7	0.28	U
75-25-2	Bromoform	1	5.7	5.7	0.55	U
74-83-9	Bromomethane	1	5.7	5.7	1.4	U
75-15-0	Carbon Disulfide	1	5.7	5.7	0.30	U
56-23-5	Carbon Tetrachloride	1	5.7	5.7	0.32	U
108-90-7	Chlorobenzene	1	5.7	5.7	0.23	U
75-00-3	Chloroethane	1	23	23	0.40	U
67-66-3	Chloroform	1	5.7	5.7	0.17	U
74-87-3	Chloromethane	1	5.7	5.7	0.28	U
110-82-7	Cyclohexane	1	11	11	0.78	U
96-12-8	1,2-Dibromo-3-chloropropane	1	11	11	0.92	U
124-48-1	Dibromochloromethane	1	5.7	5.7	0.40	U
106-93-4	1,2-Dibromoethane	1	5.7	5.7	0.95	U
95-50-1	1,2-Dichlorobenzene	1	5.7	5.7	0.28	U
541-73-1	1,3-Dichlorobenzene	1	5.7	5.7	0.27	U
106-46-7	1,4-Dichlorobenzene	1	5.7	5.7	0.25	U
75-71-8	Dichlorodifluoromethane	1	5.7	5.7	0.37	U
75-34-3	1,1-Dichloroethane	1	5.7	5.7	0.22	U
107-06-2	1,2-Dichloroethane	1	5.7	5.7	0.33	U
75-35-4	1,1-Dichloroethene	1	5.7	5.7	0.42	U
156-59-2	cis-1,2-Dichloroethene	1	5.7	5.7	0.18	U
156-60-5	trans-1,2-Dichloroethene	1	5.7	5.7	0.26	U
78-87-5	1,2-Dichloropropane	1	5.7	5.7	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1	5.7	5.7	0.29	U
10061-02-6	trans-1,3-Dichloropropene	1	5.7	5.7	0.94	U
100-41-4	Ethylbenzene	1	5.7	5.7	0.14	U
591-78-6	2-Hexanone	1	11	11	3.4	U
98-82-8	Isopropylbenzene	1	5.7	5.7	0.14	U
79-20-9	Methyl Acetate	1	26	23	0.94	
1634-04-4	Methyl tert-Butyl Ether	1	5.7	5.7	0.26	U
108-87-2	Methylcyclohexane	1	11	11	0.90	U

: 88466

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB19A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-18 File ID: 21218.D

Sampled: 01/09/08 15:30 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 14:12

Solids: 88.35 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	23	23	4.5	U
78-93-3	2-Butanone (MEK)	1	14	23	2.7	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	11	11	2.1	U
100-42-5	Styrene	1	5.7	5.7	0.25	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.7	5.7	0.23	U
127-18-4	Tetrachloroethene	1	5.7	5.7	0.50	U
108-88-3	Toluene	1	5.7	5.7	0.45	U
87-61-6	1,2,3-Trichlorobenzene	1	23	23	0.23	U
120-82-1	1,2,4-Trichlorobenzene	1	5.7	5.7	0.27	U
71-55-6	1,1,1-Trichloroethane	1	5.7	5.7	0.23	U
79-00-5	1,1,2-Trichloroethane	1	5.7	5.7	0.78	U
79-01-6	Trichloroethene	1	5.7	5.7	0.63	U
75-69-4	Trichlorofluoromethane	1	5.7	5.7	0.24	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.7	5.7	0.37	U
75-01-4	Vinyl Chloride	1	5.7	5.7	0.52	U
1330-20-7	Xylene (Total)	1	5.7	5.7	0.66	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.1	108	78 - 121	
1,2-Dichloroethane-d4	40.0	42.4	106	66 - 124	
Toluene-d8	40.0	38.3	96	85 - 115	
4-Bromofluorobenzene	40.0	35.8	90	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	725128	7.36	831188	7.35	
Chlorobenzene-d5	275822	17.4	359521	17.4	
1,4-Dichlorobenzene-d4	241978	22.44	421770	22.44	

* Values outside of QC limits

00467

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB19B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-19 File ID: 21219.D

Sampled: 01/09/08 15:40 Prepared: 01/14/08 12:00 Analyzed: 01/15/08 02:32

Solids: 82.89 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011722 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	9.6	24	5.1	J
71-43-2	Benzene	1	6.0	6.0	0.15	U
74-97-5	Bromochloromethane	1	24	24	0.15	U
75-27-4	Bromodichloromethane	1	6.0	6.0	0.30	U
75-25-2	Bromoform	1	6.0	6.0	0.58	U
74-83-9	Bromomethane	1	6.0	6.0	1.5	U
75-15-0	Carbon Disulfide	1	6.0	6.0	0.32	U
56-23-5	Carbon Tetrachloride	1	6.0	6.0	0.35	U
108-90-7	Chlorobenzene	1	6.0	6.0	0.24	U
75-00-3	Chloroethane	1	24	24	0.42	U
67-66-3	Chloroform	1	6.0	6.0	0.18	U
74-87-3	Chloromethane	1	6.0	6.0	0.29	U
110-82-7	Cyclohexane	1	12	12	0.83	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.98	U UJ,C
124-48-1	Dibromochloromethane	1	6.0	6.0	0.42	U
106-93-4	1,2-Dibromoethane	1	6.0	6.0	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.0	6.0	0.30	U
541-73-1	1,3-Dichlorobenzene	1	6.0	6.0	0.29	U
106-46-7	1,4-Dichlorobenzene	1	6.0	6.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.0	6.0	0.40	U
75-34-3	1,1-Dichloroethane	1	6.0	6.0	0.23	U
107-06-2	1,2-Dichloroethane	1	6.0	6.0	0.36	U
75-35-4	1,1-Dichloroethene	1	6.0	6.0	0.45	U
156-59-2	cis-1,2-Dichloroethene	1	6.0	6.0	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	6.0	6.0	0.27	U
78-87-5	1,2-Dichloropropane	1	6.0	6.0	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.0	6.0	0.31	U
10061-02-6	trans-1,3-Dichloropropene	1	6.0	6.0	1.0	U
100-41-4	Ethylbenzene	1	6.0	6.0	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.0	6.0	0.15	U
79-20-9	Methyl Acetate	1	1.8	24	1.0	J
1634-04-4	Methyl tert-Butyl Ether	1	6.0	6.0	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.96	U

SOUTH

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB19B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-19 File ID: 21219.D

Sampled: 01/09/08 15:40 Prepared: 01/14/08 12:00 Analyzed: 01/15/08 02:32

Solids: 82.89 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011722 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	4.9	24	4.8	J B2 Y
78-93-3	2-Butanone (MEK)	1	6.4	24	2.9	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U
100-42-5	Styrene	1	6.0	6.0	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.0	6.0	0.24	U
127-18-4	Tetrachloroethene	1	6.0	6.0	0.53	U
108-88-3	Toluene	1	6.0	6.0	0.49	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.0	6.0	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.0	6.0	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.0	6.0	0.83	U
79-01-6	Trichloroethene	1	6.0	6.0	0.68	U
75-69-4	Trichlorofluoromethane	1	6.0	6.0	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.0	6.0	0.40	U
75-01-4	Vinyl Chloride	1	6.0	6.0	0.55	U
1330-20-7	Xylene (Total)	1	6.0	6.0	0.71	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.9	112	78 - 121	
1,2-Dichloroethane-d4	40.0	43.0	108	66 - 124	
Toluene-d8	40.0	39.9	100	85 - 115	
4-Bromofluorobenzene	40.0	37.3	93	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	770867	7.38	855152	7.36	
Chlorobenzene-d5	343602	17.42	355254	17.41	
1,4-Dichlorobenzene-d4	364857	22.45	409194	22.44	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB19C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-20 File ID: 21220.D

Sampled: 01/09/08 16:05 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 14:45

Solids: 73.03 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	32	27	5.8	
71-43-2	Benzene	1	6.8	6.8	0.18	U
74-97-5	Bromochloromethane	1	27	27	0.18	U
75-27-4	Bromodichloromethane	1	6.8	6.8	0.34	U
75-25-2	Bromoform	1	6.8	6.8	0.66	U
74-83-9	Bromomethane	1	6.8	6.8	1.7	U
75-15-0	Carbon Disulfide	1	6.8	6.8	0.36	U
56-23-5	Carbon Tetrachloride	1	6.8	6.8	0.39	U
108-90-7	Chlorobenzene	1	6.8	6.8	0.28	U
75-00-3	Chloroethane	1	27	27	0.48	U
67-66-3	Chloroform	1	6.8	6.8	0.20	U
74-87-3	Chloromethane	1	6.8	6.8	0.33	U
110-82-7	Cyclohexane	1	14	14	0.94	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.1	U
124-48-1	Dibromochloromethane	1	6.8	6.8	0.48	U
106-93-4	1,2-Dibromoethane	1	6.8	6.8	1.2	U
95-50-1	1,2-Dichlorobenzene	1	6.8	6.8	0.34	U
541-73-1	1,3-Dichlorobenzene	1	6.8	6.8	0.33	U
106-46-7	1,4-Dichlorobenzene	1	6.8	6.8	0.30	U
75-71-8	Dichlorodifluoromethane	1	6.8	6.8	0.45	U
75-34-3	1,1-Dichloroethane	1	6.8	6.8	0.27	U
107-06-2	1,2-Dichloroethane	1	6.8	6.8	0.40	U
75-35-4	1,1-Dichloroethene	1	6.8	6.8	0.51	U
156-59-2	cis-1,2-Dichloroethene	1	6.8	6.8	0.22	U
156-60-5	trans-1,2-Dichloroethene	1	6.8	6.8	0.31	U
78-87-5	1,2-Dichloropropane	1	6.8	6.8	1.3	U
10061-01-5	cis-1,3-Dichloropropene	1	6.8	6.8	0.35	U
10061-02-6	trans-1,3-Dichloropropene	1	6.8	6.8	1.1	U
100-41-4	Ethylbenzene	1	6.8	6.8	0.17	U
591-78-6	2-Hexanone	1	14	14	4.1	U
98-82-8	Isopropylbenzene	1	6.8	6.8	0.17	U
79-20-9	Methyl Acetate	1	1.8	27	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.8	6.8	0.32	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U

: 66482

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB19C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801212-20 File ID: 21220.D

Sampled: 01/09/08 16:05 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 14:45

Solids: 73.03 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	8.4	27	5.4	J
78-93-3	2-Butanone (MEK)	1	7.6	27	3.3	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.6	U
100-42-5	Styrene	1	6.8	6.8	0.30	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.8	6.8	0.28	U
127-18-4	Tetrachloroethene	1	6.8	6.8	0.61	U
108-88-3	Toluene	1	6.8	6.8	0.55	U
87-61-6	1,2,3-Trichlorobenzene	1	27	27	0.28	U
120-82-1	1,2,4-Trichlorobenzene	1	6.8	6.8	0.33	U
71-55-6	1,1,1-Trichloroethane	1	6.8	6.8	0.28	U
79-00-5	1,1,2-Trichloroethane	1	6.8	6.8	0.94	U
79-01-6	Trichloroethene	1	6.8	6.8	0.77	U
75-69-4	Trichlorofluoromethane	1	6.8	6.8	0.29	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.8	6.8	0.45	U
75-01-4	Vinyl Chloride	1	6.8	6.8	0.62	U
1330-20-7	Xylene (Total)	1	6.8	6.8	0.80	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.4	108	78 - 121	
1,2-Dichloroethane-d4	40.0	44.0	110	66 - 124	
Toluene-d8	40.0	39.7	99	85 - 115	
4-Bromofluorobenzene	40.0	36.1	90	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	730086	7.35	831188	7.35	
Chlorobenzene-d5	301225	17.41	359521	17.4	
1,4-Dichlorobenzene-d4	277927	22.45	421770	22.44	

* Values outside of QC limits

: 08483

SAMPLE ID SUMMARY

USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB17A	0801083-01
57SB17B	0801083-02
57SB17C	0801135-01
57SB15A	0801135-02
57SB15B	0801135-03
57SB15C	0801135-04
DUP-1	0801135-05
EQBK-1	0801135-06
57SB16A	0801135-08
57SB16B	0801135-09
57SB16C	0801135-10
57SB10A	0801135-11
57SB10B	0801135-12
57SB10C	0801135-13
57SB11A	0801212-01
57SB11B	0801212-02
57SB11C	0801212-03
DUP-2	0801212-04
57SB2AB	0801212-05
57SB12A	0801212-06
57SB12B	0801212-07
57SB12C	0801212-08
EQBK-2	0801212-09
57SB18A	0801212-11
57SB18B	0801212-12
57SB18C	0801212-13
57SB13A	0801212-14
57SB13B	0801212-15
57SB13C	0801212-16
DUP-3	0801212-17
57SB19A	0801212-18
57SB19B	0801212-19
57SB19C	0801212-20

: 00845

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB17A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/07/08 14:25
Solids: 85.86
Laboratory ID: 0801083-01

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	12000	mg/kg dry wt.	1	10	2.1		01/18/08 09:11	
7440-39-3	Barium, Total	150	mg/kg dry wt.	1	1.0	0.17		01/18/08 09:11	
7440-41-7	Beryllium, Total	0.97	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 09:11	
7440-43-9	Cadmium, Total	0.27	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 09:11	
7440-70-2	Calcium, Total	1200	mg/kg dry wt.	1	50	4.2		01/18/08 09:11	
7440-47-3	Chromium, Total	17	mg/kg dry wt.	1	5.0	0.72		01/18/08 09:11	
7440-48-4	Cobalt, Total	4.3	mg/kg dry wt.	1	2.0	0.37		01/18/08 09:11	
7439-89-6	Iron, Total	13000	mg/kg dry wt.	1	10	0.48		01/18/08 09:11	
7439-95-4	Magnesium, Total	860	mg/kg dry wt.	1	50	5.0		01/18/08 09:11	
7439-96-5	Manganese, Total	1100	mg/kg dry wt.	1	1.0	0.16		01/18/08 09:11	Kim
7440-09-7	Potassium, Total	570	mg/kg dry wt.	1	50	5.3		01/18/08 09:11	
7440-23-5	Sodium, Total	35	mg/kg dry wt.	1	100	13	J	01/18/08 09:11	B, P
7440-66-6	Zinc, Total	36	mg/kg dry wt.	1	5.0	1.0		01/18/08 09:11	Kim

00846

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB17B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/07/08 14:38
Solids: 85.20
Laboratory ID: 0801083-02

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.4999 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	20000	mg/kg dry wt.	1	10	2.1		01/18/08 09:16
7440-39-3	Barium, Total	52	mg/kg dry wt.	1	1.0	0.17		01/18/08 09:16
7440-41-7	Beryllium, Total	0.36	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 09:16
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 09:16
7440-70-2	Calcium, Total	140	mg/kg dry wt.	1	50	4.2		01/18/08 09:16
7440-47-3	Chromium, Total	20	mg/kg dry wt.	1	5.0	0.72		01/18/08 09:16
7440-48-4	Cobalt, Total	2.4	mg/kg dry wt.	1	2.0	0.37		01/18/08 09:16
7439-89-6	Iron, Total	12000	mg/kg dry wt.	1	10	0.48		01/18/08 09:16
7439-95-4	Magnesium, Total	540	mg/kg dry wt.	1	50	5.0		01/18/08 09:16
7439-96-5	Manganese, Total	40	mg/kg dry wt.	1	1.0	0.16		01/18/08 09:16 KIM
7440-09-7	Potassium, Total	670	mg/kg dry wt.	1	50	5.3		01/18/08 09:16
7440-23-5	Sodium, Total	62	mg/kg dry wt.	1	100	13	J	01/18/08 09:16 B,P
7440-66-6	Zinc, Total	28	mg/kg dry wt.	1	5.0	1.0		01/18/08 09:16 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB17C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 08:20
Solids: 77.70
Laboratory ID: 0801135-01

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	24000	mg/kg dry wt.	1	10	2.1		01/18/08 09:20
7440-39-3	Barium, Total	64	mg/kg dry wt.	1	1.0	0.17		01/18/08 09:20
7440-41-7	Beryllium, Total	1.3	mg/kg dry wt.	1	1.0	0.021		01/18/08 09:20
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 09:20
7440-70-2	Calcium, Total	520	mg/kg dry wt.	1	50	4.2		01/18/08 09:20
7440-47-3	Chromium, Total	34	mg/kg dry wt.	1	5.0	0.72		01/18/08 09:20
7440-48-4	Cobalt, Total	8.8	mg/kg dry wt.	1	2.0	0.37		01/18/08 09:20
7439-89-6	Iron, Total	43000	mg/kg dry wt.	1	10	0.48		01/18/08 09:20
7439-95-4	Magnesium, Total	1600	mg/kg dry wt.	1	50	5.0		01/18/08 09:20
7439-96-5	Manganese, Total	230	mg/kg dry wt.	1	1.0	0.16		01/18/08 09:20 KIM
7440-09-7	Potassium, Total	1300	mg/kg dry wt.	1	50	5.3		01/18/08 09:20
7440-23-5	Sodium, Total	68	mg/kg dry wt.	1	100	13	J	01/18/08 09:20 D,P
7440-66-6	Zinc, Total	42	mg/kg dry wt.	1	5.0	1.0		01/18/08 09:20 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB15A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 10:40
Solids: 86.55
Laboratory ID: 0801135-02

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	15000	mg/kg dry wt.	1	10	2.1		01/18/08 09:25	
7440-39-3	Barium, Total	89	mg/kg dry wt.	1	1.0	0.17		01/18/08 09:25	
7440-41-7	Beryllium, Total	0.77	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 09:25	
7440-43-9	Cadmium, Total	0.63	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 09:25	
7440-70-2	Calcium, Total	1200	mg/kg dry wt.	1	50	4.2		01/18/08 09:25	
7440-47-3	Chromium, Total	29	mg/kg dry wt.	1	5.0	0.72		01/18/08 09:25	
7440-48-4	Cobalt, Total	4.9	mg/kg dry wt.	1	2.0	0.37		01/18/08 09:25	
7439-89-6	Iron, Total	16000	mg/kg dry wt.	1	10	0.48		01/18/08 09:25	
7439-95-4	Magnesium, Total	970	mg/kg dry wt.	1	50	5.0		01/18/08 09:25	
7439-96-5	Manganese, Total	410	mg/kg dry wt.	1	1.0	0.16		01/18/08 09:25	KIM
7440-09-7	Potassium, Total	670	mg/kg dry wt.	1	50	5.3		01/18/08 09:25	
7440-23-5	Sodium, Total	49	mg/kg dry wt.	1	100	13	J	01/18/08 09:25	B, P
7440-66-6	Zinc, Total	38	mg/kg dry wt.	1	5.0	1.0		01/18/08 09:25	KIM

00849

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB15B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 10:50
Solids: 78.96
Laboratory ID: 0801135-03

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	25000	mg/kg dry wt.	1	10	2.1		01/18/08 09:29	
7440-39-3	Barium, Total	86	mg/kg dry wt.	1	1.0	0.17		01/18/08 09:29	
7440-41-7	Beryllium, Total	1.2	mg/kg dry wt.	1	1.0	0.021		01/18/08 09:29	
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 09:29	
7440-70-2	Calcium, Total	61	mg/kg dry wt.	1	50	4.2		01/18/08 09:29	
7440-47-3	Chromium, Total	39	mg/kg dry wt.	1	5.0	0.72		01/18/08 09:29	
7440-48-4	Cobalt, Total	33	mg/kg dry wt.	1	2.0	0.37		01/18/08 09:29	
7439-89-6	Iron, Total	53000	mg/kg dry wt.	10	100	4.8		01/22/08 15:09	
7439-95-4	Magnesium, Total	900	mg/kg dry wt.	1	50	5.0		01/18/08 09:29	
7439-96-5	Manganese, Total	1500	mg/kg dry wt.	1	1.0	0.16		01/18/08 09:29	Kim
7440-09-7	Potassium, Total	1000	mg/kg dry wt.	1	50	5.3		01/18/08 09:29	
7440-23-5	Sodium, Total	59	mg/kg dry wt.	1	100	13	J	01/18/08 09:29	B>P
7440-66-6	Zinc, Total	30	mg/kg dry wt.	1	5.0	1.0		01/18/08 09:29	Kim

00850

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB15C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 11:40
Solids: 70.08
Laboratory ID: 0801135-04

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	23000	mg/kg dry wt.	1	10	2.1		01/18/08 09:34	
7440-39-3	Barium, Total	46	mg/kg dry wt.	1	1.0	0.17		01/18/08 09:34	
7440-41-7	Beryllium, Total	1.6	mg/kg dry wt.	1	1.0	0.021		01/18/08 09:34	
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 09:34	
7440-70-2	Calcium, Total	640	mg/kg dry wt.	1	50	4.2		01/18/08 09:34	
7440-47-3	Chromium, Total	31	mg/kg dry wt.	1	5.0	0.72		01/18/08 09:34	
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	2.0	0.37		01/18/08 09:34	
7439-89-6	Iron, Total	39000	mg/kg dry wt.	1	10	0.48		01/18/08 09:34	
7439-95-4	Magnesium, Total	1500	mg/kg dry wt.	1	50	5.0		01/18/08 09:34	
7439-96-5	Manganese, Total	340	mg/kg dry wt.	1	1.0	0.16		01/18/08 09:34	KIM
7440-09-7	Potassium, Total	1700	mg/kg dry wt.	1	50	5.3		01/18/08 09:34	
7440-23-5	Sodium, Total	85	mg/kg dry wt.	1	100	13	J	01/18/08 09:34	B,P
7440-66-6	Zinc, Total	41	mg/kg dry wt.	1	5.0	1.0		01/18/08 09:34	KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 00:00
Solids: 85.56
Laboratory ID: 0801135-05

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	14000	mg/kg dry wt.	1	10	2.1		01/18/08 09:38
7440-39-3	Barium, Total	96	mg/kg dry wt.	1	1.0	0.17		01/18/08 09:38
7440-41-7	Beryllium, Total	0.75	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 09:38
7440-43-9	Cadmium, Total	0.98	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 09:38
7440-70-2	Calcium, Total	1800	mg/kg dry wt.	1	50	4.2		01/18/08 09:38
7440-47-3	Chromium, Total	27	mg/kg dry wt.	1	5.0	0.72		01/18/08 09:38
7440-48-4	Cobalt, Total	4.9	mg/kg dry wt.	1	2.0	0.37		01/18/08 09:38
7439-89-6	Iron, Total	13000	mg/kg dry wt.	1	10	0.48		01/18/08 09:38
7439-95-4	Magnesium, Total	1300	mg/kg dry wt.	1	50	5.0		01/18/08 09:38
7439-96-5	Manganese, Total	600	mg/kg dry wt.	1	1.0	0.16		01/18/08 09:38 KIM
7440-09-7	Potassium, Total	590	mg/kg dry wt.	1	50	5.3		01/18/08 09:38
7440-23-5	Sodium, Total	51	mg/kg dry wt.	1	100	13	J	01/18/08 09:38 B,P
7440-66-6	Zinc, Total	45	mg/kg dry wt.	1	5.0	1.0		01/18/08 09:38 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

EQBK-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/08/08 12:45
Solids: 0.00
Laboratory ID: 0801135-06

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3010A Digestion
Prepared: 01/18/08 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0800636

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	01/22/08 10:52
7440-70-2	Calcium, Total	1100	ug/L	1	500	40		01/22/08 10:52
7439-89-6	Iron, Total	20	ug/L	1	20	5.7	U	01/23/08 08:39
7439-95-4	Magnesium, Total	500	ug/L	1	500	38	U	01/22/08 10:52
7440-09-7	Potassium, Total	200	ug/L	1	200	54	U	01/22/08 10:52
7440-23-5	Sodium, Total	500	ug/L	1	500	84	U	01/22/08 10:52

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB16A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 12:50
Solids: 80.00
Laboratory ID: 0801135-08

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.4997 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	22000	mg/kg dry wt.	1	10	2.1		01/18/08 09:42
7440-39-3	Barium, Total	210	mg/kg dry wt.	1	1.0	0.17		01/18/08 09:42
7440-41-7	Beryllium, Total	1.3	mg/kg dry wt.	1	1.0	0.021		01/18/08 09:42
7440-43-9	Cadmium, Total	0.42	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 09:42
7440-70-2	Calcium, Total	2900	mg/kg dry wt.	1	50	4.2		01/18/08 09:42
7440-47-3	Chromium, Total	24	mg/kg dry wt.	1	5.0	0.72		01/18/08 09:42
7440-48-4	Cobalt, Total	6.7	mg/kg dry wt.	1	2.0	0.37		01/18/08 09:42
7439-89-6	Iron, Total	15000	mg/kg dry wt.	1	10	0.48		01/18/08 09:42
7439-95-4	Magnesium, Total	1800	mg/kg dry wt.	1	50	5.0		01/18/08 09:42
7439-96-5	Manganese, Total	1600	mg/kg dry wt.	1	1.0	0.16		01/18/08 09:42 Kim
7440-09-7	Potassium, Total	1000	mg/kg dry wt.	1	50	5.3		01/18/08 09:42
7440-23-5	Sodium, Total	61	mg/kg dry wt.	1	100	13	J	01/18/08 09:42 BIP
7440-66-6	Zinc, Total	59	mg/kg dry wt.	1	5.0	1.0		01/18/08 09:42 Kim

00654

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB16B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 13:00
Solids: 76.59
Laboratory ID: 0801135-09

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	31000	mg/kg dry wt.	1	10	2.1		01/18/08 09:55
7440-39-3	Barium, Total	61	mg/kg dry wt.	1	1.0	0.17		01/18/08 09:55
7440-41-7	Beryllium, Total	0.68	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 09:55
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 09:55
7440-70-2	Calcium, Total	960	mg/kg dry wt.	1	50	4.2		01/18/08 09:55
7440-47-3	Chromium, Total	27	mg/kg dry wt.	1	5.0	0.72		01/18/08 09:55
7440-48-4	Cobalt, Total	3.4	mg/kg dry wt.	1	2.0	0.37		01/18/08 09:55
7439-89-6	Iron, Total	22000	mg/kg dry wt.	1	10	0.48		01/18/08 09:55
7439-95-4	Magnesium, Total	1200	mg/kg dry wt.	1	50	5.0		01/18/08 09:55
7439-96-5	Manganese, Total	130	mg/kg dry wt.	1	1.0	0.16		01/18/08 09:55 KIM
7440-09-7	Potassium, Total	1200	mg/kg dry wt.	1	50	5.3		01/18/08 09:55
7440-23-5	Sodium, Total	81	mg/kg dry wt.	1	100	13	J	01/18/08 09:55 B,P
7440-66-6	Zinc, Total	32	mg/kg dry wt.	1	5.0	1.0		01/18/08 09:55 KIM

60855

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB16C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 15:20
Solids: 76.05
Laboratory ID: 0801135-10

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.5002 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	35000	mg/kg dry wt.	1	10	2.1		01/18/08 10:00
7440-39-3	Barium, Total	180	mg/kg dry wt.	1	1.0	0.17		01/18/08 10:00
7440-41-7	Beryllium, Total	2.2	mg/kg dry wt.	1	1.0	0.021		01/18/08 10:00
7440-43-9	Cadmium, Total	0.41	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 10:00
7440-70-2	Calcium, Total	550	mg/kg dry wt.	1	50	4.2		01/18/08 10:00
7440-47-3	Chromium, Total	51	mg/kg dry wt.	1	5.0	0.72		01/18/08 10:00
7440-48-4	Cobalt, Total	16	mg/kg dry wt.	1	2.0	0.37		01/18/08 10:00
7439-89-6	Iron, Total	51000	mg/kg dry wt.	10	100	4.8		01/22/08 15:13
7439-95-4	Magnesium, Total	8800	mg/kg dry wt.	1	50	5.0		01/18/08 10:00
7439-96-5	Manganese, Total	2300	mg/kg dry wt.	1	1.0	0.16		01/18/08 10:00 Kim
7440-09-7	Potassium, Total	4300	mg/kg dry wt.	1	50	5.3		01/18/08 10:00
7440-23-5	Sodium, Total	99	mg/kg dry wt.	1	100	13	J	01/18/08 10:00
7440-66-6	Zinc, Total	65	mg/kg dry wt.	1	5.0	1.0		01/18/08 10:00 Kim

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 15:35
Solids: 82.52
Laboratory ID: 0801135-11

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.5002 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	19000	mg/kg dry wt.	1	10	2.1		01/18/08 10:05
7440-39-3	Barium, Total	91	mg/kg dry wt.	1	1.0	0.17		01/18/08 10:05
7440-41-7	Beryllium, Total	0.42	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 10:05
7440-43-9	Cadmium, Total	0.62	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 10:05
7440-70-2	Calcium, Total	780	mg/kg dry wt.	1	50	4.2		01/18/08 10:05
7440-47-3	Chromium, Total	21	mg/kg dry wt.	1	5.0	0.72		01/18/08 10:05
7440-48-4	Cobalt, Total	3.1	mg/kg dry wt.	1	2.0	0.37		01/18/08 10:05
7439-89-6	Iron, Total	7100	mg/kg dry wt.	1	10	0.48		01/18/08 10:05
7439-95-4	Magnesium, Total	970	mg/kg dry wt.	1	50	5.0		01/18/08 10:05
7439-96-5	Manganese, Total	350	mg/kg dry wt.	1	1.0	0.16		01/18/08 10:05 KIM
7440-09-7	Potassium, Total	820	mg/kg dry wt.	1	50	5.3		01/18/08 10:05
7440-23-5	Sodium, Total	63	mg/kg dry wt.	1	100	13	J	01/18/08 10:05 BJP
7440-66-6	Zinc, Total	34	mg/kg dry wt.	1	5.0	1.0		01/18/08 10:05 KIM

00857

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 16:00
Solids: 70.27
Laboratory ID: 0801135-12

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	30000	mg/kg dry wt.	1	10	2.1		01/18/08 10:09
7440-39-3	Barium, Total	100	mg/kg dry wt.	1	1.0	0.17		01/18/08 10:09
7440-41-7	Beryllium, Total	1.6	mg/kg dry wt.	1	1.0	0.021		01/18/08 10:09
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 10:09
7440-70-2	Calcium, Total	150	mg/kg dry wt.	1	50	4.2		01/18/08 10:09
7440-47-3	Chromium, Total	40	mg/kg dry wt.	1	5.0	0.72		01/18/08 10:09
7440-48-4	Cobalt, Total	33	mg/kg dry wt.	1	2.0	0.37		01/18/08 10:09
7439-89-6	Iron, Total	47000	mg/kg dry wt.	10	100	4.8		01/22/08 15:18
7439-95-4	Magnesium, Total	1600	mg/kg dry wt.	1	50	5.0		01/18/08 10:09
7439-96-5	Manganese, Total	3900	mg/kg dry wt.	1	1.0	0.16		01/18/08 10:09 KIM
7440-09-7	Potassium, Total	1500	mg/kg dry wt.	1	50	5.3		01/18/08 10:09
7440-23-5	Sodium, Total	130	mg/kg dry wt.	1	100	13		01/18/08 10:09
7440-66-6	Zinc, Total	37	mg/kg dry wt.	1	5.0	1.0		01/18/08 10:09 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 16:45
Solids: 77.00
Laboratory ID: 0801135-13

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:15
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0800484

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	17000	mg/kg dry wt.	100	1000	210		01/22/08 10:56
7440-39-3	Barium, Total	21	mg/kg dry wt.	1	1.0	0.17		01/18/08 10:13
7440-41-7	Beryllium, Total	2.0	mg/kg dry wt.	1	1.0	0.021		01/18/08 10:13
7440-43-9	Cadmium, Total	0.13	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 10:13
7440-70-2	Calcium, Total	520	mg/kg dry wt.	1	50	4.2		01/18/08 10:13
7440-47-3	Chromium, Total	21	mg/kg dry wt.	1	5.0	0.72		01/18/08 10:13
7440-48-4	Cobalt, Total	11	mg/kg dry wt.	1	2.0	0.37		01/18/08 10:13
7439-89-6	Iron, Total	34000	mg/kg dry wt.	500	5000	240		01/22/08 10:44
7439-95-4	Magnesium, Total	1300	mg/kg dry wt.	1	50	5.0		01/18/08 10:13
7439-96-5	Manganese, Total	190	mg/kg dry wt.	1	1.0	0.16		01/18/08 10:13 Kim
7440-09-7	Potassium, Total	2300	mg/kg dry wt.	1	50	5.3		01/18/08 10:13
7440-23-5	Sodium, Total	65	mg/kg dry wt.	1	100	13	J	01/18/08 10:13 BP
7440-66-6	Zinc, Total	31	mg/kg dry wt.	1	5.0	1.0		01/18/08 10:13 Kim

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB11A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 07:48
Solids: 84.02
Laboratory ID: 0801212-01

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	21000	mg/kg dry wt.	1	10	2.1		01/18/08 13:16	
7440-39-3	Barium, Total	57	mg/kg dry wt.	1	1.0	0.17		01/18/08 13:16	J,F
7440-41-7	Beryllium, Total	0.40	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 13:16	
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 13:16	
7440-70-2	Calcium, Total	1200	mg/kg dry wt.	1	50	4.2		01/18/08 13:16	
7440-47-3	Chromium, Total	26	mg/kg dry wt.	1	5.0	0.72		01/18/08 13:16	
7440-48-4	Cobalt, Total	1.5	mg/kg dry wt.	1	2.0	0.37	J	01/18/08 13:16	
7439-89-6	Iron, Total	8300	mg/kg dry wt.	1	10	0.48		01/18/08 13:16	
7439-95-4	Magnesium, Total	1000	mg/kg dry wt.	1	50	5.0		01/18/08 13:16	
7439-96-5	Manganese, Total	60	mg/kg dry wt.	1	1.0	0.16		01/18/08 13:16	K,M
7440-09-7	Potassium, Total	740	mg/kg dry wt.	1	50	5.3		01/18/08 13:16	
7440-23-5	Sodium, Total	78	mg/kg dry wt.	1	100	13	J	01/18/08 13:16	B,P
7440-66-6	Zinc, Total	27	mg/kg dry wt.	1	5.0	1.0		01/18/08 13:16	K,M

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB11B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 07:55
Solids: 83.53
Laboratory ID: 0801212-02

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	22000	mg/kg dry wt.	1	10	2.1		01/18/08 13:21
7440-39-3	Barium, Total	68	mg/kg dry wt.	1	1.0	0.17		01/18/08 13:21
7440-41-7	Beryllium, Total	0.49	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 13:21
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 13:21
7440-70-2	Calcium, Total	66	mg/kg dry wt.	1	50	4.2		01/18/08 13:21
7440-47-3	Chromium, Total	18	mg/kg dry wt.	1	5.0	0.72		01/18/08 13:21
7440-48-4	Cobalt, Total	5.4	mg/kg dry wt.	1	2.0	0.37		01/18/08 13:21
7439-89-6	Iron, Total	11000	mg/kg dry wt.	1	10	0.48		01/18/08 13:21
7439-95-4	Magnesium, Total	610	mg/kg dry wt.	1	50	5.0		01/18/08 13:21
7439-96-5	Manganese, Total	79	mg/kg dry wt.	1	1.0	0.16		01/18/08 13:21 KIM
7440-09-7	Potassium, Total	650	mg/kg dry wt.	1	50	5.3		01/18/08 13:21
7440-23-5	Sodium, Total	81	mg/kg dry wt.	1	100	13	J	01/18/08 13:21
7440-66-6	Zinc, Total	31	mg/kg dry wt.	1	5.0	1.0		01/18/08 13:21 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB11C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 10:30
Solids: 75.60
Laboratory ID: 0801212-03

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	25000	mg/kg dry wt.	1	10	2.1		01/18/08 13:25	
7440-39-3	Barium, Total	66	mg/kg dry wt.	1	1.0	0.17		01/18/08 13:25	
7440-41-7	Beryllium, Total	2.2	mg/kg dry wt.	1	1.0	0.021		01/18/08 13:25	
7440-43-9	Cadmium, Total	0.13	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 13:25	B,P
7440-70-2	Calcium, Total	300	mg/kg dry wt.	1	50	4.2		01/18/08 13:25	
7440-47-3	Chromium, Total	52	mg/kg dry wt.	1	5.0	0.72		01/18/08 13:25	
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	2.0	0.37		01/18/08 13:25	
7439-89-6	Iron, Total	42000	mg/kg dry wt.	1	10	0.48		01/18/08 13:25	
7439-95-4	Magnesium, Total	4700	mg/kg dry wt.	1	50	5.0		01/18/08 13:25	
7439-96-5	Manganese, Total	580	mg/kg dry wt.	1	1.0	0.16		01/18/08 13:25	KIM
7440-09-7	Potassium, Total	3200	mg/kg dry wt.	1	50	5.3		01/18/08 13:25	
7440-23-5	Sodium, Total	84	mg/kg dry wt.	1	100	13	J	01/18/08 13:25	
7440-66-6	Zinc, Total	47	mg/kg dry wt.	1	5.0	1.0		01/18/08 13:25	KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:30
Solids: 83.29
Laboratory ID: 0801212-04

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	28000	mg/kg dry wt.	1	10	2.1		01/18/08 13:30	
7440-39-3	Barium, Total	96	mg/kg dry wt.	1	1.0	0.17		01/18/08 13:30	JF
7440-41-7	Beryllium, Total	0.59	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 13:30	
7440-43-9	Cadmium, Total	0.18	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 13:30	B,P
7440-70-2	Calcium, Total	1600	mg/kg dry wt.	1	50	4.2		01/18/08 13:30	
7440-47-3	Chromium, Total	31	mg/kg dry wt.	1	5.0	0.72		01/18/08 13:30	
7440-48-4	Cobalt, Total	2.1	mg/kg dry wt.	1	2.0	0.37		01/18/08 13:30	
7439-89-6	Iron, Total	12000	mg/kg dry wt.	1	10	0.48		01/18/08 13:30	
7439-95-4	Magnesium, Total	1400	mg/kg dry wt.	1	50	5.0		01/18/08 13:30	
7439-96-5	Manganese, Total	110	mg/kg dry wt.	1	1.0	0.16		01/18/08 13:30	Kim
7440-09-7	Potassium, Total	1100	mg/kg dry wt.	1	50	5.3		01/18/08 13:30	
7440-23-5	Sodium, Total	80	mg/kg dry wt.	1	100	13	J	01/18/08 13:30	B,P
7440-66-6	Zinc, Total	41	mg/kg dry wt.	1	5.0	1.0		01/18/08 13:30	Kim

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB2AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 09:56
Solids: 75.24
Laboratory ID: 0801212-05

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.4998 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	35000	mg/kg dry wt.	1	10	2.1		01/18/08 13:34
7440-39-3	Barium, Total	94	mg/kg dry wt.	1	1.0	0.17		01/18/08 13:34
7440-41-7	Beryllium, Total	1.3	mg/kg dry wt.	1	1.0	0.021		01/18/08 13:34
7440-43-9	Cadmium, Total	12	mg/kg dry wt.	1	2.0	0.11		01/18/08 13:34
7440-70-2	Calcium, Total	3800	mg/kg dry wt.	1	50	4.2		01/18/08 13:34
7440-47-3	Chromium, Total	160	mg/kg dry wt.	1	5.0	0.72		01/18/08 13:34
7440-48-4	Cobalt, Total	5.1	mg/kg dry wt.	1	2.0	0.37		01/18/08 13:34
7439-89-6	Iron, Total	37000	mg/kg dry wt.	1	10	0.48		01/18/08 13:34
7439-95-4	Magnesium, Total	2700	mg/kg dry wt.	1	50	5.0		01/18/08 13:34
7439-96-5	Manganese, Total	860	mg/kg dry wt.	1	1.0	0.16		01/18/08 13:34 Kim
7440-09-7	Potassium, Total	1100	mg/kg dry wt.	1	50	5.3		01/18/08 13:34
7440-23-5	Sodium, Total	270	mg/kg dry wt.	1	100	13		01/18/08 13:34
7440-66-6	Zinc, Total	280	mg/kg dry wt.	1	5.0	1.0		01/18/08 13:34 Kim

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB12A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:00
Solids: 83.95
Laboratory ID: 0801212-06

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	24000	mg/kg dry wt.	100	1000	210		01/22/08 16:29
7440-39-3	Barium, Total	51	mg/kg dry wt.	1	1.0	0.17		01/18/08 13:38
7440-41-7	Beryllium, Total	0.65	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 13:38
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 13:38
7440-70-2	Calcium, Total	850	mg/kg dry wt.	1	50	4.2		01/18/08 13:38
7440-47-3	Chromium, Total	33	mg/kg dry wt.	1	5.0	0.72		01/18/08 13:38
7440-48-4	Cobalt, Total	7.0	mg/kg dry wt.	1	2.0	0.37		01/18/08 13:38
7439-89-6	Iron, Total	27000	mg/kg dry wt.	500	5000	240		01/22/08 16:16
7439-95-4	Magnesium, Total	960	mg/kg dry wt.	1	50	5.0		01/18/08 13:38
7439-96-5	Manganese, Total	240	mg/kg dry wt.	1	1.0	0.16		01/18/08 13:38 Kim
7440-09-7	Potassium, Total	890	mg/kg dry wt.	1	50	5.3		01/18/08 13:38
7440-23-5	Sodium, Total	67	mg/kg dry wt.	1	100	13	J	01/18/08 13:38 BJP
7440-66-6	Zinc, Total	40	mg/kg dry wt.	1	5.0	1.0		01/18/08 13:38 Kim

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00865

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB12B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:20
Solids: 84.20
Laboratory ID: 0801212-07

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	23000	mg/kg dry wt.	1	10	2.1		01/18/08 14:13	
7440-39-3	Barium, Total	59	mg/kg dry wt.	1	1.0	0.17		01/18/08 14:13	
7440-41-7	Beryllium, Total	0.82	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 14:13	
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 14:13	
7440-70-2	Calcium, Total	140	mg/kg dry wt.	1	50	4.2		01/18/08 14:13	
7440-47-3	Chromium, Total	15	mg/kg dry wt.	1	5.0	0.72		01/18/08 14:13	
7440-48-4	Cobalt, Total	7.3	mg/kg dry wt.	1	2.0	0.37		01/18/08 14:13	
7439-89-6	Iron, Total	29000	mg/kg dry wt.	1	10	0.48		01/18/08 14:13	
7439-95-4	Magnesium, Total	810	mg/kg dry wt.	1	50	5.0		01/18/08 14:13	
7439-96-5	Manganese, Total	780	mg/kg dry wt.	1	1.0	0.16		01/18/08 14:13	Kim
7440-09-7	Potassium, Total	1000	mg/kg dry wt.	1	50	5.3		01/18/08 14:13	
7440-23-5	Sodium, Total	56	mg/kg dry wt.	1	100	13	J	01/18/08 14:13	B,P
7440-66-6	Zinc, Total	32	mg/kg dry wt.	1	5.0	1.0		01/18/08 14:13	Kim

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB12C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 12:00
Solids: 77.36
Laboratory ID: 0801212-08

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	23000	mg/kg dry wt.	1	10	2.1		01/18/08 14:17
7440-39-3	Barium, Total	81	mg/kg dry wt.	1	1.0	0.17		01/18/08 14:17
7440-41-7	Beryllium, Total	2.4	mg/kg dry wt.	1	1.0	0.021		01/18/08 14:17
7440-43-9	Cadmium, Total	0.40	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 14:17 B,P
7440-70-2	Calcium, Total	300	mg/kg dry wt.	1	50	4.2		01/18/08 14:17
7440-47-3	Chromium, Total	33	mg/kg dry wt.	1	5.0	0.72		01/18/08 14:17
7440-48-4	Cobalt, Total	16	mg/kg dry wt.	1	2.0	0.37		01/18/08 14:17
7439-89-6	Iron, Total	32000	mg/kg dry wt.	1	10	0.48		01/18/08 14:17
7439-95-4	Magnesium, Total	6600	mg/kg dry wt.	1	50	5.0		01/18/08 14:17
7439-96-5	Manganese, Total	1400	mg/kg dry wt.	1	1.0	0.16		01/18/08 14:17 Kim
7440-09-7	Potassium, Total	3700	mg/kg dry wt.	1	50	5.3		01/18/08 14:17
7440-23-5	Sodium, Total	69	mg/kg dry wt.	1	100	13	J	01/18/08 14:17 B,P
7440-66-6	Zinc, Total	58	mg/kg dry wt.	1	5.0	1.0		01/18/08 14:17 Kim

60857

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

EQBK-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/09/08 15:25
Solids: 0.00
Laboratory ID: 0801212-09

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3010A Digestion
Prepared: 01/18/08 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0800636

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	01/22/08 10:56
7440-70-2	Calcium, Total	200	ug/L	1	500	40	J	01/22/08 10:56
7439-89-6	Iron, Total	8.3	ug/L	1	20	5.7	J	01/23/08 08:24
7439-95-4	Magnesium, Total	500	ug/L	1	500	38	U	01/22/08 10:56
7440-09-7	Potassium, Total	200	ug/L	1	200	54	U	01/22/08 10:56
7440-23-5	Sodium, Total	500	ug/L	1	500	84	U	01/22/08 10:56

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB18A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 13:05
Solids: 78.61
Laboratory ID: 0801212-11

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	28000	mg/kg dry wt.	1	10	2.1		01/18/08 14:22
7440-39-3	Barium, Total	99	mg/kg dry wt.	1	1.0	0.17		01/18/08 14:22
7440-41-7	Beryllium, Total	1.3	mg/kg dry wt.	1	1.0	0.021		01/18/08 14:22
7440-43-9	Cadmium, Total	16	mg/kg dry wt.	1	2.0	0.11		01/18/08 14:22
7440-70-2	Calcium, Total	1900	mg/kg dry wt.	1	50	4.2		01/18/08 14:22
7440-47-3	Chromium, Total	150	mg/kg dry wt.	1	5.0	0.72		01/18/08 14:22
7440-48-4	Cobalt, Total	8.6	mg/kg dry wt.	1	2.0	0.37		01/18/08 14:22
7439-89-6	Iron, Total	39000	mg/kg dry wt.	1	10	0.48		01/18/08 14:22
7439-95-4	Magnesium, Total	1500	mg/kg dry wt.	1	50	5.0		01/18/08 14:22
7439-96-5	Manganese, Total	980	mg/kg dry wt.	1	1.0	0.16		01/18/08 14:22 KIM
7440-09-7	Potassium, Total	1200	mg/kg dry wt.	1	50	5.3		01/18/08 14:22
7440-23-5	Sodium, Total	130	mg/kg dry wt.	1	100	13		01/18/08 14:22
7440-66-6	Zinc, Total	480	mg/kg dry wt.	1	5.0	1.0		01/18/08 14:22 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB18B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 13:15
Solids: 78.45
Laboratory ID: 0801212-12

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.4997 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	22000	mg/kg dry wt.	1	10	2.1		01/18/08 14:27
7440-39-3	Barium, Total	73	mg/kg dry wt.	1	1.0	0.17		01/18/08 14:27
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.021		01/18/08 14:27
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 14:27
7440-70-2	Calcium, Total	390	mg/kg dry wt.	1	50	4.2		01/18/08 14:27
7440-47-3	Chromium, Total	27	mg/kg dry wt.	1	5.0	0.72		01/18/08 14:27
7440-48-4	Cobalt, Total	16	mg/kg dry wt.	1	2.0	0.37		01/18/08 14:27
7439-89-6	Iron, Total	34000	mg/kg dry wt.	1	10	0.48		01/18/08 14:27
7439-95-4	Magnesium, Total	1700	mg/kg dry wt.	1	50	5.0		01/18/08 14:27
7439-96-5	Manganese, Total	690	mg/kg dry wt.	1	1.0	0.16		01/18/08 14:27 KIM
7440-09-7	Potassium, Total	1700	mg/kg dry wt.	1	50	5.3		01/18/08 14:27
7440-23-5	Sodium, Total	68	mg/kg dry wt.	1	100	13	J	01/18/08 14:27 BJP
7440-66-6	Zinc, Total	46	mg/kg dry wt.	1	5.0	1.0		01/18/08 14:27 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB18C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 13:38
Solids: 69.92
Laboratory ID: 0801212-13

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	29000	mg/kg dry wt.	1	10	2.1		01/18/08 14:31
7440-39-3	Barium, Total	63	mg/kg dry wt.	1	1.0	0.17		01/18/08 14:31
7440-41-7	Beryllium, Total	1.9	mg/kg dry wt.	1	1.0	0.021		01/18/08 14:31
7440-43-9	Cadmium, Total	1.2	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 14:31
7440-70-2	Calcium, Total	110	mg/kg dry wt.	1	50	4.2		01/18/08 14:31
7440-47-3	Chromium, Total	44	mg/kg dry wt.	1	5.0	0.72		01/18/08 14:31
7440-48-4	Cobalt, Total	8.2	mg/kg dry wt.	1	2.0	0.37		01/18/08 14:31
7439-89-6	Iron, Total	32000	mg/kg dry wt.	1	10	0.48		01/18/08 14:31
7439-95-4	Magnesium, Total	3300	mg/kg dry wt.	1	50	5.0		01/18/08 14:31
7439-96-5	Manganese, Total	190	mg/kg dry wt.	1	1.0	0.16		01/18/08 14:31 KIM
7440-09-7	Potassium, Total	2300	mg/kg dry wt.	1	50	5.3		01/18/08 14:31
7440-23-5	Sodium, Total	320	mg/kg dry wt.	1	100	13		01/18/08 14:31
7440-66-6	Zinc, Total	69	mg/kg dry wt.	1	5.0	1.0		01/18/08 14:31 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB13A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 14:19
Solids: 83.07
Laboratory ID: 0801212-14

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	17000	mg/kg dry wt.	1	10	2.1		01/18/08 14:35	
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	1.0	0.17		01/18/08 14:35	
7440-41-7	Beryllium, Total	2.0	mg/kg dry wt.	1	1.0	0.021		01/18/08 14:35	
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 14:35	
7440-70-2	Calcium, Total	520	mg/kg dry wt.	1	50	4.2		01/18/08 14:35	
7440-47-3	Chromium, Total	33	mg/kg dry wt.	1	5.0	0.72		01/18/08 14:35	
7440-48-4	Cobalt, Total	9.9	mg/kg dry wt.	1	2.0	0.37		01/18/08 14:35	
7439-89-6	Iron, Total	44000	mg/kg dry wt.	1	10	0.48		01/18/08 14:35	
7439-95-4	Magnesium, Total	730	mg/kg dry wt.	1	50	5.0		01/18/08 14:35	
7439-96-5	Manganese, Total	2100	mg/kg dry wt.	1	1.0	0.16		01/18/08 14:35	KIM
7440-09-7	Potassium, Total	570	mg/kg dry wt.	1	50	5.3		01/18/08 14:35	
7440-23-5	Sodium, Total	39	mg/kg dry wt.	1	100	13	J	01/18/08 14:35	BIP
7440-66-6	Zinc, Total	42	mg/kg dry wt.	1	5.0	1.0		01/18/08 14:35	KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB13B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 14:30
Solids: 80.83
Laboratory ID: 0801212-15

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	24000	mg/kg dry wt.	1	10	2.1		01/18/08 14:40
7440-39-3	Barium, Total	83	mg/kg dry wt.	1	1.0	0.17		01/18/08 14:40
7440-41-7	Beryllium, Total	1.2	mg/kg dry wt.	1	1.0	0.021		01/18/08 14:40
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 14:40
7440-70-2	Calcium, Total	140	mg/kg dry wt.	1	50	4.2		01/18/08 14:40
7440-47-3	Chromium, Total	25	mg/kg dry wt.	1	5.0	0.72		01/18/08 14:40
7440-48-4	Cobalt, Total	11	mg/kg dry wt.	1	2.0	0.37		01/18/08 14:40
7439-89-6	Iron, Total	38000	mg/kg dry wt.	1	10	0.48		01/18/08 14:40
7439-95-4	Magnesium, Total	700	mg/kg dry wt.	1	50	5.0		01/18/08 14:40
7439-96-5	Manganese, Total	1300	mg/kg dry wt.	1	1.0	0.16		01/18/08 14:40 KIM
7440-09-7	Potassium, Total	910	mg/kg dry wt.	1	50	5.3		01/18/08 14:40
7440-23-5	Sodium, Total	50	mg/kg dry wt.	1	100	13	J	01/18/08 14:40 BIP
7440-66-6	Zinc, Total	37	mg/kg dry wt.	1	5.0	1.0		01/18/08 14:40 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB13C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:10
Solids: 72.18
Laboratory ID: 0801212-16

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	30000	mg/kg dry wt.	1	10	2.1		01/18/08 14:45
7440-39-3	Barium, Total	64	mg/kg dry wt.	1	1.0	0.17		01/18/08 14:45
7440-41-7	Beryllium, Total	2.8	mg/kg dry wt.	1	1.0	0.021		01/18/08 14:45
7440-43-9	Cadmium, Total	0.30	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 14:45 BP
7440-70-2	Calcium, Total	480	mg/kg dry wt.	1	50	4.2		01/18/08 14:45
7440-47-3	Chromium, Total	41	mg/kg dry wt.	1	5.0	0.72		01/18/08 14:45
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	2.0	0.37		01/18/08 14:45
7439-89-6	Iron, Total	37000	mg/kg dry wt.	1	10	0.48		01/18/08 14:45
7439-95-4	Magnesium, Total	6100	mg/kg dry wt.	1	50	5.0		01/18/08 14:45
7439-96-5	Manganese, Total	290	mg/kg dry wt.	1	1.0	0.16		01/18/08 14:45 KIM
7440-09-7	Potassium, Total	3800	mg/kg dry wt.	1	50	5.3		01/18/08 14:45
7440-23-5	Sodium, Total	99	mg/kg dry wt.	1	100	13	J	01/18/08 14:45
7440-66-6	Zinc, Total	54	mg/kg dry wt.	1	5.0	1.0		01/18/08 14:45 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:00
Solids: 83.09
Laboratory ID: 0801212-17

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	19000	mg/kg dry wt.	1	10	2.1		01/18/08 14:58
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17		01/18/08 14:58
7440-41-7	Beryllium, Total	1.8	mg/kg dry wt.	1	1.0	0.021		01/18/08 14:58
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 14:58
7440-70-2	Calcium, Total	590	mg/kg dry wt.	1	50	4.2		01/18/08 14:58
7440-47-3	Chromium, Total	31	mg/kg dry wt.	1	5.0	0.72		01/18/08 14:58
7440-48-4	Cobalt, Total	10	mg/kg dry wt.	1	2.0	0.37		01/18/08 14:58
7439-89-6	Iron, Total	41000	mg/kg dry wt.	1	10	0.48		01/18/08 14:58
7439-95-4	Magnesium, Total	810	mg/kg dry wt.	1	50	5.0		01/18/08 14:58
7439-96-5	Manganese, Total	2400	mg/kg dry wt.	1	1.0	0.16		01/18/08 14:58 KIM
7440-09-7	Potassium, Total	620	mg/kg dry wt.	1	50	5.3		01/18/08 14:58
7440-23-5	Sodium, Total	41	mg/kg dry wt.	1	100	13	J	01/18/08 14:58 BIP
7440-66-6	Zinc, Total	44	mg/kg dry wt.	1	5.0	1.0		01/18/08 14:58 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB19A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:30
Solids: 88.35
Laboratory ID: 0801212-18

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	30000	mg/kg dry wt.	1	10	2.1		01/18/08 15:02
7440-39-3	Barium, Total	83	mg/kg dry wt.	1	1.0	0.17		01/18/08 15:02
7440-41-7	Beryllium, Total	1.3	mg/kg dry wt.	1	1.0	0.021		01/18/08 15:02
7440-43-9	Cadmium, Total	5.0	mg/kg dry wt.	1	2.0	0.11		01/18/08 15:02
7440-70-2	Calcium, Total	1600	mg/kg dry wt.	1	50	4.2		01/18/08 15:02
7440-47-3	Chromium, Total	67	mg/kg dry wt.	1	5.0	0.72		01/18/08 15:02
7440-48-4	Cobalt, Total	8.8	mg/kg dry wt.	1	2.0	0.37		01/18/08 15:02
7439-89-6	Iron, Total	40000	mg/kg dry wt.	1	10	0.48		01/18/08 15:02
7439-95-4	Magnesium, Total	1300	mg/kg dry wt.	1	50	5.0		01/18/08 15:02
7439-96-5	Manganese, Total	930	mg/kg dry wt.	1	1.0	0.16		01/18/08 15:02 KIM
7440-09-7	Potassium, Total	1300	mg/kg dry wt.	1	50	5.3		01/18/08 15:02
7440-23-5	Sodium, Total	76	mg/kg dry wt.	1	100	13	J	01/18/08 15:02 BIP
7440-66-6	Zinc, Total	180	mg/kg dry wt.	1	5.0	1.0		01/18/08 15:02 KIM

00876

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB19B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:40
Solids: 82.89
Laboratory ID: 0801212-19

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	20000	mg/kg dry wt.	1	10	2.1		01/18/08 15:06
7440-39-3	Barium, Total	67	mg/kg dry wt.	1	1.0	0.17		01/18/08 15:06
7440-41-7	Beryllium, Total	0.87	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 15:06
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 15:06
7440-70-2	Calcium, Total	72	mg/kg dry wt.	1	50	4.2		01/18/08 15:06
7440-47-3	Chromium, Total	24	mg/kg dry wt.	1	5.0	0.72		01/18/08 15:06
7440-48-4	Cobalt, Total	10	mg/kg dry wt.	1	2.0	0.37		01/18/08 15:06
7439-89-6	Iron, Total	23000	mg/kg dry wt.	1	10	0.48		01/18/08 15:06
7439-95-4	Magnesium, Total	1200	mg/kg dry wt.	1	50	5.0		01/18/08 15:06
7439-96-5	Manganese, Total	370	mg/kg dry wt.	1	1.0	0.16		01/18/08 15:06 KIM
7440-09-7	Potassium, Total	1300	mg/kg dry wt.	1	50	5.3		01/18/08 15:06
7440-23-5	Sodium, Total	90	mg/kg dry wt.	1	100	13	J	01/18/08 15:06
7440-66-6	Zinc, Total	33	mg/kg dry wt.	1	5.0	1.0		01/18/08 15:06 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB19C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 16:05
Solids: 73.03
Laboratory ID: 0801212-20

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:30
Initial/Final: 0.4995 g / 50 mL
QC Batch: 0800607

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	26000	mg/kg dry wt.	1	10	2.1		01/18/08 15:11
7440-39-3	Barium, Total	50	mg/kg dry wt.	1	1.0	0.17		01/18/08 15:11
7440-41-7	Beryllium, Total	2.6	mg/kg dry wt.	1	1.0	0.021		01/18/08 15:11
7440-43-9	Cadmium, Total	0.39	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 15:11 BJP
7440-70-2	Calcium, Total	230	mg/kg dry wt.	1	50	4.2		01/18/08 15:11
7440-47-3	Chromium, Total	25	mg/kg dry wt.	1	5.0	0.72		01/18/08 15:11
7440-48-4	Cobalt, Total	19	mg/kg dry wt.	1	2.0	0.37		01/18/08 15:11
7439-89-6	Iron, Total	32000	mg/kg dry wt.	1	10	0.48		01/18/08 15:11
7439-95-4	Magnesium, Total	8600	mg/kg dry wt.	1	50	5.0		01/18/08 15:11
7439-96-5	Manganese, Total	1000	mg/kg dry wt.	1	1.0	0.16		01/18/08 15:11 KIM
7440-09-7	Potassium, Total	3700	mg/kg dry wt.	1	50	5.3		01/18/08 15:11
7440-23-5	Sodium, Total	150	mg/kg dry wt.	1	100	13		01/18/08 15:11
7440-66-6	Zinc, Total	43	mg/kg dry wt.	1	5.0	1.0		01/18/08 15:11 KIM

SAMPLE ID SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-46

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB17A	0801083-01
57SB17B	0801083-02
57SB17C	0801135-01
57SB15A	0801135-02
57SB15B	0801135-03
57SB15C	0801135-04
DUP-1	0801135-05
EQBK-1	0801135-06
57SB16A	0801135-08
57SB16B	0801135-09
57SB16C	0801135-10
57SB10A	0801135-11
57SB10B	0801135-12
57SB10C	0801135-13
57SB11A	0801212-01
57SB11B	0801212-02
57SB11C	0801212-03
DUP-2	0801212-04
57SB2AB	0801212-05
57SB12A	0801212-06
57SB12B	0801212-07
57SB12C	0801212-08
EQBK-2	0801212-09
57SB18A	0801212-11
57SB18B	0801212-12
57SB18C	0801212-13
57SB13A	0801212-14
57SB13B	0801212-15
57SB13C	0801212-16
DUP-3	0801212-17
57SB19A	0801212-18
57SB19B	0801212-19
57SB19C	0801212-20

: 01403

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB17A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/07/08 14:25
Solids: 85.86
Laboratory ID: 0801083-01

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.4997 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	2.2	mg/kg dry wt.	1	0.20	0.071		01/22/08 09:19 LIM
7440-50-8	Copper, Total	6.9	mg/kg dry wt.	1	0.20	0.044		01/22/08 09:19 JS
7439-92-1	Lead, Total	18	mg/kg dry wt.	1	0.20	0.022		01/23/08 09:52
7440-02-0	Nickel, Total	6.8	mg/kg dry wt.	1	0.10	0.036		01/22/08 09:19 JS
7782-49-2	Selenium, Total	0.61	mg/kg dry wt.	1	0.30	0.089		01/22/08 09:19 LIM
7440-22-4	Silver, Total	0.046	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 09:19
7440-28-0	Thallium, Total	0.18	mg/kg dry wt.	1	0.10	0.0049		01/23/08 09:52
7440-62-2	Vanadium, Total	16	mg/kg dry wt.	1	0.10	0.034		01/22/08 09:19 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB17A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/07/08 14:25
Solids: 85.86
Laboratory ID: 0801083-01

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.26	mg/kg dry wt.	1	0.20	0.042		01/21/08 14:48

01405

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB17B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/07/08 14:38
Solids: 85.20
Laboratory ID: 0801083-02

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	0.79	mg/kg dry wt.	1	0.20	0.071		01/22/08 09:22	LIM
7440-50-8	Copper, Total	8.1	mg/kg dry wt.	1	0.20	0.044		01/22/08 09:22	JS
7439-92-1	Lead, Total	17	mg/kg dry wt.	1	0.20	0.022		01/23/08 09:54	
7440-02-0	Nickel, Total	6.8	mg/kg dry wt.	1	0.10	0.036		01/22/08 09:22	JS
7782-49-2	Selenium, Total	0.092	mg/kg dry wt.	1	0.30	0.089	J	01/22/08 09:22	LIM
7440-22-4	Silver, Total	0.039	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 09:22	
7440-28-0	Thallium, Total	0.23	mg/kg dry wt.	1	0.10	0.0049		01/23/08 09:54	
7440-62-2	Vanadium, Total	20	mg/kg dry wt.	1	0.10	0.034		01/22/08 09:22	KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB17B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/07/08 14:38
Solids: 85.20
Laboratory ID: 0801083-02

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.15	mg/kg dry wt.	1	0.20	0.042	J	01/21/08 14:50

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB17C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 08:20
Solids: 77.70
Laboratory ID: 0801135-01

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	3.4	mg/kg dry wt.	2	0.40	0.14		01/22/08 12:29	LIM
7440-50-8	Copper, Total	14	mg/kg dry wt.	2	0.40	0.088		01/22/08 12:29	JIS
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022		01/23/08 09:56	
7440-02-0	Nickel, Total	12	mg/kg dry wt.	2	0.20	0.071		01/22/08 12:29	JIS
7782-49-2	Selenium, Total	0.22	mg/kg dry wt.	2	0.60	0.18	J	01/22/08 12:29	LIM
7440-22-4	Silver, Total	0.042	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 09:25	
7440-28-0	Thallium, Total	0.20	mg/kg dry wt.	1	0.10	0.0049		01/23/08 09:56	
7440-62-2	Vanadium, Total	67	mg/kg dry wt.	2	0.20	0.069		01/23/08 13:03	KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB17C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 08:20
Solids: 77.70
Laboratory ID: 0801135-01

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.17	mg/kg dry wt.	1	0.20	0.042	J	01/21/08 14:52

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB15A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 10:40
Solids: 86.55
Laboratory ID: 0801135-02

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.0	mg/kg dry wt.	1	0.20	0.071		01/22/08 09:28	LIM
7440-50-8	Copper, Total	8.0	mg/kg dry wt.	1	0.20	0.044		01/22/08 09:28	JLS
7439-92-1	Lead, Total	25	mg/kg dry wt.	1	0.20	0.022		01/23/08 09:59	
7440-02-0	Nickel, Total	5.8	mg/kg dry wt.	1	0.10	0.036		01/22/08 09:28	JLS
7782-49-2	Selenium, Total	0.34	mg/kg dry wt.	1	0.30	0.089		01/22/08 09:28	LIM
7440-22-4	Silver, Total	0.049	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 09:28	
7440-28-0	Thallium, Total	0.18	mg/kg dry wt.	1	0.10	0.0049		01/23/08 09:59	
7440-62-2	Vanadium, Total	23	mg/kg dry wt.	1	0.10	0.034		01/22/08 09:28	KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB15A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 10:40
Solids: 86.55
Laboratory ID: 0801135-02

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	1.2	mg/kg dry wt.	1	0.20	0.042		01/21/08 14:55

01411

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB15B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 10:50
Solids: 78.96
Laboratory ID: 0801135-03

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.0	mg/kg dry wt.	2	0.40	0.14		01/22/08 12:32	LIM
7440-50-8	Copper, Total	14	mg/kg dry wt.	2	0.40	0.088		01/22/08 12:32	JIS
7439-92-1	Lead, Total	12	mg/kg dry wt.	1	0.20	0.022		01/23/08 10:01	
7440-02-0	Nickel, Total	11	mg/kg dry wt.	2	0.20	0.071		01/22/08 12:32	JIS
7782-49-2	Selenium, Total	0.21	mg/kg dry wt.	2	0.60	0.18	J	01/22/08 12:32	LIM
7440-22-4	Silver, Total	0.041	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 09:31	
7440-28-0	Thallium, Total	0.31	mg/kg dry wt.	1	0.10	0.0049		01/23/08 10:01	
7440-62-2	Vanadium, Total	63	mg/kg dry wt.	2	0.20	0.069		01/23/08 13:05	KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB15B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 10:50
Solids: 78.96
Laboratory ID: 0801135-03

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.12	mg/kg dry wt.	1	0.20	0.042	J	01/21/08 14:57

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB15C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 11:40
Solids: 70.08
Laboratory ID: 0801135-04

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	3.1	mg/kg dry wt.	2	0.40	0.14		01/22/08 12:35	LIM
7440-50-8	Copper, Total	24	mg/kg dry wt.	2	0.40	0.088		01/22/08 12:35	J,S
7439-92-1	Lead, Total	10	mg/kg dry wt.	1	0.20	0.022		01/23/08 10:03	
7440-02-0	Nickel, Total	17	mg/kg dry wt.	2	0.20	0.071		01/22/08 12:35	J,S
7782-49-2	Selenium, Total	0.53	mg/kg dry wt.	2	0.60	0.18	J	01/22/08 12:35	LIM
7440-22-4	Silver, Total	0.065	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 09:34	
7440-28-0	Thallium, Total	0.14	mg/kg dry wt.	1	0.10	0.0049		01/23/08 10:03	
7440-62-2	Vanadium, Total	38	mg/kg dry wt.	1	0.10	0.034		01/23/08 12:58	KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB15C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 11:40
Solids: 70.08
Laboratory ID: 0801135-04

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.23	mg/kg dry wt.	1	0.20	0.042		01/21/08 14:59

01415

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 00:00
Solids: 85.56
Laboratory ID: 0801135-05

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.0	mg/kg dry wt.	1	0.20	0.071		01/22/08 09:37	LIM
7440-50-8	Copper, Total	8.9	mg/kg dry wt.	1	0.20	0.044		01/22/08 09:37	JLS
7439-92-1	Lead, Total	37	mg/kg dry wt.	1	0.20	0.022		01/23/08 10:05	
7440-02-0	Nickel, Total	6.0	mg/kg dry wt.	1	0.10	0.036		01/22/08 09:37	JLS
7782-49-2	Selenium, Total	0.39	mg/kg dry wt.	1	0.30	0.089		01/22/08 09:37	LIM
7440-22-4	Silver, Total	0.060	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 09:37	
7440-28-0	Thallium, Total	0.19	mg/kg dry wt.	1	0.10	0.0049		01/23/08 10:05	
7440-62-2	Vanadium, Total	19	mg/kg dry wt.	1	0.10	0.034		01/22/08 09:37	KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 00:00
Solids: 85.56
Laboratory ID: 0801135-05

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	1.4	mg/kg dry wt.	1	0.20	0.042		01/21/08 15:01

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/08/08 12:45
Solids: 0.00
Laboratory ID: 0801135-06

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 01/18/08 07:15
Initial/Final: 25 mL / 125 mL
QC Batch: 0800644

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.65	ug/L	1	3.0	0.44	J	01/23/08 11:20
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	01/22/08 17:39
7440-39-3	Barium, Total	2.0	ug/L	1	2.0	0.52	U	01/22/08 17:39
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	01/22/08 17:39
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	01/22/08 17:39
7440-47-3	Chromium, Total	0.87	ug/L	1	2.0	0.31	J	01/22/08 17:39 BIP
7440-48-4	Cobalt, Total	1.0	ug/L	1	1.0	0.096	U	01/22/08 17:39
7439-96-5	Manganese, Total	1.9	ug/L	1	3.0	0.43	J	01/22/08 17:39
7440-02-0	Nickel, Total	2.0	ug/L	1	2.0	0.28	U	01/22/08 17:39
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	01/22/08 17:39
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	01/22/08 17:39
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	01/22/08 17:39

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/08/08 12:45
Solids: 0.00
Laboratory ID: 0801135-06

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 01/23/08 09:00
Initial/Final: 25 mL / 125 mL
QC Batch: 0800833

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-50-8	Copper, Total	0.44	ug/L	1	1.0	0.33	J	01/23/08 19:54
7439-92-1	Lead, Total	0.41	ug/L	1	1.0	0.33	J	01/23/08 19:54
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	01/23/08 19:54
7440-66-6	Zinc, Total	15	ug/L	1	10	0.84		01/23/08 19:54

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB16A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 12:50
Solids: 80.00
Laboratory ID: 0801135-08

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	3.4	mg/kg dry wt.	1	0.20	0.071		01/22/08 09:39	LIM
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044		01/22/08 09:39	JLS
7439-92-1	Lead, Total	35	mg/kg dry wt.	1	0.20	0.022		01/23/08 10:07	
7440-02-0	Nickel, Total	11	mg/kg dry wt.	1	0.10	0.036		01/22/08 09:39	JLS
7782-49-2	Selenium, Total	0.75	mg/kg dry wt.	1	0.30	0.089		01/22/08 09:39	LIM
7440-22-4	Silver, Total	0.10	mg/kg dry wt.	1	0.10	0.013		01/22/08 09:39	
7440-28-0	Thallium, Total	0.28	mg/kg dry wt.	1	0.10	0.0049		01/23/08 10:07	
7440-62-2	Vanadium, Total	21	mg/kg dry wt.	1	0.10	0.034		01/22/08 09:39	KLM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB16A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 12:50
Solids: 80.00
Laboratory ID: 0801135-08

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.62	mg/kg dry wt.	1	0.20	0.042		01/21/08 15:03

: 01421

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB16B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 13:00
Solids: 76.59
Laboratory ID: 0801135-09

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.2	mg/kg dry wt.	1	0.20	0.071		01/22/08 10:54	LIM
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044		01/22/08 10:54	JIS
7439-92-1	Lead, Total	15	mg/kg dry wt.	1	0.20	0.022		01/23/08 10:14	
7440-02-0	Nickel, Total	10	mg/kg dry wt.	1	0.10	0.036		01/22/08 10:54	JIS
7782-49-2	Selenium, Total	0.24	mg/kg dry wt.	1	0.30	0.089	J	01/22/08 10:54	LIM
7440-22-4	Silver, Total	0.036	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 10:54	
7440-28-0	Thallium, Total	0.18	mg/kg dry wt.	1	0.10	0.0049		01/23/08 10:14	
7440-62-2	Vanadium, Total	28	mg/kg dry wt.	1	0.10	0.034		01/22/08 10:54	KIM

01422

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB16B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 13:00
Solids: 76.59
Laboratory ID: 0801135-09

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.31	mg/kg dry wt.	1	0.20	0.042		01/21/08 15:09

01423

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB16C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 15:20
Solids: 76.05
Laboratory ID: 0801135-10

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	7.2	mg/kg dry wt.	1	0.20	0.071		01/22/08 10:57	LIM
7440-50-8	Copper, Total	21	mg/kg dry wt.	1	0.20	0.044		01/22/08 10:57	JIS
7439-92-1	Lead, Total	14	mg/kg dry wt.	1	0.20	0.022		01/23/08 10:16	
7440-02-0	Nickel, Total	35	mg/kg dry wt.	1	0.10	0.036		01/22/08 10:57	JIS
7782-49-2	Selenium, Total	0.35	mg/kg dry wt.	1	0.30	0.089		01/22/08 10:57	LIM
7440-22-4	Silver, Total	0.13	mg/kg dry wt.	1	0.10	0.013		01/22/08 10:57	
7440-28-0	Thallium, Total	0.39	mg/kg dry wt.	1	0.10	0.0049		01/23/08 10:16	
7440-62-2	Vanadium, Total	41	mg/kg dry wt.	1	0.10	0.034		01/22/08 10:57	KIM

01424

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB16C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 15:20
Solids: 76.05
Laboratory ID: 0801135-10

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.31	mg/kg dry wt.	1	0.20	0.042		01/21/08 15:11

01425

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 15:35
Solids: 82.52
Laboratory ID: 0801135-11

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.2	mg/kg dry wt.	1	0.20	0.071		01/22/08 11:00	LIM
7440-50-8	Copper, Total	7.9	mg/kg dry wt.	1	0.20	0.044		01/22/08 11:00	JIS
7439-92-1	Lead, Total	16	mg/kg dry wt.	1	0.20	0.022		01/23/08 10:18	
7440-02-0	Nickel, Total	6.2	mg/kg dry wt.	1	0.10	0.036		01/22/08 11:00	JIS
7782-49-2	Selenium, Total	0.17	mg/kg dry wt.	1	0.30	0.089	J	01/22/08 11:00	LIM
7440-22-4	Silver, Total	0.065	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 11:00	
7440-28-0	Thallium, Total	0.24	mg/kg dry wt.	1	0.10	0.0049		01/23/08 10:18	
7440-62-2	Vanadium, Total	20	mg/kg dry wt.	1	0.10	0.034		01/22/08 11:00	KIM

01426

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 15:35
Solids: 82.52
Laboratory ID: 0801135-11

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.34	mg/kg dry wt.	1	0.20	0.042		01/21/08 15:13

01427

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 16:00
Solids: 70.27
Laboratory ID: 0801135-12

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	5.4	mg/kg dry wt.	1	0.20	0.071		01/22/08 11:03 LIM
7440-50-8	Copper, Total	19	mg/kg dry wt.	1	0.20	0.044		01/22/08 11:03 JIS
7439-92-1	Lead, Total	10	mg/kg dry wt.	1	0.20	0.022		01/23/08 10:20
7440-02-0	Nickel, Total	15	mg/kg dry wt.	1	0.10	0.036		01/22/08 11:03 JIS
7782-49-2	Selenium, Total	0.33	mg/kg dry wt.	1	0.30	0.089		01/22/08 11:03 LIM
7440-22-4	Silver, Total	0.066	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 11:03
7440-28-0	Thallium, Total	0.22	mg/kg dry wt.	1	0.10	0.0049		01/23/08 10:20
7440-62-2	Vanadium, Total	33	mg/kg dry wt.	1	0.10	0.034		01/22/08 11:03 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 16:00
Solids: 70.27
Laboratory ID: 0801135-12

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.23	mg/kg dry wt.	1	0.20	0.042		01/21/08 15:15

01429

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 16:45
Solids: 77.00
Laboratory ID: 0801135-13

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800485

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.7	mg/kg dry wt.	1	0.20	0.071		01/22/08 11:06	LIM
7440-50-8	Copper, Total	22	mg/kg dry wt.	1	0.20	0.044		01/22/08 11:06	JS
7439-92-1	Lead, Total	3.4	mg/kg dry wt.	1	0.20	0.022		01/23/08 10:22	
7440-02-0	Nickel, Total	18	mg/kg dry wt.	1	0.10	0.036		01/22/08 11:06	JS
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	J	01/22/08 11:06	LIM
7440-22-4	Silver, Total	0.045	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 11:06	
7440-28-0	Thallium, Total	0.055	mg/kg dry wt.	1	0.10	0.0049	J	01/23/08 10:22	
7440-62-2	Vanadium, Total	16	mg/kg dry wt.	1	0.10	0.034		01/22/08 11:06	LIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 16:45
Solids: 77.00
Laboratory ID: 0801135-13

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 11:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800494

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.057	mg/kg dry wt.	1	0.20	0.042	J	01/21/08 15:17

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB11A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 07:48
Solids: 84.02
Laboratory ID: 0801212-01

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.19	mg/kg dry wt.	1	0.20	0.042	J	01/21/08 16:10

INORGANIC ANALYSIS DATA SHEET

USEPA-6020A

57SB11A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 07:48
Solids: 84.02
Laboratory ID: 0801212-01

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.4997 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	0.77	mg/kg dry wt.	1	0.20	0.071		01/24/08 08:39	L, m
7440-50-8	Copper, Total	7.7	mg/kg dry wt.	1	0.20	0.044		01/24/08 08:39	J, S
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022		01/24/08 08:39	
7440-02-0	Nickel, Total	6.7	mg/kg dry wt.	1	0.10	0.036		01/24/08 08:39	J, S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 08:39	UL, m
7440-22-4	Silver, Total	0.039	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 08:39	
7440-28-0	Thallium, Total	0.22	mg/kg dry wt.	1	0.10	0.0049		01/24/08 08:39	
7440-62-2	Vanadium, Total	26	mg/kg dry wt.	1	0.10	0.034		01/24/08 08:39	K, m

: 01433

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB11B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 07:55
Solids: 83.53
Laboratory ID: 0801212-02

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.15	mg/kg dry wt.	1	0.20	0.042	J	01/21/08 16:12

: 01434

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB11B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 07:55
Solids: 83.53
Laboratory ID: 0801212-02

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.1	mg/kg dry wt.	1	0.20	0.071		01/24/08 08:42	L,m
7440-50-8	Copper, Total	9.7	mg/kg dry wt.	1	0.20	0.044		01/24/08 08:42	J,S
7439-92-1	Lead, Total	16	mg/kg dry wt.	1	0.20	0.022		01/24/08 08:42	
7440-02-0	Nickel, Total	6.2	mg/kg dry wt.	1	0.10	0.036		01/24/08 08:42	J,S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 08:42	UL,m
7440-22-4	Silver, Total	0.054	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 08:42	
7440-28-0	Thallium, Total	0.23	mg/kg dry wt.	1	0.10	0.0049		01/24/08 08:42	
7440-62-2	Vanadium, Total	19	mg/kg dry wt.	1	0.10	0.034		01/24/08 08:42	K,m

01435

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB11C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 10:30
Solids: 75.60
Laboratory ID: 0801212-03

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.22	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:15

01436

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB11C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 10:30
Solids: 75.60
Laboratory ID: 0801212-03

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.4995 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.6	mg/kg dry wt.	1	0.20	0.071		01/24/08 08:45	L,M
7440-50-8	Copper, Total	29	mg/kg dry wt.	1	0.20	0.044		01/24/08 08:45	J,S
7439-92-1	Lead, Total	16	mg/kg dry wt.	1	0.20	0.022		01/24/08 08:45	
7440-02-0	Nickel, Total	23	mg/kg dry wt.	1	0.10	0.036		01/24/08 08:45	J,S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 08:45	U,L,M
7440-22-4	Silver, Total	0.077	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 08:45	
7440-28-0	Thallium, Total	0.26	mg/kg dry wt.	1	0.10	0.0049		01/24/08 08:45	
7440-62-2	Vanadium, Total	46	mg/kg dry wt.	1	0.10	0.034		01/24/08 08:45	K,M

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:30
Solids: 83.29
Laboratory ID: 0801212-04

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.42	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:17

: 01438

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:30
Solids: 83.29
Laboratory ID: 0801212-04

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.4997 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.3	mg/kg dry wt.	1	0.20	0.071		01/24/08 08:48	LIM
7440-50-8	Copper, Total	10	mg/kg dry wt.	1	0.20	0.044		01/24/08 08:48	JIS
7439-92-1	Lead, Total	15	mg/kg dry wt.	1	0.20	0.022		01/24/08 08:48	
7440-02-0	Nickel, Total	7.8	mg/kg dry wt.	1	0.10	0.036		01/24/08 08:48	JIS
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 08:48	ULIM
7440-22-4	Silver, Total	0.071	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 08:48	
7440-28-0	Thallium, Total	0.28	mg/kg dry wt.	1	0.10	0.0049		01/24/08 08:48	
7440-62-2	Vanadium, Total	29	mg/kg dry wt.	1	0.10	0.034		01/24/08 08:48	KIM

01439

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB2AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 09:56
Solids: 75.24
Laboratory ID: 0801212-05

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	14	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:19

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB2AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 09:56
Solids: 75.24
Laboratory ID: 0801212-05

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.4996 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	3.6	mg/kg dry wt.	1	0.20	0.071		01/24/08 08:51 LIM
7440-50-8	Copper, Total	17	mg/kg dry wt.	1	0.20	0.044		01/24/08 08:51 JIS
7439-92-1	Lead, Total	50	mg/kg dry wt.	5	1.0	0.11		01/24/08 11:54
7440-02-0	Nickel, Total	11	mg/kg dry wt.	1	0.10	0.036		01/24/08 08:51 JIS
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 08:51 ULIM
7440-22-4	Silver, Total	0.067	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 08:51
7440-28-0	Thallium, Total	0.29	mg/kg dry wt.	1	0.10	0.0049		01/24/08 08:51
7440-62-2	Vanadium, Total	130	mg/kg dry wt.	5	0.50	0.17		01/24/08 11:54 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB12A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:00
Solids: 83.95
Laboratory ID: 0801212-06

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.54	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:25

01442

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB12A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:00
Solids: 83.95
Laboratory ID: 0801212-06

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	3.4	mg/kg dry wt.	1	0.20	0.071		01/24/08 08:54 LIM
7440-50-8	Copper, Total	8.9	mg/kg dry wt.	1	0.20	0.044		01/24/08 08:54 JLS
7439-92-1	Lead, Total	18	mg/kg dry wt.	1	0.20	0.022		01/24/08 08:54
7440-02-0	Nickel, Total	5.5	mg/kg dry wt.	1	0.10	0.036		01/24/08 08:54 JLS
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 08:54 ULIM
7440-22-4	Silver, Total	0.033	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 08:54
7440-28-0	Thallium, Total	0.25	mg/kg dry wt.	1	0.10	0.0049		01/24/08 08:54
7440-62-2	Vanadium, Total	28	mg/kg dry wt.	1	0.10	0.034		01/24/08 08:54 KLM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB12B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:20
Solids: 84.20
Laboratory ID: 0801212-07

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.096	mg/kg dry wt.	1	0.20	0.042	J	01/21/08 16:35

014494

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB12B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:20
Solids: 84.20
Laboratory ID: 0801212-07

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	0.82	mg/kg dry wt.	1	0.20	0.071		01/24/08 09:21 L1M
7440-50-8	Copper, Total	10	mg/kg dry wt.	1	0.20	0.044		01/24/08 09:21 J,S
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022		01/24/08 09:21
7440-02-0	Nickel, Total	6.8	mg/kg dry wt.	1	0.10	0.036		01/24/08 09:21 J,S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 09:21 U L1M
7440-22-4	Silver, Total	0.014	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 09:21
7440-28-0	Thallium, Total	0.14	mg/kg dry wt.	1	0.10	0.0049		01/24/08 09:21
7440-62-2	Vanadium, Total	17	mg/kg dry wt.	1	0.10	0.034		01/24/08 09:21 K 1M

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB12C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 12:00
Solids: 77.36
Laboratory ID: 0801212-08

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.25	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:37

01446

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB12C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 12:00
Solids: 77.36
Laboratory ID: 0801212-08

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	6.1	mg/kg dry wt.	1	0.20	0.071		01/24/08 09:24 L, M
7440-50-8	Copper, Total	33	mg/kg dry wt.	1	0.20	0.044		01/24/08 09:24 J, S
7439-92-1	Lead, Total	12	mg/kg dry wt.	1	0.20	0.022		01/24/08 09:24
7440-02-0	Nickel, Total	33	mg/kg dry wt.	1	0.10	0.036		01/24/08 09:24 J, S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 09:24 U, L, M
7440-22-4	Silver, Total	0.079	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 09:24
7440-28-0	Thallium, Total	0.24	mg/kg dry wt.	1	0.10	0.0049		01/24/08 09:24
7440-62-2	Vanadium, Total	29	mg/kg dry wt.	1	0.10	0.034		01/24/08 09:24 K, M

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/09/08 15:25
Solids: 0.00
Laboratory ID: 0801212-09

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 01/18/08 07:15
Initial/Final: 25 mL / 125 mL
QC Batch: 0800644

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	01/23/08 11:30
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	01/22/08 17:51
7440-39-3	Barium, Total	2.0	ug/L	1	2.0	0.52	U	01/22/08 17:51
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	01/22/08 17:51
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	01/22/08 17:51
7440-47-3	Chromium, Total	0.80	ug/L	1	2.0	0.31	J	01/22/08 17:51 BR
7440-48-4	Cobalt, Total	1.0	ug/L	1	1.0	0.096	U	01/22/08 17:51
7439-96-5	Manganese, Total	4.2	ug/L	1	3.0	0.43		01/22/08 17:51
7440-02-0	Nickel, Total	0.40	ug/L	1	2.0	0.28	J	01/22/08 17:51
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	01/22/08 17:51
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	01/22/08 17:51
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	01/22/08 17:51

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/09/08 15:25
Solids: 0.00
Laboratory ID: 0801212-09

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 01/23/08 09:00
Initial/Final: 25 mL / 125 mL
QC Batch: 0800833

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-50-8	Copper, Total	0.36	ug/L	1	1.0	0.33	J	01/23/08 19:57
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	01/23/08 19:57
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	01/23/08 19:57
7440-66-6	Zinc, Total	13	ug/L	1	10	0.84		01/23/08 19:57

01449

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB18A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 13:05
Solids: 78.61
Laboratory ID: 0801212-11

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	87	mg/kg dry wt.	5	1.0	0.21		01/21/08 18:32

01450

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB18A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 13:05
Solids: 78.61
Laboratory ID: 0801212-11

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	3.6	mg/kg dry wt.	1	0.20	0.071		01/24/08 09:27 LIM
7440-50-8	Copper, Total	19	mg/kg dry wt.	1	0.20	0.044		01/24/08 09:27 JLS
7439-92-1	Lead, Total	96	mg/kg dry wt.	5	1.0	0.11		01/24/08 12:09
7440-02-0	Nickel, Total	10	mg/kg dry wt.	1	0.10	0.036		01/24/08 09:27 JLS
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 09:27 ULM
7440-22-4	Silver, Total	0.074	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 09:27
7440-28-0	Thallium, Total	0.28	mg/kg dry wt.	1	0.10	0.0049		01/24/08 09:27
7440-62-2	Vanadium, Total	130	mg/kg dry wt.	5	0.50	0.17		01/24/08 12:09 KLM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB18B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 13:15
Solids: 78.45
Laboratory ID: 0801212-12

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.27	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:42

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB18B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 13:15
Solids: 78.45
Laboratory ID: 0801212-12

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	0.88	mg/kg dry wt.	1	0.20	0.071		01/24/08 09:29 LIM
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044		01/24/08 09:29 JIS
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022		01/24/08 09:29
7440-02-0	Nickel, Total	10	mg/kg dry wt.	1	0.10	0.036		01/24/08 09:29 JIS
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 09:29 ULIM
7440-22-4	Silver, Total	0.018	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 09:29
7440-28-0	Thallium, Total	0.16	mg/kg dry wt.	1	0.10	0.0049		01/24/08 09:29
7440-62-2	Vanadium, Total	24	mg/kg dry wt.	1	0.10	0.034		01/24/08 09:29 KLIM

01453

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB18C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 13:38
Solids: 69.92
Laboratory ID: 0801212-13

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	2.7	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:44

014454

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB18C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 13:38
Solids: 69.92
Laboratory ID: 0801212-13

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	5.0	mg/kg dry wt.	1	0.20	0.071		01/24/08 09:32 LIM
7440-50-8	Copper, Total	22	mg/kg dry wt.	1	0.20	0.044		01/24/08 09:32 JLS
7439-92-1	Lead, Total	16	mg/kg dry wt.	1	0.20	0.022		01/24/08 09:32
7440-02-0	Nickel, Total	21	mg/kg dry wt.	1	0.10	0.036		01/24/08 09:32 JLS
7782-49-2	Selenium, Total	0.20	mg/kg dry wt.	1	0.30	0.089	J	01/24/08 09:32 LIM
7440-22-4	Silver, Total	0.071	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 09:32
7440-28-0	Thallium, Total	0.22	mg/kg dry wt.	1	0.10	0.0049		01/24/08 09:32
7440-62-2	Vanadium, Total	39	mg/kg dry wt.	1	0.10	0.034		01/24/08 09:32 LIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB13A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 14:19
Solids: 83.07
Laboratory ID: 0801212-14

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.4996 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.47	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:50

01456

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB13A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 14:19
Solids: 83.07
Laboratory ID: 0801212-14

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.4997 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	6.6	mg/kg dry wt.	1	0.20	0.071		01/24/08 09:35 L IM
7440-50-8	Copper, Total	7.2	mg/kg dry wt.	1	0.20	0.044		01/24/08 09:35 J LS
7439-92-1	Lead, Total	22	mg/kg dry wt.	1	0.20	0.022		01/24/08 09:35
7440-02-0	Nickel, Total	8.5	mg/kg dry wt.	1	0.10	0.036		01/24/08 09:35 J LS
7782-49-2	Selenium, Total	0.35	mg/kg dry wt.	1	0.30	0.089		01/24/08 09:35 L IM
7440-22-4	Silver, Total	0.051	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 09:35
7440-28-0	Thallium, Total	0.26	mg/kg dry wt.	1	0.10	0.0049		01/24/08 09:35
7440-62-2	Vanadium, Total	25	mg/kg dry wt.	1	0.10	0.034		01/24/08 09:35 K IM

014457

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB13B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 14:30
Solids: 80.83
Laboratory ID: 0801212-15

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.27	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:52

: 01458

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB13B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 14:30
Solids: 80.83
Laboratory ID: 0801212-15

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.4997 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.9	mg/kg dry wt.	1	0.20	0.071		01/24/08 09:38 LIM
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044		01/24/08 09:38 JS
7439-92-1	Lead, Total	14	mg/kg dry wt.	1	0.20	0.022		01/24/08 09:38
7440-02-0	Nickel, Total	8.5	mg/kg dry wt.	1	0.10	0.036		01/24/08 09:38 JS
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 09:38 ULIM
7440-22-4	Silver, Total	0.026	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 09:38
7440-28-0	Thallium, Total	0.21	mg/kg dry wt.	1	0.10	0.0049		01/24/08 09:38
7440-62-2	Vanadium, Total	23	mg/kg dry wt.	1	0.10	0.034		01/24/08 09:38 KLM

01459

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB13C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:10
Solids: 72.18
Laboratory ID: 0801212-16

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.57	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:54

01460

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB13C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:10
Solids: 72.18
Laboratory ID: 0801212-16

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	6.1	mg/kg dry wt.	1	0.20	0.071		01/24/08 09:41 LIM
7440-50-8	Copper, Total	23	mg/kg dry wt.	1	0.20	0.044		01/24/08 09:41 JLS
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022		01/24/08 09:41
7440-02-0	Nickel, Total	28	mg/kg dry wt.	1	0.10	0.036		01/24/08 09:41 JLS
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 09:41 ULIM
7440-22-4	Silver, Total	0.072	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 09:41
7440-28-0	Thallium, Total	0.28	mg/kg dry wt.	1	0.10	0.0049		01/24/08 09:41
7440-62-2	Vanadium, Total	34	mg/kg dry wt.	1	0.10	0.034		01/24/08 09:41 KIM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:00
Solids: 83.09
Laboratory ID: 0801212-17

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.46	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:56

: 01462

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:00
Solids: 83.09
Laboratory ID: 0801212-17

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.4997 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	7.1	mg/kg dry wt.	1	0.20	0.071		01/24/08 09:50 LIM
7440-50-8	Copper, Total	6.9	mg/kg dry wt.	1	0.20	0.044		01/24/08 09:50 JS
7439-92-1	Lead, Total	21	mg/kg dry wt.	1	0.20	0.022		01/24/08 09:50
7440-02-0	Nickel, Total	8.6	mg/kg dry wt.	1	0.10	0.036		01/24/08 09:50 JS
7782-49-2	Selenium, Total	0.50	mg/kg dry wt.	1	0.30	0.089		01/24/08 09:50 LIM
7440-22-4	Silver, Total	0.051	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 09:50
7440-28-0	Thallium, Total	0.25	mg/kg dry wt.	1	0.10	0.0049		01/24/08 09:50
7440-62-2	Vanadium, Total	26	mg/kg dry wt.	1	0.10	0.034		01/24/08 09:50 LIM

01463

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB19A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:30
Solids: 88.35
Laboratory ID: 0801212-18

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	33	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:59

01464

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB19A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:30
Solids: 88.35
Laboratory ID: 0801212-18

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	3.8	mg/kg dry wt.	1	0.20	0.071		01/24/08 09:53	L,m
7440-50-8	Copper, Total	17	mg/kg dry wt.	1	0.20	0.044		01/24/08 09:53	J,S
7439-92-1	Lead, Total	49	mg/kg dry wt.	1	0.20	0.022		01/24/08 09:53	
7440-02-0	Nickel, Total	10	mg/kg dry wt.	1	0.10	0.036		01/24/08 09:53	J,S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 09:53	UL,M
7440-22-4	Silver, Total	0.049	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 09:53	
7440-28-0	Thallium, Total	0.33	mg/kg dry wt.	1	0.10	0.0049		01/24/08 09:53	
7440-62-2	Vanadium, Total	58	mg/kg dry wt.	2	0.20	0.069		01/24/08 12:11	K,M

01465

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB19B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:40
Solids: 82.89
Laboratory ID: 0801212-19

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.61	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:01

01466

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB19B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:40
Solids: 82.89
Laboratory ID: 0801212-19

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	3.2	mg/kg dry wt.	1	0.20	0.071		01/24/08 09:56 LIM
7440-50-8	Copper, Total	11	mg/kg dry wt.	1	0.20	0.044		01/24/08 09:56 JS
7439-92-1	Lead, Total	12	mg/kg dry wt.	1	0.20	0.022		01/24/08 09:56
7440-02-0	Nickel, Total	10	mg/kg dry wt.	1	0.10	0.036		01/24/08 09:56 JS
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 09:56 ULM
7440-22-4	Silver, Total	0.015	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 09:56
7440-28-0	Thallium, Total	0.14	mg/kg dry wt.	1	0.10	0.0049		01/24/08 09:56
7440-62-2	Vanadium, Total	25	mg/kg dry wt.	1	0.10	0.034		01/24/08 09:56 KLM

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB19C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 16:05
Solids: 73.03
Laboratory ID: 0801212-20

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 09:00
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800552

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	2.2	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:03

01458

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB19C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 16:05
Solids: 73.03
Laboratory ID: 0801212-20

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 07:35
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0800608

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	6.2	mg/kg dry wt.	1	0.20	0.071		01/24/08 09:59 LIM
7440-50-8	Copper, Total	20	mg/kg dry wt.	1	0.20	0.044		01/24/08 09:59 JLS
7439-92-1	Lead, Total	12	mg/kg dry wt.	1	0.20	0.022		01/24/08 09:59
7440-02-0	Nickel, Total	30	mg/kg dry wt.	1	0.10	0.036		01/24/08 09:59 JLS
7782-49-2	Selenium, Total	0.29	mg/kg dry wt.	1	0.30	0.089	J	01/24/08 09:59 LIM
7440-22-4	Silver, Total	0.074	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 09:59
7440-28-0	Thallium, Total	0.26	mg/kg dry wt.	1	0.10	0.0049		01/24/08 09:59
7440-62-2	Vanadium, Total	25	mg/kg dry wt.	1	0.10	0.034		01/24/08 09:59 LIM

SAMPLE ID SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-46

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
EQBK-1	0801135-06
EQBK-2	0801212-09

02319

INORGANIC ANALYSIS DATA SHEET

USEPA-7470A

EQBK-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/08/08 12:45
Solids: 0.00
Laboratory ID: 0801135-06

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A Digestion - Total
Prepared: 01/21/08 14:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0800695

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.050	ug/L	1	0.20	0.046	J	01/22/08 16:32

02326

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

EQBK-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/09/08 15:25
Solids: 0.00
Laboratory ID: 0801212-09

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A Digestion - Total
Prepared: 01/21/08 14:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0800695

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	01/22/08 16:38

02321

SAMPLE ID SUMMARY

USEPA-7471A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-46

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB17A	0801083-01
57SB17B	0801083-02
57SB17C	0801135-01
57SB15A	0801135-02
57SB15B	0801135-03
57SB15C	0801135-04
DUP-1	0801135-05
57SB16A	0801135-08
57SB16B	0801135-09
57SB16C	0801135-10
57SB10A	0801135-11
57SB10B	0801135-12
57SB10C	0801135-13
57SB11A	0801212-01
57SB11B	0801212-02
57SB11C	0801212-03
DUP-2	0801212-04
57SB2AB	0801212-05
57SB12A	0801212-06
57SB12B	0801212-07
57SB12C	0801212-08
57SB18A	0801212-11
57SB18B	0801212-12
57SB18C	0801212-13
57SB13A	0801212-14
57SB13B	0801212-15
57SB13C	0801212-16
DUP-3	0801212-17
57SB19A	0801212-18
57SB19B	0801212-19
57SB19C	0801212-20

: 02352

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB17A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/07/08 14:25
Solids: 85.86
Laboratory ID: 0801083-01

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/15/08 14:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.038	mg/kg dry wt.	1	0.050	0.0075	J	01/16/08 14:00

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB17B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/07/08 14:38
Solids: 85.20
Laboratory ID: 0801083-02

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/15/08 14:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.081	mg/kg dry wt.	1	0.050	0.0075		01/16/08 14:05

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB17C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 08:20
Solids: 77.70
Laboratory ID: 0801135-01

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/15/08 14:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.038	mg/kg dry wt.	1	0.050	0.0075	J	01/16/08 14:10

02355

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB15A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 10:40
Solids: 86.55
Laboratory ID: 0801135-02

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/15/08 14:00
Initial/Final: 0.2996 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.060	mg/kg dry wt.	1	0.050	0.0075		01/16/08 14:16

02356

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB15B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 10:50
Solids: 78.96
Laboratory ID: 0801135-03

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/15/08 14:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.068	mg/kg dry wt.	1	0.050	0.0075		01/16/08 14:21

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB15C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 11:40
Solids: 70.08
Laboratory ID: 0801135-04

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestic
Prepared: 01/15/08 14:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.048	mg/kg dry wt.	1	0.050	0.0075	J	01/16/08 14:26

02358

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 00:00
Solids: 85.56
Laboratory ID: 0801135-05

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/15/08 14:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.080	mg/kg dry wt.	1	0.050	0.0075		01/16/08 14:31

02359

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB16A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 12:50
Solids: 80.00
Laboratory ID: 0801135-08

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/15/08 14:00
Initial/Final: 0.3004 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.10	mg/kg dry wt.	1	0.050	0.0075		01/16/08 14:56

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB16B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 13:00
Solids: 76.59
Laboratory ID: 0801135-09

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/15/08 14:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.047	mg/kg dry wt.	1	0.050	0.0075	J	01/16/08 15:01

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB16C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 15:20
Solids: 76.05
Laboratory ID: 0801135-10

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/15/08 14:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.031	mg/kg dry wt.	1	0.050	0.0075	J	01/16/08 15:07

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 15:35
Solids: 82.52
Laboratory ID: 0801135-11

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/15/08 14:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.046	mg/kg dry wt.	1	0.050	0.0075	J	01/16/08 15:12

02363

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 16:00
Solids: 70.27
Laboratory ID: 0801135-12

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/15/08 14:00
Initial/Final: 0.2998 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.050	mg/kg dry wt.	1	0.050	0.0075		01/16/08 15:17

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/08/08 16:45
Solids: 77.00
Laboratory ID: 0801135-13

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/15/08 14:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0800493

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.024	mg/kg dry wt.	1	0.050	0.0075	J	01/16/08 15:22

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB11A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 07:48
Solids: 84.02
Laboratory ID: 0801212-01

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.067	mg/kg dry wt.	1	0.050	0.0075		01/17/08 09:31

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB11B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 07:55
Solids: 83.53
Laboratory ID: 0801212-02

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.087	mg/kg dry wt.	1	0.050	0.0075		01/17/08 09:36

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB11C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 10:30
Solids: 75.60
Laboratory ID: 0801212-03

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.050	mg/kg dry wt.	1	0.050	0.0075	U	01/17/08 09:41

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:30
Solids: 83.29
Laboratory ID: 0801212-04

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.2998 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.070	mg/kg dry wt.	1	0.050	0.0075		01/17/08 09:46

02369

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB2AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 09:56
Solids: 75.24
Laboratory ID: 0801212-05

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestic
Prepared: 01/16/08 15:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.18	mg/kg dry wt.	1	0.050	0.0075		01/17/08 10:01

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB12A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:00
Solids: 83.95
Laboratory ID: 0801212-06

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.17	mg/kg dry wt.	1	0.050	0.0075		01/17/08 10:06

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB12B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:20
Solids: 84.20
Laboratory ID: 0801212-07

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestic
Prepared: 01/16/08 15:00
Initial/Final: 0.2997 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.032	mg/kg dry wt.	1	0.050	0.0075	J	01/17/08 10:22

: 023172

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB12C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 12:00
Solids: 77.36
Laboratory ID: 0801212-08

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.019	mg/kg dry wt.	1	0.050	0.0075	J	01/17/08 10:26

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB18A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 13:05
Solids: 78.61
Laboratory ID: 0801212-11

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.10	mg/kg dry wt.	1	0.050	0.0075		01/17/08 10:31

02374

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB18B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 13:15
Solids: 78.45
Laboratory ID: 0801212-12

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestic
Prepared: 01/16/08 15:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.034	mg/kg dry wt.	1	0.050	0.0075	J	01/17/08 10:36

02375

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB18C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 13:38
Solids: 69.92
Laboratory ID: 0801212-13

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.055	mg/kg dry wt.	1	0.050	0.0075		01/17/08 10:41

02376

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB13A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 14:19
Solids: 83.07
Laboratory ID: 0801212-14

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.042	mg/kg dry wt.	1	0.050	0.0075	J	01/17/08 10:46

02377

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB13B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 14:30
Solids: 80.83
Laboratory ID: 0801212-15

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.2998 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.042	mg/kg dry wt.	1	0.050	0.0075	J	01/17/08 11:05

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB13C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:10
Solids: 72.18
Laboratory ID: 0801212-16

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.2998 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.084	mg/kg dry wt.	1	0.050	0.0075		01/17/08 11:10

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:00
Solids: 83.09
Laboratory ID: 0801212-17

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.039	mg/kg dry wt.	1	0.050	0.0075	J	01/17/08 11:15

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB19A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:30
Solids: 88.35
Laboratory ID: 0801212-18

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.11	mg/kg dry wt.	1	0.050	0.0075		01/17/08 11:20

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB19B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 15:40
Solids: 82.89
Laboratory ID: 0801212-19

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.2995 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.030	mg/kg dry wt.	1	0.050	0.0075	J	01/17/08 11:25

02382

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB19C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 16:05
Solids: 73.03
Laboratory ID: 0801212-20

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0800546

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.066	mg/kg dry wt.	1	0.050	0.0075		01/17/08 11:30

02383

SAMPLE ID SUMMARY

MSA 29-3.5.2

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-46

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB12A	0801212-06

02440

INORGANIC ANALYSIS DATA SHEET
MSA 29-3.5.2

57SB12A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/09/08 11:00
Solids: 83.95
Laboratory ID: 0801212-06

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: Method-Specific Prepara
Prepared: 01/23/08 09:00
Initial/Final: 1.18 g / 1.18 mL
QC Batch: 0800885

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-44-0	Carbon, Total Organic	0.23	%	1	0.10	0.047		01/23/08 09:00

02442

DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: RA
Date: 2/14/08
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford 157
Project Number: 116056421.30000
Laboratory: TriMatrix
SDG No.: 30440-46
Test Name: VOC
Method No.: 8260B

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".		✓	
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Were samples preserved on ice for soils and on ice with HCL for aqueous samples?	✓		
2.2	Have any technical holding times (14 days), determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-).	✓	✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		✓	

Notes: 57SB11A and 57SB11B were received at the lab after 46 hr encore had expired. L/UL/h

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (every 12 hour period per GCMS, matrix, and level)?	✓		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample]≤ 5X[associated blank]. (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone)	✓		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	✓		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	✓		

Notes: one soil MB 1,4-DCB 8.5 ug/kg, MC13 16 ug/kg ↓ND ↓<10X B/Z in ap sample.
Aqueous MB → acetone 1.68 ug/L <10X, B/Z in Trip & EBs
EQBK-1 1/8/08 MC13 0.51, toluene 0.08 ug/L
Trip Blank 1/8/08 MC13 0.69 ug/L, toluene 0.15 ug/L
EQBK-2, 1/9/08 MC13 0.46, toluene 0.08 ug/L
Trip Blank 1/9/08 MC13 0.69, toluene 0.16 ug/L
and MC13 result <10X → B/U in ap. sample. Toluene all NDs ✓

URS

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve?Are at least five standards included in the calibration curve?	✓		
4.2	Was an initial calibration analyzed at the beginning of each analysis?	✓		
4.3	Was a second source calibration verification analyzed for each calibration curve?	✓		
4.4	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	✓		
4.5	Are all calibration standard %RSDs, correlation coefficient, or % drift within the control limits (%RSD <15%, r>0.995 or r^2>0.99; for 2° source: %D<+20%; and for CCC, %D < 20%)?		✓	
For initial calibration: %RSD > 15%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>20% J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				
4.6	Are any CCCs (chloroform, 1,1-DCE, 1,2-DCPA, ethylbenzene, toluene, and vinyl chloride) displaying an RSD greater than 30%? If yes, L(+)/R(-) all associated results.		✓	
4.7	Do any SPCC have an RRF low? (<0.10 for chloromethane, 1,1-dichloroethane, and bromoform or <0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane) If yes, L(+)/R(-) all associated results.		✓	

Notes: [illegible]

See attached

J/UJ/R unless Prev. flagged for lit anomaly.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	✓		
5.2	Have all samples been analyzed within twelve hours of the BFB tune? If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".	✓		
5.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag "R".	✓		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?		✓	
6.2	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?		✓	
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm			
6.3	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/		✓	
	1 or more <10% / 1 high/low / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / J / L / K Non-detects: R / UJ / UJ / UJ / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes: 575B16A 4-bromofluorobenzene 84% <85% J/UJ's unless prev for calibration

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes: MS/MSD for 575B12A and or RPD >QC acetone 246%, 73% RPD, chloroform 128%, 1,2-dibromo-3-Chloroprop 1,2-dichloropropane, isopropylbenzene, methyl tert-butyl ether 1,1,2-trichloroethane, trichlorofluoromethane, 2-butanone RPD>QC → Jid in parent. <RC methyl acetate, styrene ↓J/m ↓UJ/m in parent

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are %R for LCS/LCSD recoveries outside the QC limits? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).		✓	
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.			✓

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within +100% or -50% of the mid point calibration standard? If not, J(+)/UJ(-).		✓	
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	✓		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes: 575B16A 1,4-dichlorobenzene-d4 <50% at 45%.
all prev. flagged for surr failure. ND more action.

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	✓		
	For sample results > 5 x RL, use 50% RPD. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 x RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV	✓		

Notes:

575B15A	RL	& DUP-1	RPD	
acetone	94	23	110	16% ✓
methyl acetate	4.2	23	5.5	OKV OK
MEK	11	23	15	OKV
Carbon disulfide	ND	5.8	0.36	OKV

575B11A	RL	DUP-2	RPD
acetone	64	24	87	OKV
methyl acetate	4.6	24	3.5	OKV
MEK	9.2	24	ND	OKV

Also see cust@hod

11.0 Detection Limit Verification		Yes	No	NA
11.1	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	✓		
11.2	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated		✓	

Notes: acetone TE in 575B17A, 575B16A → J/q

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
12.1.1	Number of samples:			
12.1.2	Number of target compounds in each analysis:			
12.1.3	Number of results rejected and not reported:			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100%			

Notes:

VOCs DOPs (Cont.)

	575B13A	&	DUP-3	RL	RPD
acetone	150		160	24	6% OKV
Methyl Acetate	6.9		9.9	24	OKV
MEK	15		17	24	OKV

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Volatile Organic Compounds by EPA Method 8260B

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8260B

Sample/Analyte:			
	0801212-06	57SB12A	1,1,2,2-Tetrachloroethane
	0801212-06	57SB12A	Acetone
	0801212-06	57SB12A	Methyl Acetate
	0801212-06	57SB12A	Styrene

Qualification: The RPD between the MS and MSD results exceeded the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8260B

Sample/Analyte:			
	0801212-06	57SB12A	2-Butanone (MEK)
	0801212-06	57SB12A	Acetone
	0801212-06	57SB12A	Methyl Acetate
	0801212-06	57SB12A	Trichlorofluoromethane

Qualification: The MS or MSD recovery, but not both, was outside the control limit. The RPD is within the control limit. The unspiked sample result is considered estimated.

Analysis: USEPA-8260B

Sample/Analyte:			
	0801212-06	57SB12A	1,1,2-Trichloroethane
	0801212-06	57SB12A	1,2-Dibromo-3-chloropropane
	0801212-06	57SB12A	1,2-Dibromoethane
	0801212-06	57SB12A	1,2-Dichlorobenzene
	0801212-06	57SB12A	1,2-Dichloropropane
	0801212-06	57SB12A	Chloroform
	0801212-06	57SB12A	Isopropylbenzene
	0801212-06	57SB12A	Methyl tert-Butyl Ether

Qualification: Concentration exceeds calibration range

Analysis: USEPA-8260B

Sample/Analyte:			
	0801083-01	57SB17A	Acetone
	0801135-08	57SB16A	Acetone

Qualification: Sample integrity for the parameter was suspect upon receipt and the EPA hold time for analysis was exceeded. All reported values, including non-detectable results, are considered estimated.

Analysis: USEPA-8260B

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Individual sample results relate only to the sample tested.
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SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Volatile Organic Compounds by EPA Method 8260B

Sample/Analyte:	0801212-01 57SB11A 0801212-02 57SB11B
Qualification:	Duplicate analysis reported, initial analysis had failing IS and surrogate.
Analysis:	USEPA-8260B
Sample/Analyte:	0801135-08 57SB16A
Qualification:	One or more surrogate recoveries for the sample were less than the lower control limit but greater than or equal to 10%. All results are considered estimated.
Analysis:	USEPA-8260B
Sample/Analyte:	0801135-08 57SB16A

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Individual sample results relate only to the sample tested.
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QC BATCH SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
QC Batch: 0800703
QC Batch Matrix: Soil
Preparation: 5030B Aqueous Purge & Trap

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	0800703-BLK1	01/18/08 12:00	
LCS	0800703-BS1	01/18/08 12:00	
57SB18A	0801212-11	01/18/08 12:00	

00172

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0800703-BLK1 File ID: BLK0118B.D

Prepared: 01/18/08 12:00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

Analyzed: 01/18/08 14:19 Instrument: 224

QC Batch: 0800703 Sequence: 8012120 Calibration: 8A21004

CAS No.	Analyte	MDL	MRL	Concentration	Q
67-64-1	Acetone	60	750	750 ug/kg wet	U
71-43-2	Benzene	5.9	50	50 ug/kg wet	U
74-97-5	Bromochloromethane	9.8	50	50 ug/kg wet	U
75-27-4	Bromodichloromethane	9.7	50	50 ug/kg wet	U
75-25-2	Bromoform	12	50	50 ug/kg wet	U
74-83-9	Bromomethane	9.6	50	50 ug/kg wet	U
75-15-0	Carbon Disulfide	14	250	250 ug/kg wet	U
56-23-5	Carbon Tetrachloride	7.6	50	50 ug/kg wet	U
108-90-7	Chlorobenzene	6.0	50	50 ug/kg wet	U
75-00-3	Chloroethane	10	50	50 ug/kg wet	U
67-66-3	Chloroform	3.1	50	50 ug/kg wet	U
74-87-3	Chloromethane	3.0	50	50 ug/kg wet	U
110-82-7	Cyclohexane	6.9	250	250 ug/kg wet	U
96-12-8	1,2-Dibromo-3-chloropropane	14	250	250 ug/kg wet	U
124-48-1	Dibromochloromethane	6.9	50	50 ug/kg wet	U
106-93-4	1,2-Dibromoethane	11	50	50 ug/kg wet	U
95-50-1	1,2-Dichlorobenzene	3.3	50	50 ug/kg wet	U
541-73-1	1,3-Dichlorobenzene	6.0	50	50 ug/kg wet	U
106-46-7	1,4-Dichlorobenzene	6.7	50	8.50 ug/kg wet	J
75-71-8	Dichlorodifluoromethane	8.4	50	50 ug/kg wet	U
75-34-3	1,1-Dichloroethane	3.8	50	50 ug/kg wet	U
107-06-2	1,2-Dichloroethane	7.7	50	50 ug/kg wet	U
75-35-4	1,1-Dichloroethene	6.9	50	50 ug/kg wet	U
156-59-2	cis-1,2-Dichloroethene	8.3	50	50 ug/kg wet	U
156-60-5	trans-1,2-Dichloroethene	7.9	50	50 ug/kg wet	U
78-87-5	1,2-Dichloropropane	5.2	50	50 ug/kg wet	U
10061-01-5	cis-1,3-Dichloropropene	7.1	50	50 ug/kg wet	U
10061-02-6	trans-1,3-Dichloropropene	7.8	50	50 ug/kg wet	U
100-41-4	Ethylbenzene	6.6	50	50 ug/kg wet	U
591-78-6	2-Hexanone	21	2500	2500 ug/kg wet	U

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0800703-BLK1 File ID: BLK0118B.D

Prepared: 01/18/08 12:00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

Analyzed: 01/18/08 14:19 Instrument: 224

QC Batch: 0800703 Sequence: 8012120 Calibration: 8A21004

CAS No.	Analyte	MDL	MRL	Concentration	Q
98-82-8	Isopropylbenzene	6.2	50	50 ug/kg wet	U
79-20-9	Methyl Acetate	8.3	250	250 ug/kg wet	U
1634-04-4	Methyl tert-Butyl Ether	4.8	50	50 ug/kg wet	U
108-87-2	Methylcyclohexane	7.4	250	250 ug/kg wet	U
75-09-2	Methylene Chloride	8.0	250	16.0 ug/kg wet	J
78-93-3	2-Butanone (MEK)	16	2500	2500 ug/kg wet	U
108-10-1	4-Methyl-2-pentanone (MIBK)	19	2500	2500 ug/kg wet	U
100-42-5	Styrene	5.4	50	50 ug/kg wet	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	50	50 ug/kg wet	U
127-18-4	Tetrachloroethene	7.5	50	50 ug/kg wet	U
108-88-3	Toluene	3.6	50	50 ug/kg wet	U
87-61-6	1,2,3-Trichlorobenzene	6.7	100	100 ug/kg wet	U
120-82-1	1,2,4-Trichlorobenzene	8.1	100	100 ug/kg wet	U
71-55-6	1,1,1-Trichloroethane	5.5	50	50 ug/kg wet	U
79-00-5	1,1,2-Trichloroethane	10	50	50 ug/kg wet	U
79-01-6	Trichloroethene	8.5	50	50 ug/kg wet	U
75-69-4	Trichlorofluoromethane	9.0	50	50 ug/kg wet	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.2	250	250 ug/kg wet	U
75-01-4	Vinyl Chloride	8.7	50	50 ug/kg wet	U
1330-20-7	Xylene (Total)	18	150	150 ug/kg wet	U

System Monitoring Compound	Added (ug/L)	Conc. (ug/L)	% REC	QC Limits	Q
Dibromofluoromethane	40.0	40.7	102	78 - 121	
1,2-Dichloroethane-d4	40.0	44.2	111	66 - 124	
Toluene-d8	40.0	39.6	99	85 - 115	
4-Bromofluorobenzene	40.0	38.3	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	1030696	5.14	1098591	5.14	
Chlorobenzene-d5	867509	8.08	933741	8.08	
1,4-Dichlorobenzene-d4	444883	10.38	536532	10.38	

QC BATCH SUMMARY

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-46

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

QC Batch: 0800593 QC Batch Matrix: Water

Preparation: 5030B Aqueous Purge & Trap

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	0800593-BLK1	01/16/08 08:00	
LCS	0800593-BS1	01/16/08 08:00	
LCS Dup	0800593-BSD1	01/16/08 08:00	
EQBK-1	0801135-06	01/16/08 08:00	
Trip Blank	0801135-07	01/16/08 08:00	
EQBK-2	0801212-09	01/16/08 08:00	
Trip Blank	0801212-10	01/16/08 08:00	

: 66163

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-46

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0800593-BLK1 File ID: BLK0116AA.D

Prepared: 01/16/08 08:00 Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

Analyzed: 01/16/08 12:01 Instrument: 224

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002

CAS No.	Analyte	MDL	MRL	Concentration	Q
67-64-1	Acetone	1.2	20	1.68 ug/L	J
71-43-2	Benzene	0.12	1.0	1.0 ug/L	U
74-97-5	Bromochloromethane	0.20	1.0	1.0 ug/L	U
75-27-4	Bromodichloromethane	0.19	1.0	1.0 ug/L	U
75-25-2	Bromoform	0.23	1.0	1.0 ug/L	U
74-83-9	Bromomethane	0.19	1.0	1.0 ug/L	U
75-15-0	Carbon Disulfide	0.28	5.0	5.0 ug/L	U
56-23-5	Carbon Tetrachloride	0.15	1.0	1.0 ug/L	U
108-90-7	Chlorobenzene	0.12	1.0	1.0 ug/L	U
75-00-3	Chloroethane	0.20	1.0	1.0 ug/L	U
67-66-3	Chloroform	0.061	1.0	1.0 ug/L	U
74-87-3	Chloromethane	0.060	1.0	1.0 ug/L	U
110-82-7	Cyclohexane	0.14	5.0	5.0 ug/L	U
96-12-8	1,2-Dibromo-3-chloropropane	0.29	5.0	5.0 ug/L	U
124-48-1	Dibromochloromethane	0.14	1.0	1.0 ug/L	U
106-93-4	1,2-Dibromoethane	0.22	1.0	1.0 ug/L	U
95-50-1	1,2-Dichlorobenzene	0.065	1.0	1.0 ug/L	U
541-73-1	1,3-Dichlorobenzene	0.12	1.0	1.0 ug/L	U
106-46-7	1,4-Dichlorobenzene	0.13	1.0	1.0 ug/L	U
75-71-8	Dichlorodifluoromethane	0.17	1.0	1.0 ug/L	U
75-34-3	1,1-Dichloroethane	0.076	1.0	1.0 ug/L	U
107-06-2	1,2-Dichloroethane	0.15	1.0	1.0 ug/L	U
75-35-4	1,1-Dichloroethene	0.14	1.0	1.0 ug/L	U
156-59-2	cis-1,2-Dichloroethene	0.17	1.0	1.0 ug/L	U
156-60-5	trans-1,2-Dichloroethene	0.16	1.0	1.0 ug/L	U
78-87-5	1,2-Dichloropropane	0.10	1.0	1.0 ug/L	U
10061-01-5	cis-1,3-Dichloropropene	0.14	1.0	1.0 ug/L	U
10061-02-6	trans-1,3-Dichloropropene	0.16	1.0	1.0 ug/L	U
100-41-4	Ethylbenzene	0.13	1.0	1.0 ug/L	U
591-78-6	2-Hexanone	0.42	10	10 ug/L	U

CONTINUING CALIBRATION CHECK

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 139
Lab File ID: CCV0111.D
Sequence: 8011648
Lab Sample ID: 8011648-CCV1

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Calibration: 8A16008
Calibration Date: 12/29/07 00:00
Injection Date: 01/11/08
Injection Time: 08:25

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	L	40.0	31.8	7.961295E-02	0.052052		-20.6	40
Benzene	A	40.0	42.3	0.999569	1.05616		5.7	25
Bromochloromethane	A	40.0	41.7	0.2496273	0.260375		4.3	25
Bromodichloromethane	L	40.0	41.1	0.2485901	0.317141		2.8	25
Bromoform	A	40.0	38.4	0.4957425	0.475288	0.1	-4.1	25
Bromomethane	A	40.0	38.5	0.1923732	0.18528		-3.7	25
Carbon Disulfide	A	40.0	75.6	0.4674097	0.878852		88.0	25 *
Carbon Tetrachloride	A	40.0	38.8	0.2975228	0.288388		-3.1	25
Chlorobenzene	A	40.0	41.1	1.779175	1.8282	0.3	2.8	25
Chloroethane	A	40.0	36.3	0.1320845	0.119909		-9.2	25
Chloroform	A	40.0	42.5	0.41534	0.441366		6.3	20
Chloromethane	A	40.0	35.4	0.2816954	0.249567	0.1	-11.4	25
Cyclohexane	A	40.0	43.9	0.4622016	0.506748		9.6	25
1,2-Dibromo-3-chloropropane	A	40.0	36.7	0.1116763	0.102426		-8.3	25
Dibromochloromethane	L	40.0	37.5	0.5888946	0.621124		-6.2	25
1,2-Dibromoethane	L	40.0	37.0	0.5161316	0.535031		-7.6	25
1,2-Dichlorobenzene	A	40.0	40.8	1.2978	1.32244		1.9	25
1,3-Dichlorobenzene	A	40.0	40.1	1.38448	1.388		0.3	25
1,4-Dichlorobenzene	A	40.0	37.7	1.431077	1.34952		-5.7	25
Dichlorodifluoromethane	A	40.0	34.4	0.2052762	0.176514		-14.0	25
1,1-Dichloroethane	A	40.0	42.7	0.4571295	0.487799	0.1	6.7	25
1,2-Dichloroethane	A	40.0	40.4	0.2655666	0.267873		0.9	25
1,1-Dichloroethene	A	40.0	36.9	0.1682085	0.155329		-7.7	20
cis-1,2-Dichloroethene	A	40.0	42.8	0.2867374	0.306801		7.0	25
trans-1,2-Dichloroethene	A	40.0	42.1	0.282183	0.296908		5.2	25
1,2-Dichloropropane	A	40.0	41.9	0.2602898	0.272657		4.8	20
cis-1,3-Dichloropropene	L	40.0	39.6	0.2996018	0.373398		-1.0	25
trans-1,3-Dichloropropene	L	40.0	40.2	0.2329778	0.292675		0.5	25
Ethylbenzene	A	40.0	40.3	2.675435	2.84935		6.5	20

00620

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Instrument ID: 139
Calibration: 8A16008
Lab File ID: BS0114.D
Calibration Date: 12/29/07 00:00
Sequence: 8011652
Injection Date: 01/14/08
Lab Sample ID: 8011652-CCV1
Injection Time: 10:45

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	L	40.0	31.3	7.961295E-02	0.0514328		-21.8	40
Benzene	A	40.0	42.7	0.999569	1.06795		6.8	25
Bromochloromethane	A	40.0	40.8	0.2496273	0.254362		1.9	25
Bromodichloromethane	L	40.0	40.8	0.2485901	0.314673		2.0	25
Bromoform	A	40.0	43.7	0.4957425	0.541818	0.1	9.3	25
Bromomethane	A	40.0	36.1	0.1923732	0.1737		-9.7	25
Carbon Disulfide	A	40.0	44.2	0.4674097	0.513499		9.9	25
Carbon Tetrachloride	A	40.0	39.4	0.2975228	0.293466		-1.4	25
Chlorobenzene	A	40.0	42.2	1.779175	1.87845	0.3	5.6	25
Chloroethane	A	40.0	37.3	0.1320845	0.123276		-6.7	25
Chloroform	A	40.0	41.8	0.41534	0.433468		4.4	20
Chloromethane	A	40.0	33.5	0.2816954	0.236092	0.1	-16.2	25
Cyclohexane	A	40.0	43.0	0.4622016	0.496569		7.4	25
1,2-Dibromo-3-chloropropane	A	40.0	36.7	0.1116763	0.102526		-8.2	25
Dibromochloromethane	L	40.0	40.3	0.5888946	0.668526		0.8	25
1,2-Dibromoethane	L	40.0	41.3	0.5161316	0.602526		3.2	25
Dibromomethane	A	40.0	41.8	0.1601782	0.16725		4.4	25
1,2-Dichlorobenzene	A	40.0	41.8	1.2978	1.35705		4.6	25
1,3-Dichlorobenzene	A	40.0	39.5	1.38448	1.36733		-1.2	25
1,4-Dichlorobenzene	A	40.0	40.0	1.431077	1.4313		0.02	25
Dichlorodifluoromethane	A	40.0	29.8	0.2052762	0.153204		-25.4	25 *
1,1-Dichloroethane	A	40.0	42.5	0.4571295	0.485979	0.1	6.3	25
1,2-Dichloroethane	A	40.0	39.7	0.2655666	0.263865		-0.6	25
1,1-Dichloroethene	A	40.0	35.9	0.1682085	0.150957		-10.3	20
cis-1,2-Dichloroethene	A	40.0	44.2	0.2867374	0.31667		10.4	25
trans-1,2-Dichloroethene	A	40.0	40.5	0.282183	0.28552		1.2	25
1,2-Dichloropropane	A	40.0	43.4	0.2602898	0.28237		8.5	20
cis-1,3-Dichloropropene	L	40.0	41.5	0.2996018	0.392135		3.7	25
trans-1,3-Dichloropropene	L	40.0	41.5	0.2329778	0.302674		3.7	25

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 139
Lab File ID: CCV0114A.D
Sequence: 8011722
Lab Sample ID: 8011722-CCV1

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Calibration: 8A16008
Calibration Date: 12/29/07 00:00
Injection Date: 01/14/08
Injection Time: 22:09

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	L	40.0	35.5	7.961295E-02	0.0567537		-11.2	40
Benzene	A	40.0	41.6	0.999569	1.0388		3.9	25
Bromochloromethane	A	40.0	40.6	0.2496273	0.253671		1.6	25
Bromodichloromethane	L	40.0	42.1	0.2485901	0.324756		5.2	25
Bromoform	A	40.0	39.9	0.4957425	0.494973	0.1	-0.2	25
Bromomethane	A	40.0	35.8	0.1923732	0.171916		-10.6	25
Carbon Disulfide	A	40.0	47.1	0.4674097	0.547698		17.2	25
Carbon Tetrachloride	A	40.0	39.9	0.2975228	0.2968		-0.2	25
Chlorobenzene	A	40.0	41.2	1.779175	1.83394	0.3	3.1	25
Chloroethane	A	40.0	35.9	0.1320845	0.118442		-10.3	25
Chloroform	A	40.0	42.8	0.41534	0.444879		7.1	20
Chloromethane	A	40.0	34.0	0.2816954	0.239797	0.1	-14.9	25
Cyclohexane	A	40.0	41.8	0.4622016	0.483398		4.6	25
1,2-Dibromo-3-chloropropane	A	40.0	31.6	0.1116763	0.0882247		-21.0	25
Dibromochloromethane	L	40.0	38.7	0.5888946	0.640516		-3.4	25
1,2-Dibromoethane	L	40.0	38.6	0.5161316	0.56007		-3.6	25
1,2-Dichlorobenzene	A	40.0	40.5	1.2978	1.31424		1.3	25
1,3-Dichlorobenzene	A	40.0	39.5	1.38448	1.36646		-1.3	25
1,4-Dichlorobenzene	A	40.0	37.9	1.431077	1.35732		-5.2	25
Dichlorodifluoromethane	A	40.0	34.1	0.2052762	0.175115		-14.7	25
1,1-Dichloroethane	A	40.0	43.1	0.4571295	0.492599	0.1	7.8	25
1,2-Dichloroethane	A	40.0	42.2	0.2655666	0.28023		5.5	25
1,1-Dichloroethene	A	40.0	38.1	0.1682085	0.160067		-4.8	20
cis-1,2-Dichloroethene	A	40.0	42.8	0.2867374	0.306845		7.0	25
trans-1,2-Dichloroethene	A	40.0	40.5	0.282183	0.2854		1.1	25
1,2-Dichloropropane	A	40.0	43.0	0.2602898	0.279974		7.6	20
cis-1,3-Dichloropropene	L	40.0	39.1	0.2996018	0.36827		-2.2	25
trans-1,3-Dichloropropene	L	40.0	39.4	0.2329778	0.286146		-1.6	25
Ethylbenzene	A	40.0	41.9	2.675435	2.96404		10.8	20

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY
USEPA-8260B

57SB12A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 5035 Soil Purge & Trap - MS
Initial/Final: 5 g / 5 mL

Laboratory ID: 0800551-MS1
QC Batch: 0800551

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Acetone	47.6	70.1	211	296 *	20 - 160	ug/kg dry
Benzene	47.6	ND	57.8	121	75 - 125	ug/kg dry
Bromochloromethane	47.6	ND	57.6	121	70 - 125	ug/kg dry
Bromodichloromethane	47.6	ND	58.0	122	70 - 130	ug/kg dry
Bromoform	47.6	ND	64.0	134	55 - 135	ug/kg dry
Bromomethane	47.6	ND	55.0	115	30 - 160	ug/kg dry
Carbon Disulfide	47.6	ND	38.8	81	45 - 160	ug/kg dry
Carbon Tetrachloride	47.6	ND	56.8	119	65 - 135	ug/kg dry
Chlorobenzene	47.6	ND	53.7	113	75 - 125	ug/kg dry
Chloroethane	47.6	ND	52.4	110	40 - 155	ug/kg dry
Chloroform	47.6	ND	61.1	128 *	70 - 125	ug/kg dry
Chloromethane	47.6	ND	54.9	115	50 - 130	ug/kg dry
Cyclohexane	47.6	ND	55.4	116	70 - 130	ug/kg dry
1,2-Dibromo-3-chloropropane	47.6	ND	77.4	162 *	40 - 135	ug/kg dry
Dibromochloromethane	47.6	ND	59.0	124	65 - 130	ug/kg dry
1,2-Dibromoethane	47.6	ND	61.0	128 *	70 - 125	ug/kg dry
1,2-Dichlorobenzene	47.6	ND	57.8	121 *	75 - 120	ug/kg dry
1,3-Dichlorobenzene	47.6	ND	51.6	108	70 - 125	ug/kg dry
1,4-Dichlorobenzene	47.6	ND	49.1	103	70 - 125	ug/kg dry
Dichlorodifluoromethane	47.6	ND	53.1	111	35 - 135	ug/kg dry
1,1-Dichloroethane	47.6	ND	59.7	125	75 - 125	ug/kg dry
1,2-Dichloroethane	47.6	ND	60.2	126	70 - 135	ug/kg dry
1,1-Dichloroethene	47.6	ND	53.2	112	65 - 135	ug/kg dry
cis-1,2-Dichloroethene	47.6	ND	59.6	125	65 - 125	ug/kg dry
trans-1,2-Dichloroethene	47.6	ND	51.6	108	65 - 135	ug/kg dry
1,2-Dichloropropane	47.6	ND	59.1	124 *	70 - 120	ug/kg dry
cis-1,3-Dichloropropene	47.6	ND	46.8	98	70 - 125	ug/kg dry
trans-1,3-Dichloropropene	47.6	ND	47.2	99	65 - 125	ug/kg dry
Ethylbenzene	47.6	ND	53.4	112	75 - 125	ug/kg dry
2-Hexanone	47.6	ND	64.4	135	45 - 145	ug/kg dry
Isopropylbenzene	47.6	ND	62.4	131 *	75 - 130	ug/kg dry
Methyl Acetate	47.6	16.4	24.8	18 *	70 - 130	ug/kg dry
Methyl tert-Butyl Ether	47.6	ND	60.8	128 *	63 - 127	ug/kg dry

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY
USEPA-8260B

57SB12A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Preparation: 5035 Soil Purge & Trap - MS
Initial/Final: 5 g / 5 mL
Laboratory ID: 0800551-MS1
QC Batch: 0800551

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Methylcyclohexane	47.6	ND	48.8	102	70 - 130	ug/kg dry
Methylene Chloride	47.6	ND	51.0	107	55 - 140	ug/kg dry
2-Butanone (MEK)	47.6	6.37	82.6	160	30 - 160	ug/kg dry
4-Methyl-2-pentanone (MIBK)	47.6	ND	62.1	130	45 - 145	ug/kg dry
Styrene	47.6	ND	19.2	40 *	75 - 125	ug/kg dry
1,1,2,2-Tetrachloroethane	47.6	ND	82.3	173 *	55 - 130	ug/kg dry
Tetrachloroethene	47.6	ND	51.0	107	65 - 140	ug/kg dry
Toluene	47.6	ND	55.1	116	70 - 125	ug/kg dry
1,2,3-Trichlorobenzene	47.6	ND	39.5	83	60 - 135	ug/kg dry
1,2,4-Trichlorobenzene	47.6	ND	35.6	75	65 - 130	ug/kg dry
1,1,1-Trichloroethane	47.6	ND	57.9	122	70 - 135	ug/kg dry
1,1,2-Trichloroethane	47.6	ND	60.7	128 *	60 - 125	ug/kg dry
Trichloroethene	47.6	ND	52.9	111	75 - 125	ug/kg dry
Trichlorofluoromethane	47.6	ND	58.4	123	25 - 185	ug/kg dry
1,1,2-Trichloro-1,2,2-trifluoroetha	47.6	ND	47.8	100	80 - 120	ug/kg dry
Vinyl Chloride	47.6	ND	56.9	120	60 - 125	ug/kg dry
Xylene (Total)	143	ND	153	107	75 - 125	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY
USEPA-8260B

57SB12A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Preparation: 5035 Soil Purge & Trap - MS
Initial/Final: 5 g / 5 mL
Laboratory ID: 0800551-MSD1
QC Batch: 0800551

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Acetone	47.6	98.1	59	73 *	30	20 - 160	ug/kg dry
Benzene	47.6	47.5	100	19	30	75 - 125	ug/kg dry
Bromochloromethane	47.6	48.6	102	17	30	70 - 125	ug/kg dry
Bromodichloromethane	47.6	47.5	100	20	30	70 - 130	ug/kg dry
Bromoform	47.6	51.5	108	22	30	55 - 135	ug/kg dry
Bromomethane	47.6	48.5	102	12	30	30 - 160	ug/kg dry
Carbon Disulfide	47.6	50.2	105	26	30	45 - 160	ug/kg dry
Carbon Tetrachloride	47.6	44.6	94	24	30	65 - 135	ug/kg dry
Chlorobenzene	47.6	46.3	97	15	30	75 - 125	ug/kg dry
Chloroethane	47.6	44.2	93	17	30	40 - 155	ug/kg dry
Chloroform	47.6	51.0	107	18	30	70 - 125	ug/kg dry
Chloromethane	47.6	46.7	98	16	30	50 - 130	ug/kg dry
Cyclohexane	47.6	45.3	95	20	30	70 - 130	ug/kg dry
1,2-Dibromo-3-chloropropane	47.6	64.2	135	19	30	40 - 135	ug/kg dry
Dibromochloromethane	47.6	49.4	104	18	30	65 - 130	ug/kg dry
1,2-Dibromoethane	47.6	51.3	108	17	30	70 - 125	ug/kg dry
1,2-Dichlorobenzene	47.6	50.1	105	14	30	75 - 120	ug/kg dry
1,3-Dichlorobenzene	47.6	44.3	93	15	30	70 - 125	ug/kg dry
1,4-Dichlorobenzene	47.6	42.7	90	14	30	70 - 125	ug/kg dry
Dichlorodifluoromethane	47.6	41.9	88	24	30	35 - 135	ug/kg dry
1,1-Dichloroethane	47.6	51.8	109	14	30	75 - 125	ug/kg dry
1,2-Dichloroethane	47.6	48.4	102	22	30	70 - 135	ug/kg dry
1,1-Dichloroethene	47.6	44.4	93	18	30	65 - 135	ug/kg dry
cis-1,2-Dichloroethene	47.6	48.1	101	21	30	65 - 125	ug/kg dry
trans-1,2-Dichloroethene	47.6	46.2	97	11	30	65 - 135	ug/kg dry
1,2-Dichloropropane	47.6	48.9	103	19	30	70 - 120	ug/kg dry
cis-1,3-Dichloropropene	47.6	39.9	84	16	30	70 - 125	ug/kg dry
trans-1,3-Dichloropropene	47.6	38.2	80	21	30	65 - 125	ug/kg dry
Ethylbenzene	47.6	46.4	97	14	30	75 - 125	ug/kg dry
2-Hexanone	47.6	59.5	125	8	30	45 - 145	ug/kg dry
Isopropylbenzene	47.6	51.8	109	19	30	75 - 130	ug/kg dry
Methyl Acetate	47.6	15.9	-0.9 *	44 *	30	70 - 130	ug/kg dry
Methyl tert-Butyl Ether	47.6	50.0	105	20	30	63 - 127	ug/kg dry
Methylcyclohexane	47.6	38.7	81	23	30	70 - 130	ug/kg dry

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8260B

57SB12A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-46

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 5035 Soil Purge & Trap - MS

Initial/Final: 5 g / 5 mL

Laboratory ID: 0800551-MSD1

QC Batch: 0800551

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Methylene Chloride	47.6	44.2	93	14	30	55 - 140	ug/kg dry
2-Butanone (MEK)	47.6	60.1	113	31 *	30	30 - 160	ug/kg dry
4-Methyl-2-pentanone (MIBK)	47.6	65.5	137	5	30	45 - 145	ug/kg dry
Styrene	47.6	24.6	52 *	24	30	75 - 125	ug/kg dry
1,1,2,2-Tetrachloroethane	47.6	66.2	139 *	22	30	55 - 130	ug/kg dry
Tetrachloroethene	47.6	42.1	88	19	30	65 - 140	ug/kg dry
Toluene	47.6	46.4	97	17	30	70 - 125	ug/kg dry
1,2,3-Trichlorobenzene	47.6	36.9	77	7	30	60 - 135	ug/kg dry
1,2,4-Trichlorobenzene	47.6	34.4	72	4	30	65 - 130	ug/kg dry
1,1,1-Trichloroethane	47.6	49.3	103	16	30	70 - 135	ug/kg dry
1,1,2-Trichloroethane	47.6	49.1	103	21	30	60 - 125	ug/kg dry
Trichloroethene	47.6	44.7	94	17	30	75 - 125	ug/kg dry
Trichlorofluoromethane	47.6	42.8	90	31 *	30	25 - 185	ug/kg dry
1,1,2-Trichloro-1,2,2-trifluoroetha	47.6	39.5	83	19	30	80 - 120	ug/kg dry
Vinyl Chloride	47.6	47.2	99	19	30	60 - 125	ug/kg dry
Xylene (Total)	143	132	93	14	30	75 - 125	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 8011652
Matrix: Soil

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Instrument: 139
Calibration: 8A16008

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
LCS (0800551-BS2)		**Lab File ID: BS0114.D**		**Analyzed: 01/14/08 10:45**			
Dibromofluoromethane	4.86	4.85	0.01	+/-1.0	99	78 - 121	
1,2-Dichloroethane-d4	5.61	5.59	0.02	+/-1.0	95	66 - 124	
Toluene-d8	13.39	13.37	0.02	+/-1.0	102	85 - 115	
4-Bromofluorobenzene	20.32	20.31	0.01	+/-1.0	105	85 - 120	
LCS (0800592-BS1)		**Lab File ID: BS0114.D**		**Analyzed: 01/14/08 10:45**			
Dibromofluoromethane	4.86	4.85	0.01	+/-1.0	99	78 - 121	
1,2-Dichloroethane-d4	5.61	5.59	0.02	+/-1.0	95	66 - 124	
Toluene-d8	13.39	13.37	0.02	+/-1.0	102	85 - 115	
4-Bromofluorobenzene	20.32	20.31	0.01	+/-1.0	105	85 - 120	
Calibration Check (8011652-CCV1)		**Lab File ID: BS0114.D**		**Analyzed: 01/14/08 10:45**			
Dibromofluoromethane	4.86	4.85	0.01	+/-1.0	99	75 - 125	
1,2-Dichloroethane-d4	5.61	5.59	0.02	+/-1.0	95	75 - 125	
Toluene-d8	13.39	13.37	0.02	+/-1.0	102	75 - 125	
4-Bromofluorobenzene	20.32	20.31	0.01	+/-1.0	105	75 - 125	
Blank (0800551-BLK2)		**Lab File ID: BLK0114.D**		**Analyzed: 01/14/08 12:24**			
Dibromofluoromethane	4.87	4.85	0.02	+/-1.0	103	78 - 121	
1,2-Dichloroethane-d4	5.62	5.59	0.03	+/-1.0	99	66 - 124	
Toluene-d8	13.40	13.37	0.03	+/-1.0	102	85 - 115	
4-Bromofluorobenzene	20.33	20.31	0.02	+/-1.0	97	85 - 120	
Blank (0800592-BLK1)		**Lab File ID: BLK0114.D**		**Analyzed: 01/14/08 12:24**			
Dibromofluoromethane	4.87	4.85	0.02	+/-1.0	103	78 - 121	
1,2-Dichloroethane-d4	5.62	5.59	0.03	+/-1.0	99	66 - 124	
Toluene-d8	13.40	13.37	0.03	+/-1.0	102	85 - 115	
4-Bromofluorobenzene	20.33	20.31	0.02	+/-1.0	97	85 - 120	
57SB16A (0801135-08)		**Lab File ID: 13508.D**		**Analyzed: 01/14/08 12:57**			
Dibromofluoromethane	4.87	4.85	0.02	+/-1.0	113	78 - 121	
1,2-Dichloroethane-d4	5.62	5.59	0.03	+/-1.0	108	66 - 124	
Toluene-d8	13.39	13.37	0.02	+/-1.0	92	85 - 115	
4-Bromofluorobenzene	20.33	20.31	0.02	+/-1.0	84	85 - 120	*

INTERNAL STANDARD AREA AND RT SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 8011652
Matrix: Soil

SDG: 36440-46
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Instrument: 139
Calibration: 8A16008

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (0800551-BS2)			**Lab File ID: BS0114.D**			**Analyzed: 01/14/08 10:45**			
Fluorobenzene	939926	7.38	939926	7.38	100	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	386242	17.42	386242	17.42	100	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	454579	22.45	454579	22.45	100	50 - 200	0.0000	+/-0.50	
LCS (0800592-BS1)			**Lab File ID: BS0114.D**			**Analyzed: 01/14/08 10:45**			
Fluorobenzene	939926	7.38	939926	7.38	100	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	386242	17.42	386242	17.42	100	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	454579	22.45	454579	22.45	100	50 - 200	0.0000	+/-0.50	
Calibration Check (8011652-CCV1)			**Lab File ID: BS0114.D**			**Analyzed: 01/14/08 10:45**			
Fluorobenzene	939926	7.38	896575	7.36	105	50 - 200	0.0200	+/-0.50	
Chlorobenzene-d5	386242	17.42	369835	17.41	104	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	454579	22.45	404368	22.44	112	50 - 200	0.0100	+/-0.50	
Blank (0800551-BLK2)			**Lab File ID: BLK0114.D**			**Analyzed: 01/14/08 12:24**			
Fluorobenzene	920602	7.39	939926	7.38	98	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	388071	17.42	386242	17.42	100	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	404646	22.46	454579	22.45	89	50 - 200	0.0100	+/-0.50	
Blank (0800592-BLK1)			**Lab File ID: BLK0114.D**			**Analyzed: 01/14/08 12:24**			
Fluorobenzene	920602	7.39	939926	7.38	98	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	388071	17.42	386242	17.42	100	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	404646	22.46	454579	22.45	89	50 - 200	0.0100	+/-0.50	
57SB16A (0801135-08)			**Lab File ID: 13508.D**			**Analyzed: 01/14/08 12:57**			
Fluorobenzene	754161	7.39	939926	7.38	80	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	260112	17.43	386242	17.42	67	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	203543	22.46	454579	22.45	45	50 - 200	0.0100	+/-0.50	*
57SB11A (0801212-01)			**Lab File ID: 21201.D**			**Analyzed: 01/14/08 13:29**			
Fluorobenzene	831809	7.39	939926	7.38	88	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	329277	17.43	386242	17.42	85	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	345213	22.46	454579	22.45	76	50 - 200	0.0100	+/-0.50	
57SB11B (0801212-02)			**Lab File ID: 21202.D**			**Analyzed: 01/14/08 14:02**			
Fluorobenzene	827242	7.39	939926	7.38	88	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	347381	17.43	386242	17.42	90	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	375775	22.45	454579	22.45	83	50 - 200	0.0000	+/-0.50	
57SB11C (0801212-03)			**Lab File ID: 21203.D**			**Analyzed: 01/14/08 14:35**			
Fluorobenzene	828998	7.39	939926	7.38	88	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	345071	17.43	386242	17.42	89	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	386054	22.46	454579	22.45	85	50 - 200	0.0100	+/-0.50	

00197

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-46
Project No.: 11654421.30000

Project Name: RAADford SWMU57
Reviewer: EA
Date: 2/14/08

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓			✓			✓					
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓			✓			✓					
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓			✓			✓				
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{o}C \pm 2\ ^{o}C$)	✓			✓			✓					
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓			✓			✓					

Note: _____

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		✓			✓			✓				

Note: _____

URS

3.0 Instrument Calibration

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	✓			✓			✓					
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	✓			✓			✓					
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.												
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	✓			✓			✓					
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	✓			✓			✓					
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	✓			✓			✓					
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	✓			✓								
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K												

Note: _____

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓			✓			✓					
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	✓			✓			✓					
4.3	Are there reported MB or ICB/CCBs values > MDL?	✓			✓				✓				
	Sample Results > MDL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > MDL?		✓			✓			✓				
	Sample Results Non-detects > MDL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± MDL?	✓						✓					
	Sample Results > MDL												
	< 5X Blank Contamination B												

Note: 6010 → Soil → Be, Ca, Na, Cd, Fe, Waters → Na < 5X, B, P, EBs → Ca, Fe all 75X EB, no more action
6020 → Soil, Cu, lead, V, < 5X B, P, water Cr, lead < 5X B, P, EBs → antimony, Mn, Cu, Pb, zinc, Ni all 75X EB, NO action
Hg → EGBK-1 Hg at 0.05 ug/L all 75X EB, No action

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	✓			✓								
5.2	Are the ICS AB recoveries within 80% - 120%?	✓			✓								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	✓			✓								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?	✓					✓						
	If not...												
	Action: Not Spiked Analytes: < -MDL L(+)/UL(-); > MDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note:

URS

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	✓			✓			✓					
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		✓			✓			✓				
	Action:												

Solid		Aqueous		
< LCL	> UCL	< 50%	50% - 79%	> 120%
L(+)/UL(-)	K(+)	L(+)/R(-)	L(+)/UL(-)	K(+)

Note:

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	✓			✓			✓					
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.	✓			✓								
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.							✓					

Note:

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	✓			✓			✓					
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous matrices or lab limits for soil matrices?		✓			✓		✓					
	%R > 125% 30%< %R < 74% < 30% Positive K L L Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	✓			✓					✓			

Note: 6010 → Mn 135%; Zn 130%/131% > QC Post Kim in all samples
6020 → As 72%; Se 70% and 74% < QC L/UL Kim
V 126% > QC all pos → Kym

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?				✓			✓					

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	✓			✓								
10.2	Was a five-fold dilution performed?	✓			✓								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).		✓		✓								

Note: 6020 → for 575B10C Copper 17% > nicked 15% > V 12%.
6020 → 4 575B12A Copper 16% > nicked 14%.
Pos Copper, nickel J, s
V prev Kim, No more action

11.0 Field Duplicate Samples

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	✓			✓			✓					
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	✓				✓		✓					

Note: Hg → 575B15A / DUP-1 RL
0.06 0.08 0.050 kv
Hg → 575B13A / DUP-3 RL
0.042 0.039 0.050 kv
575B11A / DUP-2 RL
Hg 0.067 0.07 0.050 kv

12.0 Result Verification/ Internal Standards/ Tune

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	✓			✓			✓					
12.2	Were all dilution reflected in the positive results and detection limits?	✓			✓			✓					
12.3	Were the Internal Standard recoveries within 30-120%	✓			✓								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	✓											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	✓											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	✓											

Note: → For 6010 575B11A/ DUP-2 Ba 51%, Mn 59% QC, Ba → I,F in both, Mn previously

13.0 Completeness Calculation

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	✓			✓			✓					
13.1.1	Number of samples:												
13.1.2	Number of target compounds in each analysis:												
13.1.3	Number of results rejected and not reported:												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2) % Completeness = 100%												

Note:

Method 6010B Field DUPs

	575B15A,	DUP-1	RL	RPD
Al	15000 mg/kg	14000	10	7% OKV
Ba	89	96	1	8% OKV
Be	0.77	0.75	1	OKV
Cd	0.63	0.98	2	OKV
Ca	1200	1800	50	40% OKV
Cr	29	27	5	7% OKV
Co	4.9	4.9	2	OKV
Fe	16000	13000	10	20% OKV
Mg	970	1300	50	29% OKV
Mn	410	600	1	37% OKV
K	670	590	50	12% OKV
Na	49	51	100	OKV
Zn	38	45	5	17% OKV

	575B11A,	DUP-2	RL	RPD
Al	21000 mg/kg	28,000	10	29% OKV
Ba	57	96	1	51%
Be	0.4	0.59	1	OKV
~~Cd~~	~~2~~		~~2~~	
Ca	1200	1600	50	29% OKV
Cr	26	31	5	17% OKV
Co	1.5	2.1	2	OKV
Fe	8300	12,000	10	36% OKV
Mg	1000	1,400	50	33% OKV
Mn	60	110	1	59%
K	740	1,100	50	39% OKV
Na	78	80	100	OKV
Zn	27	41	5	41% OKV

Method 6010 field Dups

	575B13A	DUP-3	RL	RPD
Al	17000 mg/kg	19000	10	11%. OKV
Ba	110	130	1	16%. OKV
Be	2	1.8	1	OKV
Ca	520	590	50	13%. OKV
Cr	33	31	5	6%. OKV
Co	9.9	10	2	OKV
Fe	44,000	41,000	10	7%. OKV
Mg	730	810	50	10%. OKV
Mn	2,100	2400	1	13%. OKV
K	570	620	50	8%. OKV
Na	39	41	100	5%. OKV
Zn	42	44	5	5%. OKV

Method 6020 Field DUPs

	575B15A	DUP-1	RL	%RPD
As	2 mg/kg	2	0.2	OK
Cu	8	8.9	0.2	10%, OK✓
lead	25	37	0.2	38%, ✓
nickel	5.8	6	0.1	3.4%, ✓
Se	0.34	0.39	0.3	OK
silver	0.049	0.06	0.1	20%, ✓
Tl	0.18	0.19	0.1	OK ✓
V	23	19	0.1	19%, ✓
antimony	1.2	1.4	0.2	15%, ✓

	575B11A	DUP-2	RL	%RPD
Sb	0.19	0.42	0.2	OK✓
As	0.77	1.3	0.2	OK✓
Cu	7.7	10	0.2	26%, ✓
Pb	11	15	0.2	30%, ✓
Ni	6.7	7.8	0.1	15%, ✓
Se	0.3	0.3	0.3	OK✓
Silver	0.039	0.071	0.1	OK✓
Tl	0.22	0.28	0.1	OK✓
V	26	29	0.1	10%, ✓

	575B13A	DUP-3	RL	%RPD
Sb	0.47	0.46	0.2	OK✓
As	6.6	7.1	0.2	7%, ✓
Cu	7.2	6.9	0.2	4%, ✓
lead	22	21	0.2	5%, ✓
Ni	8.5	8.6	0.1	1.2%, ✓
Se	0.35	0.5	0.3	OK✓
Silver	0.051	0.051	0.1	OK✓
Tl	0.26	0.25	0.1	OK✓
V	25	26	0.1	4%, ✓

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800484-BLK1
File ID: 8011709-016
Prepared: 01/15/08 07:15
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 01/18/08 09:03
Instrument: 101
QC Batch: 0800484
Sequence: 8011709
Calibration: 8A21002

CAS No.	Analyte	MDL	MRL	Concentration	Q
7429-90-5	Aluminum, Total	2.1	10	10 mg/kg dry wt.	U
7440-39-3	Barium, Total	0.17	1.0	1.0 mg/kg dry wt.	U
7440-41-7	Beryllium, Total	0.021	1.0	0.0325 mg/kg dry wt.	J
7440-43-9	Cadmium, Total	0.11	2.0	2.0 mg/kg dry wt.	U
7440-70-2	Calcium, Total	4.2	50	6.90 mg/kg dry wt.	J
7440-47-3	Chromium, Total	0.72	5.0	5.0 mg/kg dry wt.	U
7440-48-4	Cobalt, Total	0.37	2.0	2.0 mg/kg dry wt.	U
7439-89-6	Iron, Total	0.48	10	10 mg/kg dry wt.	U
7439-95-4	Magnesium, Total	5.0	50	50 mg/kg dry wt.	U
7439-96-5	Manganese, Total	0.16	1.0	1.0 mg/kg dry wt.	U
7440-09-7	Potassium, Total	5.3	50	50 mg/kg dry wt.	U
7440-23-5	Sodium, Total	13	100	17.9 mg/kg dry wt.	J
7440-66-6	Zinc, Total	1.0	5.0	5.0 mg/kg dry wt.	U

Be → 0.1625
Ca → 34.5
Na → 89.5

: 00323

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800607-BLK1
File ID: 8011709-070
Prepared: 01/17/08 07:30
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 01/18/08 13:07
Instrument: 101
QC Batch: 0800607
Sequence: 8011709
Calibration: 8A21002

CAS No.	Analyte	MDL	MRL	Concentration	Q
7429-90-5	Aluminum, Total	2.1	10	10 mg/kg dry wt.	U
7440-39-3	Barium, Total	0.17	1.0	1.0 mg/kg dry wt.	U
7440-41-7	Beryllium, Total	0.021	1.0	0.0228 mg/kg dry wt.	J
7440-43-9	Cadmium, Total	0.11	2.0	0.200 mg/kg dry wt.	J
7440-70-2	Calcium, Total	4.2	50	5.48 mg/kg dry wt.	J
7440-47-3	Chromium, Total	0.72	5.0	5.0 mg/kg dry wt.	U
7440-48-4	Cobalt, Total	0.37	2.0	2.0 mg/kg dry wt.	U
7439-89-6	Iron, Total	0.48	10	0.980 mg/kg dry wt.	J
7439-95-4	Magnesium, Total	5.0	50	50 mg/kg dry wt.	U
7439-96-5	Manganese, Total	0.16	1.0	1.0 mg/kg dry wt.	U
7440-09-7	Potassium, Total	5.3	50	50 mg/kg dry wt.	U
7440-23-5	Sodium, Total	13	100	16.1 mg/kg dry wt.	J
7440-66-6	Zinc, Total	1.0	5.0	5.0 mg/kg dry wt.	U

Be 0.114
cd 1
ca 27.4
Fe 4.9
Na 80.5

00530

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0800636-BLK1
File ID: 8012209-018
Prepared: 01/18/08 07:00
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL
Analyzed: 01/22/08 10:43
Instrument: 116
QC Batch: 0800636
Sequence: 8012209
Calibration: 8A22007

CAS No.	Analyte	MDL	MRL	Concentration	Q
7429-90-5	Aluminum, Total	44	200	200 ug/L	U
7440-70-2	Calcium, Total	40	500	500 ug/L	U
7439-95-4	Magnesium, Total	38	500	500 ug/L	U
7440-09-7	Potassium, Total	54	200	200 ug/L	U
7440-23-5	Sodium, Total	84	500	99.0 ug/L	J

Na → 495

00331

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6010B

57SB12A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-46

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3050B Digestion

Initial/Final: 0.5 g / 50 mL

Laboratory ID: 0800607-MS1

QC Batch: 0800607

within RPD 75-125%

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Barium, Total	25.0	50.7	81.0	121 * OK	80 - 120	mg/kg dry wt.
Beryllium, Total	2.50	0.649	3.24	104	80 - 120	mg/kg dry wt.
Cadmium, Total	25.0	ND	23.9	96	80 - 120	mg/kg dry wt.
Calcium, Total	1250	853	2090	99	80 - 120	mg/kg dry wt.
Chromium, Total	25.0	32.6	57.7	100	80 - 120	mg/kg dry wt.
Cobalt, Total	25.0	7.00	29.3	89	80 - 120	mg/kg dry wt.
Magnesium, Total	1250	962	2330	109	80 - 120	mg/kg dry wt.
Manganese, Total	25.0	238	262	96	80 - 120	mg/kg dry wt.
Potassium, Total	1250	891	2270	110	80 - 120	mg/kg dry wt.
Sodium, Total	1250	67.0	1260	95	80 - 120	mg/kg dry wt.
Zinc, Total	25.0	40.3	72.8	130 *	80 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6010B

57SB12A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-46

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3050B Digestion

Initial/Final: 0.4999 g / 50 mL

Laboratory ID: 0800607-MSD1

QC Batch: 0800607

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Barium, Total	25.0	80.2	118	1	20	80 - 120	mg/kg dry wt.
Beryllium, Total	2.50	3.15	100	3	20	80 - 120	mg/kg dry wt.
Cadmium, Total	25.0	23.3	93	3	20	80 - 120	mg/kg dry wt.
Calcium, Total	1250	2040	95	2	20	80 - 120	mg/kg dry wt.
Chromium, Total	25.0	56.5	95	2	20	80 - 120	mg/kg dry wt.
Cobalt, Total	25.0	29.3	89	0.3	20	80 - 120	mg/kg dry wt.
Magnesium, Total	1250	2290	106	2	20	80 - 120	mg/kg dry wt.
Manganese, Total	25.0	272	135 *	4	20	80 - 120	mg/kg dry wt.
Potassium, Total	1250	2260	109	0.6	20	80 - 120	mg/kg dry wt.
Sodium, Total	1250	1240	94	1	20	80 - 120	mg/kg dry wt.
Zinc, Total	25.0	72.9	131 *	0.2	20	80 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00934

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Total Metals by EPA 6000/7000 Series Methods

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis:	USEPA-6010B		
Sample/Analyte:	0801212-06	57SB12A	Zinc
Analysis:	USEPA-6020A		
Sample/Analyte:	0801212-06	57SB12A	Arsenic
	0801212-06	57SB12A	Selenium

Qualification: The MS or MSD recovery, but not both, was outside the control limit. The RPD is within the control limit. The unspiked sample result is considered estimated.

Analysis:	USEPA-6010B		
Sample/Analyte:	0801212-06	57SB12A	Barium
Analysis:	USEPA-6020A		
Sample/Analyte:	0801212-06	57SB12A	Vanadium

Qualification: The % difference in results between the sample and a serial dilution of the sample exceeded the control limit. Sample matrix interference is suspected and the reported result is considered estimated.

Analysis:	USEPA-6020A		
Sample/Analyte:	0801135-13	57SB10C	Copper
	0801135-13	57SB10C	Nickel
	0801135-13	57SB10C	Vanadium
	0801212-06	57SB12A	Copper
	0801212-06	57SB12A	Nickel

Qualification: The post-digestion spike recovery for this sample was outside the control limit. Sample matrix interference is suspected and the reported result must be considered as estimated.

Analysis:	USEPA-6010B		
Sample/Analyte:	0801212-06	57SB12A	Iron

Qualification: This analyte was not present in this sample at a concentration greater than 50 times the MDL, therefore serial dilution is not required.

Analysis:	USEPA-6010B		
Sample/Analyte:	0801135-13	57SB10C	Chromium
	0801212-06	57SB12A	Beryllium
	0801212-06	57SB12A	Chromium
	0801212-06	57SB12A	Sodium

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Individual sample results relate only to the sample tested.
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SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Total Metals by EPA 6000/7000 Series Methods

Qualification: This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.

Analysis: USEPA-6020A

Sample/Analyte:		
0801135-13	57SB10C	Arsenic

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was greater than or equal to 4 times the spiked amount; the non-spiked sample result is not qualified.

Analysis: USEPA-6010B

Sample/Analyte:		
0801212-06	57SB12A	Aluminum
0801212-06	57SB12A	Iron
0801212-06	57SB12A	Manganese

Qualification: Due to sample matrix-related Internal Standard failure, the sample was reanalyzed at dilution. The RL for this analyte has been elevated.

Analysis: USEPA-6020A

Sample/Analyte:		
0801135-01	57SB17C	Arsenic
0801135-01	57SB17C	Copper
0801135-01	57SB17C	Nickel
0801135-01	57SB17C	Selenium
0801135-03	57SB15B	Arsenic
0801135-03	57SB15B	Copper
0801135-03	57SB15B	Nickel
0801135-03	57SB15B	Selenium
0801135-04	57SB15C	Arsenic
0801135-04	57SB15C	Copper
0801135-04	57SB15C	Nickel
0801135-04	57SB15C	Selenium

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METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0800833-BLK1
File ID: 8012332-037
Prepared: 01/23/08 09:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL
Analyzed: 01/23/08 19:48
Instrument: 114
QC Batch: 0800833
Sequence: 8012332
Calibration: 8A24001

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-50-8	Copper, Total	0.33	1.0	1.0 ug/L	U
7439-92-1	Lead, Total	0.33	1.0	0.442 ug/L	J
7440-28-0	Thallium, Total	0.17	1.0	1.0 ug/L	U
7440-66-6	Zinc, Total	0.84	10	10 ug/L	U

lead 2.21

01542

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800485-BLK1
File ID: 8012206-022
Prepared: 01/15/08 07:00
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 250 mL
Analyzed: 01/22/08 09:13
Instrument: 114
QC Batch: 0800485
Sequence: 8012206
Calibration: 8A22009

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-38-2	Arsenic, Total	0.071	0.20	0.20 mg/kg dry wt.	U
7440-50-8	Copper, Total	0.044	0.20	0.0580 mg/kg dry wt.	J
7440-02-0	Nickel, Total	0.036	0.10	0.10 mg/kg dry wt.	U
7782-49-2	Selenium, Total	0.089	0.30	0.30 mg/kg dry wt.	U
7440-22-4	Silver, Total	0.013	0.10	0.10 mg/kg dry wt.	U
7440-62-2	Vanadium, Total	0.034	0.10	0.10 mg/kg dry wt.	U

Copper 0.29

01535

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800608-BLK1
File ID: 8012401-014
Prepared: 01/17/08 07:35
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 250 mL
Analyzed: 01/24/08 08:33
Instrument: 114
QC Batch: 0800608
Sequence: 8012401
Calibration: 8A24008

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-38-2	Arsenic, Total	0.071	0.20	0.20 mg/kg dry wt.	U
7440-50-8	Copper, Total	0.044	0.20	0.20 mg/kg dry wt.	U
7439-92-1	Lead, Total	0.022	0.20	0.0365 mg/kg dry wt.	J
7440-02-0	Nickel, Total	0.036	0.10	0.10 mg/kg dry wt.	U
7782-49-2	Selenium, Total	0.089	0.30	0.30 mg/kg dry wt.	U
7440-22-4	Silver, Total	0.013	0.10	0.10 mg/kg dry wt.	U
7440-28-0	Thallium, Total	0.0049	0.10	0.10 mg/kg dry wt.	U
7440-62-2	Vanadium, Total	0.034	0.10	0.0360 mg/kg dry wt.	J

lead 0.18 25
V 0.18

01539

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-46
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0800644-BLK1
File ID: 8012242-015
Prepared: 01/18/08 07:15
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL
Analyzed: 01/22/08 17:24
Instrument: 114
QC Batch: 0800644
Sequence: 8012242
Calibration: 8A23012

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-38-2	Arsenic, Total	0.74	3.0	3.0 ug/L	U
7440-39-3	Barium, Total	0.52	2.0	2.0 ug/L	U
7440-41-7	Beryllium, Total	0.31	2.0	2.0 ug/L	U
7440-43-9	Cadmium, Total	0.062	0.20	0.20 ug/L	U
7440-47-3	Chromium, Total	0.31	2.0	0.411 ug/L	J
7440-48-4	Cobalt, Total	0.096	1.0	1.0 ug/L	U
7439-96-5	Manganese, Total	0.43	3.0	3.0 ug/L	U
7440-02-0	Nickel, Total	0.28	2.0	2.0 ug/L	U
7782-49-2	Selenium, Total	0.92	3.0	3.0 ug/L	U
7440-22-4	Silver, Total	0.12	0.50	0.50 ug/L	U
7440-62-2	Vanadium, Total	0.83	5.0	5.0 ug/L	U

Cr 2.055

01548

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

57SB12A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-46

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3050B Digestion

Initial/Final: 0.5004 g / 250 mL

Laboratory ID: 0800608-MS1

QC Batch: 0800608

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Arsenic, Total	20.0	3.42	17.7	72 *	80 - 120	mg/kg dry wt.
Copper, Total	20.0	8.88	26.2	87	80 - 120	mg/kg dry wt.
Lead, Total	20.0	17.8	38.1	101	80 - 120	mg/kg dry wt.
Nickel, Total	20.0	5.54	23.3	89	80 - 120	mg/kg dry wt.
Selenium, Total	20.0	ND	13.9	70 *	80 - 120	mg/kg dry wt.
Silver, Total	20.0	0.0330	19.2	96	75 - 120	mg/kg dry wt.
Thallium, Total	20.0	0.255	19.0	94	80 - 120	mg/kg dry wt.
Vanadium, Total	20.0	28.4	53.6	126 *	80 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

01545

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

57SB12A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

Laboratory ID: 0800608-MSD1

SDG: 36440-46

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3050B Digestion

Initial/Final: 0.4996 g / 250 mL

QC Batch: 0800608

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Arsenic, Total	20.0	18.5	75 *	4	20	80 - 120	mg/kg dry wt.
Copper, Total	20.0	26.8	90	2	20	80 - 120	mg/kg dry wt.
Lead, Total	20.0	39.1	106	3	20	80 - 120	mg/kg dry wt.
Nickel, Total	20.0	24.0	92	3	20	80 - 120	mg/kg dry wt.
Selenium, Total	20.0	14.9	74 *	7	20	80 - 120	mg/kg dry wt.
Silver, Total	20.0	19.7	98	3	20	75 - 120	mg/kg dry wt.
Thallium, Total	20.0	19.7	97	4	20	80 - 120	mg/kg dry wt.
Vanadium, Total	20.0	47.5	95	12	20	80 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

01546

SERIAL DILUTION

USEPA-6020A

57SB12A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

% Solids: 83.95

Laboratory ID: 8012401-SRD1

Lab Source ID: 0801212-06

SDG: 36440-46

Project: RFAAP SWMU 57 RFI/CMS, WO 003

QC Batch: 8012401

Sequence: 8012401

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Arsenic, Total	0.00684		0.00748		9.0 #		mg/L	10
Copper, Total	0.0178		0.0207		16.0	*	mg/L	10
Lead, Total	0.0357		0.0364		2.0		mg/L	10
Nickel, Total	0.0111		0.0127		14.0	*	mg/L	10
Selenium, Total	-0.0000900	U	-0.00160	U	1678.0 #		mg/L	10
Silver, Total	0.0000660	J	0.00001000	U	85.0 #		mg/L	10
Thallium, Total	0.000510		0.000545	J	7.0 #		mg/L	10
Vanadium, Total	0.0568		0.0623		10.0		mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

01564

SERIAL DILUTION

USEPA-6020A

57SB10C

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

% Solids: 77.00

Laboratory ID: 8012206-SRD1

Lab Source ID: 0801135-13

SDG: 36440-46

Project: RFAAP SWMU 57 RFI/CMS, WO 003

QC Batch: 8012206

Sequence: 8012206

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Arsenic, Total	0.00540		0.00625		16.0 #		mg/L	10
Copper, Total	0.0441		0.0518		17.0	*	mg/L	10
Nickel, Total	0.0359		0.0413		15.0	*	mg/L	10
Selenium, Total	0.000598	J	0.000650	U	9.0 #		mg/L	10
Silver, Total	0.0000900	J	0.0000800	U	11.0 #		mg/L	10
Vanadium, Total	0.0321		0.0359		12.0	*	mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

01562

DATA VALIDATION WORKSHEET

Total Organic Carbon

Reviewer: RA
Date: 2/15/08
DV Level: II III IV
Review Document:
_X__ Region III Modified for National Functional Guidelines
_X__ Methods of Soil Analyses for soil by Walkley Black
_X__ Project QAPP/SAP

Project Name: Radford
Project Number: 11605 6421
Laboratory: TriMatrix
SDG No.: 36440-46
Test Name: TOC
Method No.: Walkley Black

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?			
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?			
1.3	Do sample preservation, collection and storage condition meet method requirement? (4C and <2)			
	If samples were received with the cooler temperature exceeding 20 °C, then flag L(+)/UL(-).			
1.4	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?			

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Have any technical holding times (28 days), determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field / equipment blanks have positive results? If yes, use same rules above.			✓

Notes:

URS

4.0 Calibration		Yes	No	NA
4.1	Was a titration blank analyzed before processing the samples?	✓		
4.2	Is titrant normality within 0.5 +/- 0.05N? If no, J/UJ	✓		
				✓

Notes:

5.0 Laboratory Control Sample (LCS)		Yes	No	NA
5.1	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.2	Are there any %R for LCS/LCSD recoveries outside the laboratory's QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
5.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.			✓

Notes:

6.0 Laboratory Duplicate		Yes	No	NA
6.1	Was a laboratory duplicate analyzed at required frequency (one per 20 samples per batch) ?	✓		
6.2	Is the RPD within the laboratory's QC limits?	✓		
	If no, J flag positive results only.			

Notes:

7.0 Field Duplicate		Yes	No	NA
7.1	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended should be noted during data validation and discussed in the DV report.			

Notes:

8.0 Compound Identification and Detection Limit Verification		Yes	No	NA
8.1	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes:

9.0 Data Completeness		Yes	No	NA
9.1	Is % completeness for certainty? (Control limit 90%)	✓		
9.1.1	Number of samples:_____			
9.1.2	Number of target compounds in each analysis: 1			
9.1.3	Number of results that are uncertain at comparison criteria standard:_____			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100 %			

Notes:

SDG CASE NARRATIVE

URS Corporation
RFAAP SWMU 57 RFI/CMS, WO 003

SDG Executive Summary

This case narrative applies to samples received on January 08, 2008 through January 11, 2008. All samples were scheduled for analysis in accordance with parameters outlined on the field chain of custody record, the TriMatrix bid form, and/or oral and written correspondence between URS Corporation and TriMatrix Laboratories, Inc..

Each sample receipt event was assigned a unique TriMatrix work order number. Sample receipt documentation is included in section A of this data package.

Project Technical Issues/Problems

Project-related data qualification designations and reporting conventions are included in Attachment 1 - *Project Technical Narrative*.

QA/QC Data Qualifications/Narrations

Quality assurance issues and/or quality control data qualifications and narrations related to the analysis and reporting of this SDG are presented in Attachment 2 - *Statement of Data Qualifications*. The absence of a statement page for a particular analyte group (*e.g.* Percent Solids) implies that no qualifying statements were generated for that analyte.

Data Review and Approval

All data was peer-reviewed by a second analyst, and then by appropriate data management staff against laboratory quality control requirements and project specifications. It was then reviewed and approved by the group supervisor/manager prior to further review by the project chemist.

Data Deliverables

The data deliverables, both hardcopy and/or electronic (EDD), that comprise this data package are intended to comply with the documents referenced in the introductory section of this narrative. The EDD, if requested, will be issued separately from this hardcopy report. Hold time reports for each test procedure are presented following the CLP-like forms section of this report.

This report relates only to the sample(s) as received. Test results are in compliance with the requirements of the National Environmental Laboratory Accreditation Conference (NELAC). Estimates of analytical uncertainties for the test results contained within the report are available upon request.

Walter J. Roudebush, Project Chemist

2/12/2008
Date

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SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 0801083

TriMatrix Laboratories received the cooler(s) for this work order on January 08, 2008, at 09:15am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
57SB17A	0801083-01	Soil	1/7/2008
57SB17B	0801083-02	Soil	1/7/2008

No administrative issues were encountered during the receipt and analysis of this work order.

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SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 0801135

TriMatrix Laboratories received the cooler(s) for this work order on January 09, 2008, at 08:45am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
57SB17C	0801135-01	Soil	1/8/2008
57SB15A	0801135-02	Soil	1/8/2008
57SB15B	0801135-03	Soil	1/8/2008
57SB15C	0801135-04	Soil	1/8/2008
DUP-1	0801135-05	Soil	1/8/2008
EQBK-1	0801135-06	Water	1/8/2008
Trip Blank	0801135-07	Water	1/8/2008
57SB16A	0801135-08	Soil	1/8/2008
57SB16B	0801135-09	Soil	1/8/2008
57SB16C	0801135-10	Soil	1/8/2008
57SB10A	0801135-11	Soil	1/8/2008
57SB10B	0801135-12	Soil	1/8/2008
57SB10C	0801135-13	Soil	1/8/2008

No administrative issues were encountered during the receipt and analysis of this work order.

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SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 0801212

TriMatrix Laboratories received the cooler(s) for this work order on January 11, 2008, at 08:30am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
57SB11A	0801212-01	Soil	1/9/2008
57SB11B	0801212-02	Soil	1/9/2008
57SB11C	0801212-03	Soil	1/9/2008
DUP-2	0801212-04	Soil	1/9/2008
57SB2AB	0801212-05	Soil	1/9/2008
57SB12A	0801212-06	Soil	1/9/2008
57SB12B	0801212-07	Soil	1/9/2008
57SB12C	0801212-08	Soil	1/9/2008
EQBK-2	0801212-09	Water	1/9/2008
Trip Blank	0801212-10	Water	1/9/2008
57SB18A	0801212-11	Soil	1/9/2008
57SB18B	0801212-12	Soil	1/9/2008
57SB18C	0801212-13	Soil	1/9/2008
57SB13A	0801212-14	Soil	1/9/2008
57SB13B	0801212-15	Soil	1/9/2008
57SB13C	0801212-16	Soil	1/9/2008
DUP-3	0801212-17	Soil	1/9/2008
57SB19A	0801212-18	Soil	1/9/2008
57SB19B	0801212-19	Soil	1/9/2008
57SB19C	0801212-20	Soil	1/9/2008

No administrative issues were encountered during the receipt and analysis of this work order.

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SDG CASE NARRATIVE

Attachment 1
Project Technical Narrative

Sample Result Reporting Convention

Sample results are reported as RL "U" (e.g. 0.001 U) if the target analyte was not detected above the MDL.

If a sample for an organic analyte is reanalyzed and also reported, the second analysis includes the suffix "RE*n*" where *n* = the first, second, etc. reanalysis.

Data Qualifier Designation

If applicable, sample results are qualified with:

- a "J" flag if the analyte was detected, but the concentration is greater than the MDL and less than the RL;
- a "B" flag if the analyte was also detected at or above the RL in the associated method blank, and the sample concentration was less than five times the method blank result;
- an "E" flag if the analyte exceeded the instrument calibration range;
- an asterisk (*) if a report-generated statement of qualification applies; qualifying statements, if any, will be found in Attachment 2 to this narrative.

QC Batch and Analytical Batch Designation

A Quality Control (QC) Batch is a seven-digit number that associates all samples that have been prepared together (or analyzed together if there is no preparation). Quality Control batches are limited to no more than twenty samples, excluding batch QC (method blanks, control spikes, etc.). Some batches may contain multiple sets of method blanks (BLK) and laboratory control samples (BS), where a set of method quality control analyses were prepared in concert with each set of samples on a given day.

An Analytical Batch (or Sequence) is a seven-digit number that associates all samples analyzed as a set under one analytical sequence.

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Chain of Custody Record

COC No. 121991

Page 1 of 1

For Lab Use Only
Cart:
VOA Rack/Tray: —
Receipt Log No. 454
Project Chemist: WSR
Laboratory Project No. 080108 3

Client Name: URS/RFAAP
Address: 5540 Falmouth St., Suite 201
Richmond, VA 23230
Phone 804-965-9000
Fax 804-965-9764

Project Name: SWMU 57 RFI
RAAP ~~10 RFI/CMS~~
Client Project No./P.O. No. 11656421 ~~21354887.20002~~
Invoice No. ☑ Client ☐ Other (comments)
Contact/Report To: Tina DeVine

Analyses Requested

Container Type (corresponds to Container Packing List): 21 16 20

Number of Containers Submitted

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	VOC 8260	Metals	Percent Solids	Total	Sample Comments
19	SO	01	1	57SB17A		1.7.08	1425		✓	S	1/21	1		3	corrections/ additions by Tri Matrix & per client WSR
19	SO	02	2	57SB17B		1.7.08	1438		✓	S	1/31	1		3	
			3												
			4												
			5												
			6												
			7												
			8												
			9												
			10												

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS

How Shipped? Hand Carrier FedEx
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	1.7.08	1800						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						[signature]	1-8-08	0915

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Chain of Custody Record

COC No. 122302

Page 1 of 2

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Cart: 5+ Vol Soil Prog
VOA Rack/Tray: 4950.
Receipt Log No.: 47-7
Project Chemist: WOR
Laboratory Project No: E 0801135

Client Name: URS Corp.
Address: 5540 Falmouth St. Suite 201
Richmond, Va. 23230
Phone (804) 965-9000
Fax 804 965-9764

Project Name: SWMU 57 RFI
Client Project No./P.O. No.: 11656421
Invoice No. ☒ Client ☐ Other (comments)
Contact/Report To: Tina DeVine

Analyses Requested

Container Type (corresponds to Container Packing List)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals	VOCs 8260 B	% Solids	Metals	VOCs								Total	Sample Comments
				Number of Containers Submitted							1	B	1											
1950	SO	01	1	57SB17C		1/8/08	0820		X	S	1	B	1										5	
1950	SO	02	2	57SB15A		1/8/08	1040		X	S	1	B	1										5	
1950	SO	03	3	57SB15B		1/8/08	1050		X	S	1	B	1										5	
1950	SO	04	4	57SB15C		1/8/08	1140		X	S	1	B	1										5	
2150	SO	05	5	DUP-1		1/8/08	—		X	S	1	B	1										5	
2050	WQ	06	6	EQBK-1		1/8/08	1245		X	W	~~1~~	~~B~~	~~mL~~	1	E								3	
0550	WQ	07	7	Trip Blank		1/8/08	1245		X	W					E								2	
1950	SO	08	8	57SB16A		1/8/08	1250		X	S	1	B	1										5	
1950	SO	09	9	57SB16B		1/8/08	1300		X	S	1	B	1										5	
1950	SO	10	10	57SB16C		1/8/08	1520		X	S	1	B	1										5	

Preservatives: A NONE pH~7; B HNO_3 pH<2; C H_2SO_4 pH<2; D 1+1 HCl pH<2; E NaOH pH>12; F ZnAc/NaOH pH>9; G MeOH; H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corporation

How Shipped? Hand Carrier FedEx
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	1-08-08	1730						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						Kim Ziegler	1-9-08	0845

FedEX

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Chain of Custody Record

COC No. 122301

Page 2 of 2

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Cart: 5 + Nd Soil Frdg
VOA Rack/Tray: 495 D.
Receipt Log No.: 47-7
Project Chemist: WSR
Laboratory Project No.: E 0801135

Client Name: URS Corp.
Address: 5540 Falmouth St. Suite 201
Richmond, Va. 23230
Phone (804) 965-9000
Fax 804 965-9764

Project Name: Sumu 57 RF1
Client Project No./P.O. No.: 11656421
Invoice No.: ☑ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

Metals
VOCs 8260B
% Solids

Container Type (corresponds to Container Packing List)

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

	Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Number of Containers Submitted								Total	Sample Comments
1	19	50	11	57SB10A		1/8/08	1535		X	S	1	B	1						5	
2	19	50	12	57SB10B		1/8/08	1600		X	S	1	B	1						5	
3	19	50	13	57SB10C		1/8/08	1645		X	S	1	B	1						5	
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corporation

How Shipped? Hand Carrier Fed Ex
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	1-8-08	1730						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						Kim Ziegler	1/9/08	0845

Fed EX

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Chain of Custody Record

COC No. 122300

For Lab Use Only
Cart: 4
VOA Rack/Tray: 13B
Receipt Log No.: 3-2
Project Chemist: MJR
Laboratory Project No.: E 0801212

Client Name: URS Corp.
Address: 5540 Falmouth St. Suite 201
Richmond, Va. 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFAAP Swmu 57 RFI
Client Project No./P.O. No.: 11656421
Invoice No.: ☒ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

Container Type (corresponds to Container Packing List): 1 6 2 1 2 0 6 p 1 7

Number of Containers Submitted

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals	VOCs 8260 B	% Solids	Metals	VOCs	TOC							Total	Sample Comments
														B	D									
1950		01	1	57SB11A	TM187H	1/9/08	0748		X	S	1	B	1										5	
1950		02	2	57SB11B		1/9/08	0755		X	S	1	B	1										5	
1950		03	3	57SB11C		1/9/08	1030		X	S	1	B	1										5	
2150		04	4	DUP-2		1/9/08	—		X	S	1	B	1										5	Sample time = 11:30 per client (MR)
1950		05	5	57SB12AB		1/9/08	0956		X	S	1	B	1										5	
2250		06	6	57SB12A/MS/MSD		1/9/08	1100		X	S	1	B	1			✓							10	TOC Added by Tri Matrix per client (MR)
1950		07	7	57SB12B		1/9/08	1120		X	S	1	B	1										5	
1950		08	8	57SB12C		1/9/08	1200		X	S	1	B	1										5	
2040	W	09	9	EQBK-2		1/9/08	1525		X	W				1	2								3	
0502	W	10	10	Trip Blank	↓	1/9/08	1525		X	W					2								2	

Preservatives
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corporation

How Shipped? Hand Carrier: FedEx
Tracking No.:

Comments:

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	01.09.08	16:40						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
							1-11-08	0830

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COC No. 122298

Page 2 of 2

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Cart: 4
VOA Rack/Tray: B1B
Receipt Log No.: 32
Project Chemist: CWR
Laboratory Project No.: E 0801212

Client Name: URS Corp.
Address: 5540 Falmouth St. Suite 201
Richmond, VA. 23230
Phone: (804) 965-9000
Fax: (804) 965-9764

Project Name: RFAAP Sumu 57 RFI
Client Project No./P.O. No.: 11656421
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested: Metals; VOC's 8260B; % Solids

Container Type (corresponds to Container Packing List): 1L 2L 125

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Number of Containers Submitted			Total	Sample Comments
19	SO	11	1	57SB18A	TM1871	1/9/08	1305		X	S	1	B	1	5	
19	SO	12	2	57SB18B		1/9/08	1315		X	S	1	B	1	5	
19	SO	13	3	57SB18C		1/9/08	1338		X	S	1	B	1	5	
19	SO	14	4	57SB13A		1/9/08	1419		X	S	1	B	1	5	
19	SO	15	5	57SB13B		1/9/08	1430		X	S	1	B	1	5	
19	SO	16	6	57SB13C		1/9/08	1510		X	S	1	B	1	5	
21	SO	17	7	DUP-3		1/9/08	—		X	S	1	B	1	5	Sample time = 1500 per client (CWR)
19	SO	18	8	57SB19A		1/9/08	1530		X	S	1	B	1	5	
19	SO	19	9	57SB19B		1/9/08	1540		X	S	1	B	1	5	
19	SO	20	10	57SB19C		1/9/08	1605		X	S	1	B	1	5	

Sampled By (print): ~~Jim Carter~~ Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp.

How Shipped? Hand Carrier FedEx
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	01.09.08	16:40						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						[signature]	1.11.08	0830

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Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCS/LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	g	Laboratory duplicate imprecision
g	Tuning failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	h	Holding time violation
h	Holding time violation	h	Holding time violation	k	Cooler receipt temperature exceeds limits
i	Internal standard failure	i	Internal standard failure	l	LCS recovery failure
k	Cooler receipt temperature exceeds limits	k	Cooler receipt temperature exceeds limits	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination	n	Failed Signal to noise ratio		

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-47 **Fraction:** VOCs, SVOCs, Pest, PCBs, Explosives, Metals, & TOC

Lab: TriMatrix **Project Name** Radford SWMU 57

Reviewer: RA **Date:** February 22, 2008

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the Region III Modifications to the USEPA National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical method employed and provisions of the approved project-specific QAPP.

Major Anomalies: None.

Minor Anomalies: For the VOCs analyses, the soil method blanks displayed positive detections for 1,4-dichlorobenzene at 8.5 ug/Kg and methylene chloride at 16 ug/Kg. The aqueous method blank displayed a positive detection for acetone at 1.68 ug/L. Positive associated field sample results less than ten times the method blank concentrations for acetone and methylene chloride were flagged "B,z". The associated field sample results for 1,4-dichlorobenzene were non-detects and no data qualifying action was required. Trip blanks displayed positive detections for methylene chloride and toluene. Positive associated field sample results less than ten times the trip blank concentration for methylene chloride and less than five times the trip blank concentration for toluene were flagged "B,y". The equipment blank, EQBK-5 displayed a positive detection for chloroform at 0.84 ug/L. The associated field sample results were non-detects and no data qualifying action was required.

The continuing calibration analyzed for sequence 8011735 displayed a percent difference (%D) greater than the control limit (i.e., 20%) with a negative bias for acetone at 22% and with a positive bias for carbon disulfide at 35.5%. The continuing calibration analyzed for sequence 8011744 displayed a %D greater than the control limit with a positive bias for carbon disulfide at 87.3%. The continuing calibration analyzed for sequence 8012120 displayed a %D greater than the control limit with a positive bias for bromomethane at 21.2%. Positive associated field sample results were flagged "J,c" for the compounds that displayed a positive bias. The associated field sample results for acetone were positive and were flagged "J,c".

The matrix spike pair analyzed for sample 57SB14A displayed percent recoveries (%Rs) and/or relative percent differences (RPDs) greater than the upper control limits for 1,1-dichloroethane (130%, 135%), 1,2-dichloropropane (122%, 130%),

isopropylbenzene (157%, 162%), methyl tert-butyl ether (135%, 136%), 1,1,2,2-tetrachloroethane (161%, 178%), chloroform (127%), 1,2-dibromo-3-chloropropane (166%), 1,2-dibromoethane (132%), 1,2-dichlorobenzene (122%), cis-1,2-dichloroethene (126%), 2-hexanone (155%), and methyl acetate (199%, 40%). The associated parent sample result for methyl acetate was positive and was flagged "J,m". This matrix spike pair also displayed %Rs less than the lower control limits for styrene (57%, 66%), 1,2,3-trichlorobenzene (57%), and 1,2,4-trichlorobenzene (60%). The associated parent sample results were non-detects and were flagged "UJ,m".

The matrix spike pair analyzed for sample 57SB8AB displayed %Rs and/or RPDs greater than the upper control limits for1,2-dibromo-3-chloropropane (143%, 160%), 2-butanone (178%), 1,1,2,2-tetrachloroethane (146%, 161%), 1,2-dichlorobenzene (123%), isopropylbenzene (145%, 40%), methylcyclohexane (53%), 1,2,3-trichlorobenzene (43%), and 1,2,4-trichlorobenzene (41%). The associated parent sample results were non-detects and no data qualifying action was required. This matrix spike pair also displayed %Rs less than the lower control limits for acetone (11%, -175%), methyl acetate (10%, 7%), methylcyclohexane (67%), 1,2,4-trichlorobenzene (57%), and 1,1,2-trichloro-1,2,2-trifluoroethane (78%). The associated parent sample results for acetone and methyl acetate were positive and were flagged "J,m". The associated parent sample results for methylcyclohexane, 1,2,4-trichlorobenzene, and 1,1,2-trichloro-1,2,2-trifluoroethane were non-detects and were flagged "UJ,m".

The laboratory control sample analyzed for batch 800592 displayed a %R greater than the upper control limit for carbon disulfide at 188%. The laboratory control sample pair analyzed for batch 800595 displayed %Rs greater than the upper control limit for carbon disulfide (163%, 188%). Positive associated field sample results were flagged "J,l", unless previously flagged for a calibration anomaly.

Samples 57SB6A and 57SB5AB displayed areas less than the lower control limit of 50% for the internal standard 1,4-dichlorobenzene-d4 at 48%, and 49%, respectively. The associated field sample results were non-detects and were flagged "UJ,i".

Acetone exceeded the calibration range of the instrument in sample 57SB14A and was flagged "E" by the laboratory. This result was flagged "J,q" by the reviewer.

For the SVOCs analyses, the soil method blanks displayed positive detections for di-n-butyl phthalate at 1.33 ug/Kg, and bis(2-ethylhexyl)phthalate at 1.67 ug/Kg. The aqueous method blanks displayed positive detections for butyl benzyl phthalate at 0.11 ug/L, and di-n-butyl phthalate at 0.56 ug/L. Positive associated field sample results less than ten times the method blank concentrations were flagged "B,z". Equipment blank, EQBK-4 displayed a positive detection for acetophenone at 0.075 ug/L. Equipment blank, EQBK-5 displayed positive detections for diethyl phthalate at 0.038 ug/L, naphthalene at 0.066 ug/L, and phenanthrene at 0.019 ug/L. The associated field

sample results were well above the equipment blank concentrations and no data qualifying action was required.

The matrix spike pair analyzed for sample 57SB8AB displayed %Rs and/or RPDs greater than the upper control limits for carbazole (168%, 172%), caprolactam (32%), and hexachlorocyclopentadiene (32%). The associated parent sample results were non-detects and no data qualifying action was required. This matrix spike pair also displayed %Rs less than the lower control limits for 4,6-dinitro-2-methylphenol (25%, 24%), and 2,4-dinitrophenol (12%). The associated parent sample results were non-detects and were flagged "UJ,m".

For the pesticides analyses, the continuing calibration analyzed for sequence 8020314 displayed a %D greater than the control limit with a positive bias for endrin on the second column at 20.9%. The associated field sample results were non-detects and no data qualifying action was required.

Surrogate tetrachloro-m-xylene displayed %Rs less than the lower control limit of 70% on the second column for samples 57SB5B (66%), 57SB5C (63%), DUP-6 (59%), 57SB8A (54%), 57SB8AB (53%), 57SB8B (53%), and 57SB8C (67%). No data qualifying action is required based on one surrogate failure, and no data flags were applied.

The matrix spike pair analyzed for sample 57SB8AB displayed %Rs and/or RPDs greater than the upper control limits for 4,4'-DDT (156%, 158%), and toxaphene (260%, 170%, 42%). The associated parent sample results were non-detects and no data qualifying action was necessary.

The laboratory control sample analyzed for batch 800928 displayed %Rs and/or RPDs greater than the upper control limits for alpha-chlordane (121%, 124%), 4,4'-DDE (127%), and toxaphene (302%, 172%, 55%). The associated field sample results were non-detects and no data qualifying action was necessary.

Several compounds displayed percent differences greater than the control limit of 40% between the two analytical columns for several samples. These results were flagged "J,g" in the associated samples.

For the PCBs analyses, several compounds displayed percent differences greater than the control limit of 40% between the two analytical columns for several samples. These results were flagged "J,g" in the associated samples.

The field duplicate pair (57SB5AB/DUP-6) displayed results outside the control limits for PCB-1254. These results were flagged "J,f" in these two samples.

For the metals analyses, for method 6010, the soil method blanks displayed positive detections for beryllium, cadmium, calcium, iron, and sodium. The aqueous method blank displayed a positive detection for sodium. Positive associated field sample results less than five times the method blank concentrations were flagged "B,p". The equipment blanks displayed positive detections for calcium and iron. The associated field sample results were greater than five times the equipment blank concentrations and no data qualifying action was required.

For method 6020, the soil method blanks displayed positive detections for lead, copper, and vanadium. The aqueous method blank displayed positive detections for chromium and lead. Positive associated field sample results less than five times the method blank concentrations were flagged "B,p". The equipment blanks displayed positive detections for barium, manganese, and nickel. The associated field sample results were greater than five times the equipment blank concentrations and no data qualifying action was necessary.

For method 6020, the matrix spike analyzed for sample 57SB14A displayed a %R less than the lower control limit of 75% for selenium at 74%. The matrix spike pair analyzed for sample 57SB8AB displayed %Rs less than the lower control limit for arsenic (63%/63%), copper (74%), selenium (60%/59%), and vanadium (73%). Positive associated field sample results were flagged "L,m", and non-detects were flagged "UL,m".

For method 6010, the serial dilution analyzed for sample 57SB14A displayed a percent difference greater than the control limit of 10% for aluminum at 19%. For method 6020, the serial dilution analyzed for sample 57SB8AB displayed percent differences greater than the control limit of 10% for copper at 16%, nickel at 20%, and vanadium at 14%. Positive associated field sample results were flagged "J,s", unless previously flagged for a matrix spike anomaly.

Correctable Anomalies: None.

Comments: On the basis of this evaluation, the laboratory appears to have followed the specified method. All data are usable, as qualified, for their intended purpose based on the data reviewed. It should be noted that detection limits were raised in several samples due to dilutions. It should also be noted that the percent solids were less than 50% for samples 57SB6A and 57SB7A at 29%, and 37%, respectively. Please note that if a fraction is not discussed in this report, all quality control criteria are met for that fraction.

Signed: Rayam

SAMPLE ID SUMMARY

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-47

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB14A	0801213-01
57SB14B	0801213-02
57SB14C	0801213-03
57SB1AB	0801213-04
DUP-4	0801213-05
57SB9A	0801213-06
57SB9AB	0801213-07
EQBK-3	0801213-08
Trip Blank	0801213-09
57SB6A	0801213-10
57SB6AB	0801213-11
57SB6B	0801213-12
EQBK-4	0801230-01
Trip Blank	0801230-02
57SB6C	0801233-01
57SB7A	0801233-02
57SB7AB	0801233-03
57SB7B	0801233-04
57SB7C	0801233-05
57SB4AB	0801233-06
57SB4B	0801233-07
57SB4C	0801233-08
DUP-5	0801233-09
EQBK-5	0801250-01
Trip Blank	0801250-02
57SB5A	0801253-01
57SB5AB	0801253-02
57SB5B	0801253-03
57SB5C	0801253-04
DUP-6	0801253-06
57SB8A	0801253-07
57SB8AB	0801253-08
57SB8B	0801253-09
57SB8C	0801253-10

01681

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB14A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-01 File ID: 21301A.D

Sampled: 01/10/08 08:10 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 17:29

Solids: 86.34 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	260	23	4.9	E J, B
71-43-2	Benzene	1	5.8	5.8	0.15	U
74-97-5	Bromochloromethane	1	23	23	0.15	U
75-27-4	Bromodichloromethane	1	5.8	5.8	0.29	U
75-25-2	Bromoform	1	5.8	5.8	0.56	U
74-83-9	Bromomethane	1	5.8	5.8	1.4	U
75-15-0	Carbon Disulfide	1	0.36	5.8	0.30	J J, L
56-23-5	Carbon Tetrachloride	1	5.8	5.8	0.33	U
108-90-7	Chlorobenzene	1	5.8	5.8	0.23	U
75-00-3	Chloroethane	1	23	23	0.41	U
67-66-3	Chloroform	1	5.8	5.8	0.17	U
74-87-3	Chloromethane	1	5.8	5.8	0.28	U
110-82-7	Cyclohexane	1	12	12	0.80	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.94	U
124-48-1	Dibromochloromethane	1	5.8	5.8	0.41	U
106-93-4	1,2-Dibromoethane	1	5.8	5.8	0.98	U
95-50-1	1,2-Dichlorobenzene	1	5.8	5.8	0.28	U
541-73-1	1,3-Dichlorobenzene	1	5.8	5.8	0.28	U
106-46-7	1,4-Dichlorobenzene	1	5.8	5.8	0.25	U
75-71-8	Dichlorodifluoromethane	1	5.8	5.8	0.38	U
75-34-3	1,1-Dichloroethane	1	5.8	5.8	0.22	U
107-06-2	1,2-Dichloroethane	1	5.8	5.8	0.34	U
75-35-4	1,1-Dichloroethene	1	5.8	5.8	0.43	U
156-59-2	cis-1,2-Dichloroethene	1	5.8	5.8	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	5.8	5.8	0.26	U
78-87-5	1,2-Dichloropropane	1	5.8	5.8	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	5.8	5.8	0.29	U
10061-02-6	trans-1,3-Dichloropropene	1	5.8	5.8	0.97	U
100-41-4	Ethylbenzene	1	5.8	5.8	0.14	U
591-78-6	2-Hexanone	1	12	12	3.5	U
98-82-8	Isopropylbenzene	1	5.8	5.8	0.14	U
79-20-9	Methyl Acetate	1	22	23	0.96	J J, M
1634-04-4	Methyl tert-Butyl Ether	1	5.8	5.8	0.27	U
108-87-2	Methylcyclohexane	1	12	12	0.92	U
75-09-2	Methylene Chloride	1	4.8	23	4.6	J B, J
78-93-3	2-Butanone (MEK)	1	22	23	2.8	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U

01775

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB14A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-01 File ID: 21301A.D

Sampled: 01/10/08 08:10 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 17:29

Solids: 86.34 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	5.8	5.8	0.26	U UJ, m
79-34-5	1,1,2,2-Tetrachloroethane	1	5.8	5.8	0.23	U
127-18-4	Tetrachloroethene	1	5.8	5.8	0.51	U
108-88-3	Toluene	1	5.8	5.8	0.47	U
87-61-6	1,2,3-Trichlorobenzene	1	23	23	0.24	U UJ, m
120-82-1	1,2,4-Trichlorobenzene	1	5.8	5.8	0.28	U UJ, m
71-55-6	1,1,1-Trichloroethane	1	5.8	5.8	0.24	U
79-00-5	1,1,2-Trichloroethane	1	5.8	5.8	0.80	U
79-01-6	Trichloroethene	1	5.8	5.8	0.65	U
75-69-4	Trichlorofluoromethane	1	5.8	5.8	0.25	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.8	5.8	0.38	U
75-01-4	Vinyl Chloride	1	5.8	5.8	0.53	U
1330-20-7	Xylene (Total)	1	5.8	5.8	0.68	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.0	107	78 - 121	
1,2-Dichloroethane-d4	40.0	43.2	108	66 - 124	
Toluene-d8	40.0	39.1	98	85 - 115	
4-Bromofluorobenzene	40.0	35.8	90	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	608626	7.35	831188	7.35	
Chlorobenzene-d5	242708	17.41	359521	17.4	
1,4-Dichlorobenzene-d4	222975	22.44	421770	22.44	

* Values outside of QC limits

01776

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB14B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-02 File ID: 21302.D

Sampled: 01/10/08 08:25 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 15:18

Solids: 79.37 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	27	25	5.3	
71-43-2	Benzene	1	6.3	6.3	0.16	U
74-97-5	Bromochloromethane	1	25	25	0.16	U
75-27-4	Bromodichloromethane	1	6.3	6.3	0.31	U
75-25-2	Bromoform	1	6.3	6.3	0.61	U
74-83-9	Bromomethane	1	6.3	6.3	1.5	U
75-15-0	Carbon Disulfide	1	6.3	6.3	0.33	U
56-23-5	Carbon Tetrachloride	1	6.3	6.3	0.36	U
108-90-7	Chlorobenzene	1	6.3	6.3	0.25	U
75-00-3	Chloroethane	1	25	25	0.44	U
67-66-3	Chloroform	1	6.3	6.3	0.19	U
74-87-3	Chloromethane	1	6.3	6.3	0.31	U
110-82-7	Cyclohexane	1	13	13	0.87	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.0	U
124-48-1	Dibromochloromethane	1	6.3	6.3	0.44	U
106-93-4	1,2-Dibromoethane	1	6.3	6.3	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.3	6.3	0.31	U
541-73-1	1,3-Dichlorobenzene	1	6.3	6.3	0.30	U
106-46-7	1,4-Dichlorobenzene	1	6.3	6.3	0.27	U
75-71-8	Dichlorodifluoromethane	1	6.3	6.3	0.42	U
75-34-3	1,1-Dichloroethane	1	6.3	6.3	0.24	U
107-06-2	1,2-Dichloroethane	1	6.3	6.3	0.37	U
75-35-4	1,1-Dichloroethene	1	6.3	6.3	0.47	U
156-59-2	cis-1,2-Dichloroethene	1	6.3	6.3	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.3	6.3	0.28	U
78-87-5	1,2-Dichloropropane	1	6.3	6.3	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.3	6.3	0.32	U
10061-02-6	trans-1,3-Dichloropropene	1	6.3	6.3	1.1	U
100-41-4	Ethylbenzene	1	6.3	6.3	0.16	U
591-78-6	2-Hexanone	1	13	13	3.8	U
98-82-8	Isopropylbenzene	1	6.3	6.3	0.15	U
79-20-9	Methyl Acetate	1	3.5	25	1.0	J
1634-04-4	Methyl tert-Butyl Ether	1	6.3	6.3	0.29	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U
75-09-2	Methylene Chloride	1	25	25	5.0	U
78-93-3	2-Butanone (MEK)	1	25	25	3.0	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U

01784

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB14B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-02 File ID: 21302.D

Sampled: 01/10/08 08:25 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 15:18

Solids: 79.37 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.3	6.3	0.28	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.3	6.3	0.25	U
127-18-4	Tetrachloroethene	1	6.3	6.3	0.56	U
108-88-3	Toluene	1	6.3	6.3	0.51	U
87-61-6	1,2,3-Trichlorobenzene	1	25	25	0.26	U
120-82-1	1,2,4-Trichlorobenzene	1	6.3	6.3	0.30	U
71-55-6	1,1,1-Trichloroethane	1	6.3	6.3	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.3	6.3	0.87	U
79-01-6	Trichloroethene	1	6.3	6.3	0.71	U
75-69-4	Trichlorofluoromethane	1	6.3	6.3	0.27	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.3	6.3	0.42	U
75-01-4	Vinyl Chloride	1	6.3	6.3	0.57	U
1330-20-7	Xylene (Total)	1	6.3	6.3	0.74	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	45.1	113	78 - 121	
1,2-Dichloroethane-d4	40.0	44.9	112	66 - 124	
Toluene-d8	40.0	40.2	101	85 - 115	
4-Bromofluorobenzene	40.0	35.7	89	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	660969	7.36	831188	7.35	
Chlorobenzene-d5	271569	17.41	359521	17.4	
1,4-Dichlorobenzene-d4	250502	22.44	421770	22.44	

* Values outside of QC limits

01785

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB14C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-03 File ID: 21303A.D

Sampled: 01/10/08 09:07 Prepared: 01/18/08 12:00 Analyzed: 01/18/08 18:38

Solids: 72.10 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0800703 Sequence: 8012120 Calibration: 8A21004 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	140	1000	83	J
71-43-2	Benzene	1	69	69	8.2	U
74-97-5	Bromochloromethane	1	69	69	14	U
75-27-4	Bromodichloromethane	1	69	69	13	U
75-25-2	Bromoform	1	69	69	16	U
74-83-9	Bromomethane	1	69	69	13	U
75-15-0	Carbon Disulfide	1	350	350	20	U
56-23-5	Carbon Tetrachloride	1	69	69	11	U
108-90-7	Chlorobenzene	1	69	69	8.3	U
75-00-3	Chloroethane	1	69	69	14	U
67-66-3	Chloroform	1	69	69	4.3	U
74-87-3	Chloromethane	1	21	69	4.2	J
110-82-7	Cyclohexane	1	350	350	9.6	U
96-12-8	1,2-Dibromo-3-chloropropane	1	350	350	20	U
124-48-1	Dibromochloromethane	1	69	69	9.6	U
106-93-4	1,2-Dibromoethane	1	69	69	15	U
95-50-1	1,2-Dichlorobenzene	1	69	69	4.6	U
541-73-1	1,3-Dichlorobenzene	1	69	69	8.3	U
106-46-7	1,4-Dichlorobenzene	1	69	69	9.3	U
75-71-8	Dichlorodifluoromethane	1	69	69	12	U
75-34-3	1,1-Dichloroethane	1	69	69	5.3	U
107-06-2	1,2-Dichloroethane	1	69	69	11	U
75-35-4	1,1-Dichloroethene	1	69	69	9.6	U
156-59-2	cis-1,2-Dichloroethene	1	69	69	12	U
156-60-5	trans-1,2-Dichloroethene	1	69	69	11	U
78-87-5	1,2-Dichloropropane	1	69	69	7.2	U
10061-01-5	cis-1,3-Dichloropropene	1	69	69	9.8	U
10061-02-6	trans-1,3-Dichloropropene	1	69	69	11	U
100-41-4	Ethylbenzene	1	69	69	9.2	U
591-78-6	2-Hexanone	1	3500	3500	29	U
98-82-8	Isopropylbenzene	1	69	69	8.6	U
79-20-9	Methyl Acetate	1	350	350	12	U
1634-04-4	Methyl tert-Butyl Ether	1	69	69	6.7	U
108-87-2	Methylcyclohexane	1	350	350	10	U
75-09-2	Methylene Chloride	1	28	350	11	J B, Z
78-93-3	2-Butanone (MEK)	1	3500	3500	23	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	3500	3500	26	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB14C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-03 File ID: 21303A.D

Sampled: 01/10/08 09:07 Prepared: 01/18/08 12:00 Analyzed: 01/18/08 18:38

Solids: 72.10 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0800703 Sequence: 8012120 Calibration: 8A21004 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	69	69	7.5	U
79-34-5	1,1,2,2-Tetrachloroethane	1	69	69	6.9	U
127-18-4	Tetrachloroethene	1	69	69	10	U
108-88-3	Toluene	1	69	69	5.0	U
87-61-6	1,2,3-Trichlorobenzene	1	140	140	9.3	U
120-82-1	1,2,4-Trichlorobenzene	1	140	140	11	U
71-55-6	1,1,1-Trichloroethane	1	69	69	7.6	U
79-00-5	1,1,2-Trichloroethane	1	69	69	14	U
79-01-6	Trichloroethene	1	69	69	12	U
75-69-4	Trichlorofluoromethane	1	69	69	12	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	350	350	10	U
75-01-4	Vinyl Chloride	1	69	69	12	U
1330-20-7	Xylene (Total)	1	210	210	25	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	39.6	99	78 - 121	
1,2-Dichloroethane-d4	40.0	44.4	111	66 - 124	
Toluene-d8	40.0	40.0	100	85 - 115	
4-Bromofluorobenzene	40.0	38.3	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	934943	5.14	1098591	5.14	
Chlorobenzene-d5	802927	8.08	933741	8.08	
1,4-Dichlorobenzene-d4	443425	10.38	536532	10.38	

* Values outside of QC limits

61794

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB1AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-04 File ID: 21304.D

Sampled: 01/10/08 10:55 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 16:24

Solids: 77.72 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	38	26	5.4	
71-43-2	Benzene	1	6.4	6.4	0.16	U
74-97-5	Bromochloromethane	1	26	26	0.16	U
75-27-4	Bromodichloromethane	1	6.4	6.4	0.32	U
75-25-2	Bromoform	1	6.4	6.4	0.62	U
74-83-9	Bromomethane	1	6.4	6.4	1.6	U
75-15-0	Carbon Disulfide	1	6.4	6.4	0.34	U
56-23-5	Carbon Tetrachloride	1	6.4	6.4	0.37	U
108-90-7	Chlorobenzene	1	6.4	6.4	0.26	U
75-00-3	Chloroethane	1	26	26	0.45	U
67-66-3	Chloroform	1	1.5	6.4	0.19	J
74-87-3	Chloromethane	1	6.4	6.4	0.31	U
110-82-7	Cyclohexane	1	13	13	0.88	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.0	U
124-48-1	Dibromochloromethane	1	6.4	6.4	0.45	U
106-93-4	1,2-Dibromoethane	1	6.4	6.4	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.4	6.4	0.32	U
541-73-1	1,3-Dichlorobenzene	1	6.4	6.4	0.31	U
106-46-7	1,4-Dichlorobenzene	1	6.4	6.4	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.4	6.4	0.42	U
75-34-3	1,1-Dichloroethane	1	6.4	6.4	0.25	U
107-06-2	1,2-Dichloroethane	1	6.4	6.4	0.38	U
75-35-4	1,1-Dichloroethene	1	6.4	6.4	0.48	U
156-59-2	cis-1,2-Dichloroethene	1	6.4	6.4	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.4	6.4	0.29	U
78-87-5	1,2-Dichloropropane	1	6.4	6.4	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.4	6.4	0.33	U
10061-02-6	trans-1,3-Dichloropropene	1	6.4	6.4	1.1	U
100-41-4	Ethylbenzene	1	6.4	6.4	0.16	U
591-78-6	2-Hexanone	1	13	13	3.8	U
98-82-8	Isopropylbenzene	1	6.4	6.4	0.16	U
79-20-9	Methyl Acetate	1	3.4	26	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.4	6.4	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U
75-09-2	Methylene Chloride	1	26	26	5.1	U
78-93-3	2-Butanone (MEK)	1	26	26	3.1	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U

01808

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB1AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-04 File ID: 21304.D

Sampled: 01/10/08 10:55 Prepared: 01/15/08 07:00 Analyzed: 01/15/08 16:24

Solids: 77.72 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011726 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.4	6.4	0.28	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.4	6.4	0.26	U
127-18-4	Tetrachloroethene	1	6.4	6.4	0.57	U
108-88-3	Toluene	1	6.4	6.4	0.52	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.4	6.4	0.31	U
71-55-6	1,1,1-Trichloroethane	1	6.4	6.4	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.4	6.4	0.88	U
79-01-6	Trichloroethene	1	6.4	6.4	0.72	U
75-69-4	Trichlorofluoromethane	1	6.4	6.4	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.4	6.4	0.43	U
75-01-4	Vinyl Chloride	1	6.4	6.4	0.59	U
1330-20-7	Xylene (Total)	1	6.4	6.4	0.75	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.4	108	78 - 121	
1,2-Dichloroethane-d4	40.0	44.9	112	66 - 124	
Toluene-d8	40.0	38.5	96	85 - 115	
4-Bromofluorobenzene	40.0	34.6	86	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	668988	7.36	831188	7.35	
Chlorobenzene-d5	268019	17.41	359521	17.4	
1,4-Dichlorobenzene-d4	226760	22.44	421770	22.44	

* Values outside of QC limits

01893

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-05 File ID: 21305.D

Sampled: 01/10/08 12:00 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 16:52

Solids: 77.38 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	28	26	5.5	
71-43-2	Benzene	1	6.5	6.5	0.17	U
74-97-5	Bromochloromethane	1	26	26	0.17	U
75-27-4	Bromodichloromethane	1	6.5	6.5	0.32	U
75-25-2	Bromoform	1	6.5	6.5	0.63	U
74-83-9	Bromomethane	1	6.5	6.5	1.6	U
75-15-0	Carbon Disulfide	1	6.5	6.5	0.34	U
56-23-5	Carbon Tetrachloride	1	6.5	6.5	0.37	U
108-90-7	Chlorobenzene	1	6.5	6.5	0.26	U
75-00-3	Chloroethane	1	26	26	0.45	U
67-66-3	Chloroform	1	0.84	6.5	0.19	J
74-87-3	Chloromethane	1	6.5	6.5	0.31	U
110-82-7	Cyclohexane	1	13	13	0.89	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.5	6.5	0.45	U
106-93-4	1,2-Dibromoethane	1	6.5	6.5	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.5	6.5	0.32	U
541-73-1	1,3-Dichlorobenzene	1	6.5	6.5	0.31	U
106-46-7	1,4-Dichlorobenzene	1	6.5	6.5	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.5	6.5	0.43	U
75-34-3	1,1-Dichloroethane	1	6.5	6.5	0.25	U
107-06-2	1,2-Dichloroethane	1	6.5	6.5	0.38	U
75-35-4	1,1-Dichloroethene	1	6.5	6.5	0.48	U
156-59-2	cis-1,2-Dichloroethene	1	6.5	6.5	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.5	6.5	0.29	U
78-87-5	1,2-Dichloropropane	1	6.5	6.5	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.5	6.5	0.33	U
10061-02-6	trans-1,3-Dichloropropene	1	6.5	6.5	1.1	U
100-41-4	Ethylbenzene	1	6.5	6.5	0.16	U
591-78-6	2-Hexanone	1	13	13	3.9	U
98-82-8	Isopropylbenzene	1	6.5	6.5	0.16	U
79-20-9	Methyl Acetate	1	3.5	26	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.5	6.5	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U
75-09-2	Methylene Chloride	1	26	26	5.1	U
78-93-3	2-Butanone (MEK)	1	26	26	3.1	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U

01817

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-05 File ID: 21305.D

Sampled: 01/10/08 12:00 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 16:52

Solids: 77.38 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.5	6.5	0.29	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.5	6.5	0.26	U
127-18-4	Tetrachloroethene	1	6.5	6.5	0.57	U
108-88-3	Toluene	1	6.5	6.5	0.52	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.5	6.5	0.31	U
71-55-6	1,1,1-Trichloroethane	1	6.5	6.5	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.5	6.5	0.89	U
79-01-6	Trichloroethene	1	6.5	6.5	0.73	U
75-69-4	Trichlorofluoromethane	1	6.5	6.5	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.5	6.5	0.43	U
75-01-4	Vinyl Chloride	1	6.5	6.5	0.59	U
1330-20-7	Xylene (Total)	1	6.5	6.5	0.76	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.6	104	78 - 121	
1,2-Dichloroethane-d4	40.0	44.2	110	66 - 124	
Toluene-d8	40.0	39.9	100	85 - 115	
4-Bromofluorobenzene	40.0	39.0	97	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	787549	7.44	893757	7.36	
Chlorobenzene-d5	333376	17.46	379762	17.41	
1,4-Dichlorobenzene-d4	340724	22.48	446152	22.44	

* Values outside of QC limits

01818

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-06 File ID: 21306A.D

Sampled: 01/10/08 12:55 Prepared: 01/18/08 12:00 Analyzed: 01/18/08 19:15

Solids: 85.84 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0800703 Sequence: 8012120 Calibration: 8A21004 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	140	870	70	J
71-43-2	Benzene	1	58	58	6.9	U
74-97-5	Bromochloromethane	1	58	58	11	U
75-27-4	Bromodichloromethane	1	58	58	11	U
75-25-2	Bromoform	1	58	58	13	U
74-83-9	Bromomethane	1	58	58	11	U
75-15-0	Carbon Disulfide	1	290	290	17	U
56-23-5	Carbon Tetrachloride	1	58	58	8.9	U
108-90-7	Chlorobenzene	1	58	58	7.0	U
75-00-3	Chloroethane	1	58	58	12	U
67-66-3	Chloroform	1	58	58	3.6	U
74-87-3	Chloromethane	1	19	58	3.5	J
110-82-7	Cyclohexane	1	290	290	8.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1	290	290	17	U
124-48-1	Dibromochloromethane	1	58	58	8.0	U
106-93-4	1,2-Dibromoethane	1	58	58	13	U
95-50-1	1,2-Dichlorobenzene	1	58	58	3.8	U
541-73-1	1,3-Dichlorobenzene	1	58	58	7.0	U
106-46-7	1,4-Dichlorobenzene	1	58	58	7.8	U
75-71-8	Dichlorodifluoromethane	1	58	58	9.8	U
75-34-3	1,1-Dichloroethane	1	58	58	4.4	U
107-06-2	1,2-Dichloroethane	1	58	58	9.0	U
75-35-4	1,1-Dichloroethene	1	58	58	8.0	U
156-59-2	cis-1,2-Dichloroethene	1	58	58	9.7	U
156-60-5	trans-1,2-Dichloroethene	1	58	58	9.2	U
78-87-5	1,2-Dichloropropane	1	58	58	6.1	U
10061-01-5	cis-1,3-Dichloropropene	1	58	58	8.3	U
10061-02-6	trans-1,3-Dichloropropene	1	58	58	9.1	U
100-41-4	Ethylbenzene	1	58	58	7.7	U
591-78-6	2-Hexanone	1	2900	2900	25	U
98-82-8	Isopropylbenzene	1	58	58	7.2	U
79-20-9	Methyl Acetate	1	290	290	9.7	U
1634-04-4	Methyl tert-Butyl Ether	1	58	58	5.6	U
108-87-2	Methylcyclohexane	1	290	290	8.6	U
75-09-2	Methylene Chloride	1	19	290	9.3	J B
78-93-3	2-Butanone (MEK)	1	2900	2900	19	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	2900	2900	22	U

01825

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-06 File ID: 21306A.D

Sampled: 01/10/08 12:55 Prepared: 01/18/08 12:00 Analyzed: 01/18/08 19:15

Solids: 85.84 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0800703 Sequence: 8012120 Calibration: 8A21004 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	58	58	6.3	U
79-34-5	1,1,2,2-Tetrachloroethane	1	58	58	5.8	U
127-18-4	Tetrachloroethene	1	58	58	8.7	U
108-88-3	Toluene	1	58	58	4.2	U
87-61-6	1,2,3-Trichlorobenzene	1	120	120	7.8	U
120-82-1	1,2,4-Trichlorobenzene	1	120	120	9.4	U
71-55-6	1,1,1-Trichloroethane	1	58	58	6.4	U
79-00-5	1,1,2-Trichloroethane	1	58	58	12	U
79-01-6	Trichloroethene	1	58	58	9.9	U
75-69-4	Trichlorofluoromethane	1	58	58	10	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	290	290	8.4	U
75-01-4	Vinyl Chloride	1	58	58	10	U
1330-20-7	Xylene (Total)	1	170	170	21	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	38.3	96	78 - 121	
1,2-Dichloroethane-d4	40.0	44.2	110	66 - 124	
Toluene-d8	40.0	40.0	100	85 - 115	
4-Bromofluorobenzene	40.0	38.1	95	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	924038	5.14	1098591	5.14	
Chlorobenzene-d5	791026	8.08	933741	8.08	
1,4-Dichlorobenzene-d4	438141	10.38	536532	10.38	

* Values outside of QC limits

01825

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB9AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-07 File ID: 21307.D

Sampled: 01/10/08 13:30 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 11:03

Solids: 79.97 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	12	25	5.3	J J,C
71-43-2	Benzene	1	6.3	6.3	0.16	U
74-97-5	Bromochloromethane	1	25	25	0.16	U
75-27-4	Bromodichloromethane	1	6.3	6.3	0.31	U
75-25-2	Bromoform	1	6.3	6.3	0.61	U
74-83-9	Bromomethane	1	6.3	6.3	1.5	U
75-15-0	Carbon Disulfide	1	6.3	6.3	0.33	U
56-23-5	Carbon Tetrachloride	1	6.3	6.3	0.36	U
108-90-7	Chlorobenzene	1	6.3	6.3	0.25	U
75-00-3	Chloroethane	1	25	25	0.44	U
67-66-3	Chloroform	1	6.3	6.3	0.18	U
74-87-3	Chloromethane	1	6.3	6.3	0.30	U
110-82-7	Cyclohexane	1	13	13	0.86	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.0	U
124-48-1	Dibromochloromethane	1	6.3	6.3	0.44	U
106-93-4	1,2-Dibromoethane	1	6.3	6.3	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.3	6.3	0.31	U
541-73-1	1,3-Dichlorobenzene	1	6.3	6.3	0.30	U
106-46-7	1,4-Dichlorobenzene	1	6.3	6.3	0.27	U
75-71-8	Dichlorodifluoromethane	1	6.3	6.3	0.41	U
75-34-3	1,1-Dichloroethane	1	6.3	6.3	0.24	U
107-06-2	1,2-Dichloroethane	1	6.3	6.3	0.37	U
75-35-4	1,1-Dichloroethene	1	6.3	6.3	0.46	U
156-59-2	cis-1,2-Dichloroethene	1	6.3	6.3	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.3	6.3	0.28	U
78-87-5	1,2-Dichloropropane	1	6.3	6.3	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.3	6.3	0.32	U
10061-02-6	trans-1,3-Dichloropropene	1	6.3	6.3	1.0	U
100-41-4	Ethylbenzene	1	6.3	6.3	0.16	U
591-78-6	2-Hexanone	1	13	13	3.7	U
98-82-8	Isopropylbenzene	1	6.3	6.3	0.15	U
79-20-9	Methyl Acetate	1	2.2	25	1.0	J
1634-04-4	Methyl tert-Butyl Ether	1	6.3	6.3	0.29	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U
75-09-2	Methylene Chloride	1	25	25	4.9	U
78-93-3	2-Butanone (MEK)	1	25	25	3.0	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.3	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB9AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-07 File ID: 21307.D

Sampled: 01/10/08 13:30 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 11:03

Solids: 79.97 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.3	6.3	0.28	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.3	6.3	0.25	U
127-18-4	Tetrachloroethene	1	6.3	6.3	0.55	U
108-88-3	Toluene	1	6.3	6.3	0.50	U
87-61-6	1,2,3-Trichlorobenzene	1	25	25	0.26	U
120-82-1	1,2,4-Trichlorobenzene	1	6.3	6.3	0.30	U
71-55-6	1,1,1-Trichloroethane	1	6.3	6.3	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.3	6.3	0.86	U
79-01-6	Trichloroethene	1	6.3	6.3	0.70	U
75-69-4	Trichlorofluoromethane	1	6.3	6.3	0.27	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.3	6.3	0.41	U
75-01-4	Vinyl Chloride	1	6.3	6.3	0.57	U
1330-20-7	Xylene (Total)	1	6.3	6.3	0.73	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.7	109	78 - 121	
1,2-Dichloroethane-d4	40.0	45.0	112	66 - 124	
Toluene-d8	40.0	41.9	105	85 - 115	
4-Bromofluorobenzene	40.0	38.8	97	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	790263	7.33	846261	7.3	
Chlorobenzene-d5	337410	17.38	353868	17.36	
1,4-Dichlorobenzene-d4	363839	22.43	422284	22.41	

* Values outside of QC limits

018941

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801213-08 File ID: 21308A.D

Sampled: 01/10/08 14:10 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 18:38

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	3.0	20	1.2	J B
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	0.54	5.0	0.051	J B
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

01848

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801213-08 File ID: 21308A.D

Sampled: 01/10/08 14:10 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 18:38

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.080	1.0	0.072	J BJH
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.5	101	85 - 115	
1,2-Dichloroethane-d4	40.0	43.0	108	70 - 120	
Toluene-d8	40.0	40.2	101	85 - 120	
4-Bromofluorobenzene	40.0	35.6	89	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	981567	5.16	1106369	5.15	
Chlorobenzene-d5	829023	8.09	945467	8.09	
1,4-Dichlorobenzene-d4	299840	10.39	442622	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801213-09 File ID: 21309.D

Sampled: 01/10/08 14:10 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 15:34

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	4.4	20	1.2	J B7Z
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	0.69	5.0	0.051	J
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801213-09 File ID: 21309.D

Sampled: 01/10/08 14:10 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 15:34

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.17	1.0	0.072	J
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.6	104	85 - 115	
1,2-Dichloroethane-d4	40.0	44.4	111	70 - 120	
Toluene-d8	40.0	40.7	102	85 - 120	
4-Bromofluorobenzene	40.0	35.5	89	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	984815	5.15	1106369	5.15	
Chlorobenzene-d5	851233	8.09	945467	8.09	
1,4-Dichlorobenzene-d4	307457	10.39	442622	10.38	

* Values outside of QC limits

01856

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-10 File ID: 21310.D

Sampled: 01/10/08 15:40 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 11:36

Solids: 28.65 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	190	70	15	J,C
71-43-2	Benzene	1	17	17	0.45	U
74-97-5	Bromochloromethane	1	70	70	0.45	U
75-27-4	Bromodichloromethane	1	17	17	0.87	U
75-25-2	Bromoform	1	17	17	1.7	U
74-83-9	Bromomethane	1	17	17	4.3	U
75-15-0	Carbon Disulfide	1	4.7	17	0.92	J J,C
56-23-5	Carbon Tetrachloride	1	17	17	1.0	U
108-90-7	Chlorobenzene	1	17	17	0.70	U
75-00-3	Chloroethane	1	70	70	1.2	U
67-66-3	Chloroform	1	17	17	0.51	U
74-87-3	Chloromethane	1	17	17	0.85	U
110-82-7	Cyclohexane	1	35	35	2.4	U
96-12-8	1,2-Dibromo-3-chloropropane	1	35	35	2.8	U
124-48-1	Dibromochloromethane	1	17	17	1.2	U
106-93-4	1,2-Dibromoethane	1	17	17	2.9	U
95-50-1	1,2-Dichlorobenzene	1	17	17	0.86	U
541-73-1	1,3-Dichlorobenzene	1	17	17	0.83	U
106-46-7	1,4-Dichlorobenzene	1	17	17	0.76	U
75-71-8	Dichlorodifluoromethane	1	17	17	1.2	U
75-34-3	1,1-Dichloroethane	1	17	17	0.68	U
107-06-2	1,2-Dichloroethane	1	17	17	1.0	U
75-35-4	1,1-Dichloroethene	1	17	17	1.3	U
156-59-2	cis-1,2-Dichloroethene	1	17	17	0.56	U
156-60-5	trans-1,2-Dichloroethene	1	17	17	0.79	U
78-87-5	1,2-Dichloropropane	1	17	17	3.2	U
10061-01-5	cis-1,3-Dichloropropene	1	17	17	0.88	U
10061-02-6	trans-1,3-Dichloropropene	1	17	17	2.9	U
100-41-4	Ethylbenzene	1	17	17	0.44	U
591-78-6	2-Hexanone	1	35	35	10	U
98-82-8	Isopropylbenzene	1	17	17	0.43	U UJ, i
79-20-9	Methyl Acetate	1	19	70	2.9	J
1634-04-4	Methyl tert-Butyl Ether	1	17	17	0.82	U
108-87-2	Methylcyclohexane	1	35	35	2.8	U
75-09-2	Methylene Chloride	1	70	70	14	U
78-93-3	2-Butanone (MEK)	1	70	70	8.4	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	35	35	6.5	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-10 File ID: 21310.D

Sampled: 01/10/08 15:40 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 11:36

Solids: 28.65 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	17	17	0.77	U
79-34-5	1,1,2,2-Tetrachloroethane	1	17	17	0.70	U UJ
127-18-4	Tetrachloroethene	1	17	17	1.5	U
108-88-3	Toluene	1	17	17	1.4	U
87-61-6	1,2,3-Trichlorobenzene	1	70	70	0.72	U
120-82-1	1,2,4-Trichlorobenzene	1	17	17	0.84	U
71-55-6	1,1,1-Trichloroethane	1	17	17	0.72	U
79-00-5	1,1,2-Trichloroethane	1	17	17	2.4	U
79-01-6	Trichloroethene	1	17	17	2.0	U
75-69-4	Trichlorofluoromethane	1	17	17	0.75	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	17	17	1.2	U
75-01-4	Vinyl Chloride	1	17	17	1.6	U
1330-20-7	Xylene (Total)	1	17	17	2.0	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.3	108	78 - 121	
1,2-Dichloroethane-d4	40.0	43.1	108	66 - 124	
Toluene-d8	40.0	38.5	96	85 - 115	
4-Bromofluorobenzene	40.0	33.9	85	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	724371	7.32	846261	7.3	
Chlorobenzene-d5	279951	17.38	353868	17.36	
1,4-Dichlorobenzene-d4	202961	22.43	422284	22.41	*

* Values outside of QC limits

01863

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB6AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-11 File ID: 21311.D

Sampled: 01/10/08 15:40 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 12:09

Solids: 77.38 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	76	26	5.5	J JC
71-43-2	Benzene	1	6.5	6.5	0.17	U
74-97-5	Bromochloromethane	1	26	26	0.17	U
75-27-4	Bromodichloromethane	1	6.5	6.5	0.32	U
75-25-2	Bromoform	1	6.5	6.5	0.63	U
74-83-9	Bromomethane	1	6.5	6.5	1.6	U
75-15-0	Carbon Disulfide	1	0.54	6.5	0.34	J JC
56-23-5	Carbon Tetrachloride	1	6.5	6.5	0.37	U
108-90-7	Chlorobenzene	1	6.5	6.5	0.26	U
75-00-3	Chloroethane	1	26	26	0.45	U
67-66-3	Chloroform	1	6.5	6.5	0.19	U
74-87-3	Chloromethane	1	6.5	6.5	0.31	U
110-82-7	Cyclohexane	1	13	13	0.89	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.5	6.5	0.45	U
106-93-4	1,2-Dibromoethane	1	6.5	6.5	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.5	6.5	0.32	U
541-73-1	1,3-Dichlorobenzene	1	6.5	6.5	0.31	U
106-46-7	1,4-Dichlorobenzene	1	6.5	6.5	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.5	6.5	0.43	U
75-34-3	1,1-Dichloroethane	1	6.5	6.5	0.25	U
107-06-2	1,2-Dichloroethane	1	6.5	6.5	0.38	U
75-35-4	1,1-Dichloroethene	1	6.5	6.5	0.48	U
156-59-2	cis-1,2-Dichloroethene	1	6.5	6.5	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.5	6.5	0.29	U
78-87-5	1,2-Dichloropropane	1	6.5	6.5	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.5	6.5	0.33	U
10061-02-6	trans-1,3-Dichloropropene	1	6.5	6.5	1.1	U
100-41-4	Ethylbenzene	1	6.5	6.5	0.16	U
591-78-6	2-Hexanone	1	13	13	3.9	U
98-82-8	Isopropylbenzene	1	6.5	6.5	0.16	U
79-20-9	Methyl Acetate	1	2.7	26	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.5	6.5	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U
75-09-2	Methylene Chloride	1	26	26	5.1	U
78-93-3	2-Butanone (MEK)	1	26	26	3.1	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U

01871

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB6AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-11 File ID: 21311.D

Sampled: 01/10/08 15:40 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 12:09

Solids: 77.38 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.5	6.5	0.29	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.5	6.5	0.26	U
127-18-4	Tetrachloroethene	1	6.5	6.5	0.57	U
108-88-3	Toluene	1	6.5	6.5	0.52	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.5	6.5	0.31	U
71-55-6	1,1,1-Trichloroethane	1	6.5	6.5	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.5	6.5	0.89	U
79-01-6	Trichloroethene	1	6.5	6.5	0.72	U
75-69-4	Trichlorofluoromethane	1	6.5	6.5	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.5	6.5	0.43	U
75-01-4	Vinyl Chloride	1	6.5	6.5	0.59	U
1330-20-7	Xylene (Total)	1	6.5	6.5	0.76	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.5	106	78 - 121	
1,2-Dichloroethane-d4	40.0	43.1	108	66 - 124	
Toluene-d8	40.0	39.1	98	85 - 115	
4-Bromofluorobenzene	40.0	35.1	88	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	748670	7.34	846261	7.3	
Chlorobenzene-d5	310245	17.39	353868	17.36	
1,4-Dichlorobenzene-d4	267218	22.43	422284	22.41	

* Values outside of QC limits

01872

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-12 File ID: 21312.D

Sampled: 01/10/08 17:00 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 12:41

Solids: 69.91 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	220	29	6.1	J1C
71-43-2	Benzene	1	7.2	7.2	0.18	U
74-97-5	Bromochloromethane	1	29	29	0.18	U
75-27-4	Bromodichloromethane	1	7.2	7.2	0.35	U
75-25-2	Bromoform	1	7.2	7.2	0.69	U
74-83-9	Bromomethane	1	7.2	7.2	1.7	U
75-15-0	Carbon Disulfide	1	0.76	7.2	0.38	J J1C
56-23-5	Carbon Tetrachloride	1	7.2	7.2	0.41	U
108-90-7	Chlorobenzene	1	7.2	7.2	0.29	U
75-00-3	Chloroethane	1	29	29	0.50	U
67-66-3	Chloroform	1	7.2	7.2	0.21	U
74-87-3	Chloromethane	1	7.2	7.2	0.35	U
110-82-7	Cyclohexane	1	14	14	0.98	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.2	U
124-48-1	Dibromochloromethane	1	7.2	7.2	0.50	U
106-93-4	1,2-Dibromoethane	1	7.2	7.2	1.2	U
95-50-1	1,2-Dichlorobenzene	1	7.2	7.2	0.35	U
541-73-1	1,3-Dichlorobenzene	1	7.2	7.2	0.34	U
106-46-7	1,4-Dichlorobenzene	1	7.2	7.2	0.31	U
75-71-8	Dichlorodifluoromethane	1	7.2	7.2	0.47	U
75-34-3	1,1-Dichloroethane	1	7.2	7.2	0.28	U
107-06-2	1,2-Dichloroethane	1	7.2	7.2	0.42	U
75-35-4	1,1-Dichloroethene	1	7.2	7.2	0.53	U
156-59-2	cis-1,2-Dichloroethene	1	7.2	7.2	0.23	U
156-60-5	trans-1,2-Dichloroethene	1	7.2	7.2	0.32	U
78-87-5	1,2-Dichloropropane	1	7.2	7.2	1.3	U
10061-01-5	cis-1,3-Dichloropropene	1	7.2	7.2	0.36	U
10061-02-6	trans-1,3-Dichloropropene	1	7.2	7.2	1.2	U
100-41-4	Ethylbenzene	1	7.2	7.2	0.18	U
591-78-6	2-Hexanone	1	14	14	4.3	U
98-82-8	Isopropylbenzene	1	7.2	7.2	0.18	U
79-20-9	Methyl Acetate	1	9.9	29	1.2	J
1634-04-4	Methyl tert-Butyl Ether	1	7.2	7.2	0.33	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U
75-09-2	Methylene Chloride	1	29	29	5.6	U
78-93-3	2-Butanone (MEK)	1	29	29	3.5	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.7	U

01879

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-12 File ID: 21312.D

Sampled: 01/10/08 17:00 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 12:41

Solids: 69.91 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800592 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	7.2	7.2	0.32	U
79-34-5	1,1,2,2-Tetrachloroethane	1	7.2	7.2	0.29	U
127-18-4	Tetrachloroethene	1	7.2	7.2	0.63	U
108-88-3	Toluene	1	7.2	7.2	0.58	U
87-61-6	1,2,3-Trichlorobenzene	1	29	29	0.29	U
120-82-1	1,2,4-Trichlorobenzene	1	7.2	7.2	0.34	U
71-55-6	1,1,1-Trichloroethane	1	7.2	7.2	0.29	U
79-00-5	1,1,2-Trichloroethane	1	7.2	7.2	0.98	U
79-01-6	Trichloroethene	1	7.2	7.2	0.80	U
75-69-4	Trichlorofluoromethane	1	7.2	7.2	0.31	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	7.2	7.2	0.47	U
75-01-4	Vinyl Chloride	1	7.2	7.2	0.65	U
1330-20-7	Xylene (Total)	1	7.2	7.2	0.84	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.9	110	78 - 121	
1,2-Dichloroethane-d4	40.0	44.5	111	66 - 124	
Toluene-d8	40.0	39.9	100	85 - 115	
4-Bromofluorobenzene	40.0	34.9	87	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	710661	7.34	846261	7.3	
Chlorobenzene-d5	291515	17.38	353868	17.36	
1,4-Dichlorobenzene-d4	235263	22.43	422284	22.41	

* Values outside of QC limits

01880

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801230-01 File ID: 23001.D

Sampled: 01/11/08 13:40 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 16:11

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	3.0	20	1.2	J B,Z
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	0.48	5.0	0.051	J B,Y
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

01887

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801230-01 File ID: 23001.D

Sampled: 01/11/08 13:40 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 16:11

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.080	1.0	0.072	J B
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.1	103	85 - 115	
1,2-Dichloroethane-d4	40.0	43.3	108	70 - 120	
Toluene-d8	40.0	40.4	101	85 - 120	
4-Bromofluorobenzene	40.0	36.0	90	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	1023250	5.16	1106369	5.15	
Chlorobenzene-d5	876334	8.09	945467	8.09	
1,4-Dichlorobenzene-d4	324674	10.38	442622	10.38	

* Values outside of QC limits

01888

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801230-02 File ID: 23002.D

Sampled: 01/11/08 13:40 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 16:48

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	3.5	20	1.2	J B
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	0.66	5.0	0.051	J
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

61694

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801230-02 File ID: 23002.D

Sampled: 01/11/08 13:40 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 16:48

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.10	1.0	0.072	J
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.3	101	85 - 115	
1,2-Dichloroethane-d4	40.0	43.0	107	70 - 120	
Toluene-d8	40.0	40.2	101	85 - 120	
4-Bromofluorobenzene	40.0	36.3	91	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	1027109	5.16	1106369	5.15	
Chlorobenzene-d5	874583	8.09	945467	8.09	
1,4-Dichlorobenzene-d4	321734	10.38	442622	10.38	

* Values outside of QC limits

01895

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-01 File ID: 23301A.D

Sampled: 01/11/08 08:15 Prepared: 01/16/08 12:00 Analyzed: 01/16/08 22:33

Solids: 73.67 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011742 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	97	27	5.7	
71-43-2	Benzene	1	6.8	6.8	0.17	U
74-97-5	Bromochloromethane	1	27	27	0.17	U
75-27-4	Bromodichloromethane	1	6.8	6.8	0.34	U
75-25-2	Bromoform	1	6.8	6.8	0.66	U
74-83-9	Bromomethane	1	6.8	6.8	1.7	U
75-15-0	Carbon Disulfide	1	6.8	6.8	0.36	U
56-23-5	Carbon Tetrachloride	1	6.8	6.8	0.39	U
108-90-7	Chlorobenzene	1	6.8	6.8	0.27	U
75-00-3	Chloroethane	1	27	27	0.48	U
67-66-3	Chloroform	1	6.8	6.8	0.20	U
74-87-3	Chloromethane	1	6.8	6.8	0.33	U
110-82-7	Cyclohexane	1	14	14	0.93	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.1	U
124-48-1	Dibromochloromethane	1	6.8	6.8	0.48	U
106-93-4	1,2-Dibromoethane	1	6.8	6.8	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.8	6.8	0.33	U
541-73-1	1,3-Dichlorobenzene	1	6.8	6.8	0.32	U
106-46-7	1,4-Dichlorobenzene	1	6.8	6.8	0.29	U
75-71-8	Dichlorodifluoromethane	1	6.8	6.8	0.45	U
75-34-3	1,1-Dichloroethane	1	6.8	6.8	0.26	U
107-06-2	1,2-Dichloroethane	1	6.8	6.8	0.40	U
75-35-4	1,1-Dichloroethene	1	6.8	6.8	0.50	U
156-59-2	cis-1,2-Dichloroethene	1	6.8	6.8	0.22	U
156-60-5	trans-1,2-Dichloroethene	1	6.8	6.8	0.31	U
78-87-5	1,2-Dichloropropane	1	6.8	6.8	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.8	6.8	0.34	U
10061-02-6	trans-1,3-Dichloropropene	1	6.8	6.8	1.1	U
100-41-4	Ethylbenzene	1	6.8	6.8	0.17	U
591-78-6	2-Hexanone	1	14	14	4.1	U
98-82-8	Isopropylbenzene	1	6.8	6.8	0.17	U
79-20-9	Methyl Acetate	1	2.0	27	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.8	6.8	0.32	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U
75-09-2	Methylene Chloride	1	27	27	5.4	U
78-93-3	2-Butanone (MEK)	1	27	27	3.3	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.5	U

01901

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-01 File ID: 23301A.D

Sampled: 01/11/08 08:15 Prepared: 01/16/08 12:00 Analyzed: 01/16/08 22:33

Solids: 73.67 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011742 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.8	6.8	0.30	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.8	6.8	0.27	U
127-18-4	Tetrachloroethene	1	6.8	6.8	0.60	U
108-88-3	Toluene	1	6.8	6.8	0.55	U
87-61-6	1,2,3-Trichlorobenzene	1	27	27	0.28	U
120-82-1	1,2,4-Trichlorobenzene	1	6.8	6.8	0.33	U
71-55-6	1,1,1-Trichloroethane	1	6.8	6.8	0.28	U
79-00-5	1,1,2-Trichloroethane	1	6.8	6.8	0.93	U
79-01-6	Trichloroethene	1	6.8	6.8	0.76	U
75-69-4	Trichlorofluoromethane	1	6.8	6.8	0.29	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.8	6.8	0.45	U
75-01-4	Vinyl Chloride	1	6.8	6.8	0.62	U
1330-20-7	Xylene (Total)	1	6.8	6.8	0.79	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.7	107	78 - 121	
1,2-Dichloroethane-d4	40.0	41.6	104	66 - 124	
Toluene-d8	40.0	40.0	100	85 - 115	
4-Bromofluorobenzene	40.0	38.0	95	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	788433	7.34	867670	7.33	
Chlorobenzene-d5	331873	17.39	368023	17.38	
1,4-Dichlorobenzene-d4	346142	22.43	430366	22.43	

* Values outside of QC limits

01982

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-02 File ID: 23302.D

Sampled: 01/11/08 09:05 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 13:47

Solids: 37.36 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	140	54	11	J,C
71-43-2	Benzene	1	13	13	0.34	U
74-97-5	Bromochloromethane	1	54	54	0.34	U
75-27-4	Bromodichloromethane	1	13	13	0.66	U
75-25-2	Bromoform	1	13	13	1.3	U
74-83-9	Bromomethane	1	13	13	3.3	U
75-15-0	Carbon Disulfide	1	3.6	13	0.70	J J,C
56-23-5	Carbon Tetrachloride	1	13	13	0.77	U
108-90-7	Chlorobenzene	1	13	13	0.54	U
75-00-3	Chloroethane	1	54	54	0.94	U
67-66-3	Chloroform	1	13	13	0.39	U
74-87-3	Chloromethane	1	13	13	0.65	U
110-82-7	Cyclohexane	1	27	27	1.8	U
96-12-8	1,2-Dibromo-3-chloropropane	1	27	27	2.2	U
124-48-1	Dibromochloromethane	1	13	13	0.94	U
106-93-4	1,2-Dibromoethane	1	13	13	2.3	U
95-50-1	1,2-Dichlorobenzene	1	13	13	0.66	U
541-73-1	1,3-Dichlorobenzene	1	13	13	0.64	U
106-46-7	1,4-Dichlorobenzene	1	13	13	0.58	U
75-71-8	Dichlorodifluoromethane	1	13	13	0.88	U
75-34-3	1,1-Dichloroethane	1	13	13	0.52	U
107-06-2	1,2-Dichloroethane	1	13	13	0.79	U
75-35-4	1,1-Dichloroethene	1	13	13	0.99	U
156-59-2	cis-1,2-Dichloroethene	1	13	13	0.43	U
156-60-5	trans-1,2-Dichloroethene	1	13	13	0.60	U
78-87-5	1,2-Dichloropropane	1	13	13	2.5	U
10061-01-5	cis-1,3-Dichloropropene	1	13	13	0.68	U
10061-02-6	trans-1,3-Dichloropropene	1	13	13	2.2	U
100-41-4	Ethylbenzene	1	13	13	0.33	U
591-78-6	2-Hexanone	1	27	27	8.0	U
98-82-8	Isopropylbenzene	1	13	13	0.33	U
79-20-9	Methyl Acetate	1	32	54	2.2	J
1634-04-4	Methyl tert-Butyl Ether	1	13	13	0.63	U
108-87-2	Methylcyclohexane	1	27	27	2.1	U
75-09-2	Methylene Chloride	1	54	54	11	U
78-93-3	2-Butanone (MEK)	1	17	54	6.5	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	27	27	5.0	U

01909

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-02 File ID: 23302.D

Sampled: 01/11/08 09:05 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 13:47

Solids: 37.36 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	13	13	0.59	U
79-34-5	1,1,2,2-Tetrachloroethane	1	13	13	0.54	U
127-18-4	Tetrachloroethene	1	13	13	1.2	U
108-88-3	Toluene	1	13	13	1.1	U
87-61-6	1,2,3-Trichlorobenzene	1	54	54	0.55	U
120-82-1	1,2,4-Trichlorobenzene	1	13	13	0.65	U
71-55-6	1,1,1-Trichloroethane	1	13	13	0.55	U
79-00-5	1,1,2-Trichloroethane	1	13	13	1.8	U
79-01-6	Trichloroethene	1	13	13	1.5	U
75-69-4	Trichlorofluoromethane	1	13	13	0.57	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	13	13	0.89	U
75-01-4	Vinyl Chloride	1	13	13	1.2	U
1330-20-7	Xylene (Total)	1	6.2	13	1.6	J

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.9	112	78 - 121	
1,2-Dichloroethane-d4	40.0	44.5	111	66 - 124	
Toluene-d8	40.0	39.2	98	85 - 115	
4-Bromofluorobenzene	40.0	34.6	86	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	703358	7.33	846261	7.3	
Chlorobenzene-d5	270742	17.39	353868	17.36	
1,4-Dichlorobenzene-d4	227695	22.43	422284	22.41	

* Values outside of QC limits

01910

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB7AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-03 File ID: 23303.D

Sampled: 01/11/08 09:05 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 14:20

Solids: 71.69 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	130	28	5.9	J,C
71-43-2	Benzene	1	7.0	7.0	0.18	U
74-97-5	Bromochloromethane	1	28	28	0.18	U
75-27-4	Bromodichloromethane	1	7.0	7.0	0.35	U
75-25-2	Bromoform	1	7.0	7.0	0.68	U
74-83-9	Bromomethane	1	7.0	7.0	1.7	U
75-15-0	Carbon Disulfide	1	3.0	7.0	0.37	J JC
56-23-5	Carbon Tetrachloride	1	7.0	7.0	0.40	U
108-90-7	Chlorobenzene	1	7.0	7.0	0.28	U
75-00-3	Chloroethane	1	28	28	0.49	U
67-66-3	Chloroform	1	7.0	7.0	0.21	U
74-87-3	Chloromethane	1	7.0	7.0	0.34	U
110-82-7	Cyclohexane	1	14	14	0.96	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.1	U
124-48-1	Dibromochloromethane	1	7.0	7.0	0.49	U
106-93-4	1,2-Dibromoethane	1	7.0	7.0	1.2	U
95-50-1	1,2-Dichlorobenzene	1	7.0	7.0	0.34	U
541-73-1	1,3-Dichlorobenzene	1	7.0	7.0	0.33	U
106-46-7	1,4-Dichlorobenzene	1	7.0	7.0	0.30	U
75-71-8	Dichlorodifluoromethane	1	7.0	7.0	0.46	U
75-34-3	1,1-Dichloroethane	1	7.0	7.0	0.27	U
107-06-2	1,2-Dichloroethane	1	7.0	7.0	0.41	U
75-35-4	1,1-Dichloroethene	1	7.0	7.0	0.52	U
156-59-2	cis-1,2-Dichloroethene	1	7.0	7.0	0.22	U
156-60-5	trans-1,2-Dichloroethene	1	7.0	7.0	0.32	U
78-87-5	1,2-Dichloropropane	1	7.0	7.0	1.3	U
10061-01-5	cis-1,3-Dichloropropene	1	7.0	7.0	0.35	U
10061-02-6	trans-1,3-Dichloropropene	1	7.0	7.0	1.2	U
100-41-4	Ethylbenzene	1	7.0	7.0	0.17	U
591-78-6	2-Hexanone	1	14	14	4.2	U
98-82-8	Isopropylbenzene	1	7.0	7.0	0.17	U
79-20-9	Methyl Acetate	1	4.4	28	1.2	J
1634-04-4	Methyl tert-Butyl Ether	1	7.0	7.0	0.33	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U
75-09-2	Methylene Chloride	1	28	28	5.5	U
78-93-3	2-Butanone (MEK)	1	28	28	3.4	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.6	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB7AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-03 File ID: 23303.D

Sampled: 01/11/08 09:05 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 14:20

Solids: 71.69 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	7.0	7.0	0.31	U
79-34-5	1,1,2,2-Tetrachloroethane	1	7.0	7.0	0.28	U
127-18-4	Tetrachloroethene	1	7.0	7.0	0.62	U
108-88-3	Toluene	1	7.0	7.0	0.56	U
87-61-6	1,2,3-Trichlorobenzene	1	28	28	0.29	U
120-82-1	1,2,4-Trichlorobenzene	1	7.0	7.0	0.34	U
71-55-6	1,1,1-Trichloroethane	1	7.0	7.0	0.29	U
79-00-5	1,1,2-Trichloroethane	1	7.0	7.0	0.96	U
79-01-6	Trichloroethene	1	7.0	7.0	0.78	U
75-69-4	Trichlorofluoromethane	1	7.0	7.0	0.30	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	7.0	7.0	0.46	U
75-01-4	Vinyl Chloride	1	7.0	7.0	0.64	U
1330-20-7	Xylene (Total)	1	7.0	7.0	0.82	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.7	109	78 - 121	
1,2-Dichloroethane-d4	40.0	42.2	106	66 - 124	
Toluene-d8	40.0	40.0	100	85 - 115	
4-Bromofluorobenzene	40.0	34.5	86	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	664858	7.34	846261	7.3	
Chlorobenzene-d5	264682	17.39	353868	17.36	
1,4-Dichlorobenzene-d4	233060	22.43	422284	22.41	

* Values outside of QC limits

01919

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-04 File ID: 23304.D

Sampled: 01/11/08 09:10 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 14:53

Solids: 80.43 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	200	25	5.3	JC
71-43-2	Benzene	1	6.2	6.2	0.16	U
74-97-5	Bromochloromethane	1	25	25	0.16	U
75-27-4	Bromodichloromethane	1	6.2	6.2	0.31	U
75-25-2	Bromoform	1	6.2	6.2	0.60	U
74-83-9	Bromomethane	1	6.2	6.2	1.5	U
75-15-0	Carbon Disulfide	1	6.2	6.2	0.33	U
56-23-5	Carbon Tetrachloride	1	6.2	6.2	0.36	U
108-90-7	Chlorobenzene	1	6.2	6.2	0.25	U
75-00-3	Chloroethane	1	25	25	0.44	U
67-66-3	Chloroform	1	6.2	6.2	0.18	U
74-87-3	Chloromethane	1	6.2	6.2	0.30	U
110-82-7	Cyclohexane	1	12	12	0.85	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	1.0	U
124-48-1	Dibromochloromethane	1	6.2	6.2	0.44	U
106-93-4	1,2-Dibromoethane	1	6.2	6.2	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.2	6.2	0.30	U
541-73-1	1,3-Dichlorobenzene	1	6.2	6.2	0.30	U
106-46-7	1,4-Dichlorobenzene	1	6.2	6.2	0.27	U
75-71-8	Dichlorodifluoromethane	1	6.2	6.2	0.41	U
75-34-3	1,1-Dichloroethane	1	6.2	6.2	0.24	U
107-06-2	1,2-Dichloroethane	1	6.2	6.2	0.37	U
75-35-4	1,1-Dichloroethene	1	6.2	6.2	0.46	U
156-59-2	cis-1,2-Dichloroethene	1	6.2	6.2	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.2	6.2	0.28	U
78-87-5	1,2-Dichloropropane	1	6.2	6.2	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.2	6.2	0.31	U
10061-02-6	trans-1,3-Dichloropropene	1	6.2	6.2	1.0	U
100-41-4	Ethylbenzene	1	6.2	6.2	0.16	U
591-78-6	2-Hexanone	1	12	12	3.7	U
98-82-8	Isopropylbenzene	1	6.2	6.2	0.15	U
79-20-9	Methyl Acetate	1	9.3	25	1.0	J
1634-04-4	Methyl tert-Butyl Ether	1	6.2	6.2	0.29	U
108-87-2	Methylcyclohexane	1	12	12	0.99	U
75-09-2	Methylene Chloride	1	25	25	4.9	U
78-93-3	2-Butanone (MEK)	1	25	25	3.0	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U

01927

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-04 File ID: 23304.D

Sampled: 01/11/08 09:10 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 14:53

Solids: 80.43 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.2	6.2	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.2	6.2	0.25	U
127-18-4	Tetrachloroethene	1	6.2	6.2	0.55	U
108-88-3	Toluene	1	6.2	6.2	0.50	U
87-61-6	1,2,3-Trichlorobenzene	1	25	25	0.26	U
120-82-1	1,2,4-Trichlorobenzene	1	6.2	6.2	0.30	U
71-55-6	1,1,1-Trichloroethane	1	6.2	6.2	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.2	6.2	0.85	U
79-01-6	Trichloroethene	1	6.2	6.2	0.70	U
75-69-4	Trichlorofluoromethane	1	6.2	6.2	0.27	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.2	6.2	0.41	U
75-01-4	Vinyl Chloride	1	6.2	6.2	0.57	U
1330-20-7	Xylene (Total)	1	6.2	6.2	0.73	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.5	109	78 - 121	
1,2-Dichloroethane-d4	40.0	44.3	111	66 - 124	
Toluene-d8	40.0	38.8	97	85 - 115	
4-Bromofluorobenzene	40.0	34.8	87	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	696879	7.34	846261	7.3	
Chlorobenzene-d5	272823	17.39	353868	17.36	
1,4-Dichlorobenzene-d4	234518	22.43	422284	22.41	

* Values outside of QC limits

01928

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-05 File ID: 23305.D

Sampled: 01/11/08 10:05 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 15:26

Solids: 69.25 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	12	29	6.1	J JC
71-43-2	Benzene	1	7.2	7.2	0.18	U
74-97-5	Bromochloromethane	1	29	29	0.18	U
75-27-4	Bromodichloromethane	1	7.2	7.2	0.36	U
75-25-2	Bromoform	1	7.2	7.2	0.70	U
74-83-9	Bromomethane	1	7.2	7.2	1.8	U
75-15-0	Carbon Disulfide	1	7.2	7.2	0.38	U
56-23-5	Carbon Tetrachloride	1	7.2	7.2	0.41	U
108-90-7	Chlorobenzene	1	7.2	7.2	0.29	U
75-00-3	Chloroethane	1	29	29	0.51	U
67-66-3	Chloroform	1	7.2	7.2	0.21	U
74-87-3	Chloromethane	1	7.2	7.2	0.35	U
110-82-7	Cyclohexane	1	14	14	0.99	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.2	U
124-48-1	Dibromochloromethane	1	7.2	7.2	0.51	U
106-93-4	1,2-Dibromoethane	1	7.2	7.2	1.2	U
95-50-1	1,2-Dichlorobenzene	1	7.2	7.2	0.35	U
541-73-1	1,3-Dichlorobenzene	1	7.2	7.2	0.34	U
106-46-7	1,4-Dichlorobenzene	1	7.2	7.2	0.31	U
75-71-8	Dichlorodifluoromethane	1	7.2	7.2	0.48	U
75-34-3	1,1-Dichloroethane	1	7.2	7.2	0.28	U
107-06-2	1,2-Dichloroethane	1	7.2	7.2	0.43	U
75-35-4	1,1-Dichloroethene	1	7.2	7.2	0.54	U
156-59-2	cis-1,2-Dichloroethene	1	7.2	7.2	0.23	U
156-60-5	trans-1,2-Dichloroethene	1	7.2	7.2	0.33	U
78-87-5	1,2-Dichloropropane	1	7.2	7.2	1.3	U
10061-01-5	cis-1,3-Dichloropropene	1	7.2	7.2	0.37	U
10061-02-6	trans-1,3-Dichloropropene	1	7.2	7.2	1.2	U
100-41-4	Ethylbenzene	1	7.2	7.2	0.18	U
591-78-6	2-Hexanone	1	14	14	4.3	U
98-82-8	Isopropylbenzene	1	7.2	7.2	0.18	U
79-20-9	Methyl Acetate	1	29	29	1.2	U
1634-04-4	Methyl tert-Butyl Ether	1	7.2	7.2	0.34	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U
75-09-2	Methylene Chloride	1	29	29	5.7	U
78-93-3	2-Butanone (MEK)	1	29	29	3.5	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.7	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-05 File ID: 23305.D

Sampled: 01/11/08 10:05 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 15:26

Solids: 69.25 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	7.2	7.2	0.32	U
79-34-5	1,1,2,2-Tetrachloroethane	1	7.2	7.2	0.29	U
127-18-4	Tetrachloroethene	1	7.2	7.2	0.64	U
108-88-3	Toluene	1	7.2	7.2	0.58	U
87-61-6	1,2,3-Trichlorobenzene	1	29	29	0.30	U
120-82-1	1,2,4-Trichlorobenzene	1	7.2	7.2	0.35	U
71-55-6	1,1,1-Trichloroethane	1	7.2	7.2	0.30	U
79-00-5	1,1,2-Trichloroethane	1	7.2	7.2	0.99	U
79-01-6	Trichloroethene	1	7.2	7.2	0.81	U
75-69-4	Trichlorofluoromethane	1	7.2	7.2	0.31	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	7.2	7.2	0.48	U
75-01-4	Vinyl Chloride	1	7.2	7.2	0.66	U
1330-20-7	Xylene (Total)	1	7.2	7.2	0.84	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.1	108	78 - 121	
1,2-Dichloroethane-d4	40.0	42.2	106	66 - 124	
Toluene-d8	40.0	40.3	101	85 - 115	
4-Bromofluorobenzene	40.0	35.6	89	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	718135	7.34	846261	7.3	
Chlorobenzene-d5	298873	17.39	353868	17.36	
1,4-Dichlorobenzene-d4	268533	22.43	422284	22.41	

* Values outside of QC limits

01936

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB4AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-06 File ID: 23306.D

Sampled: 01/11/08 12:05 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 15:59

Solids: 76.38 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	51	26	5.5	J,C
71-43-2	Benzene	1	6.5	6.5	0.17	U
74-97-5	Bromochloromethane	1	26	26	0.17	U
75-27-4	Bromodichloromethane	1	6.5	6.5	0.32	U
75-25-2	Bromoform	1	6.5	6.5	0.63	U
74-83-9	Bromomethane	1	6.5	6.5	1.6	U
75-15-0	Carbon Disulfide	1	1.6	6.5	0.34	J J,C
56-23-5	Carbon Tetrachloride	1	6.5	6.5	0.38	U
108-90-7	Chlorobenzene	1	6.5	6.5	0.26	U
75-00-3	Chloroethane	1	26	26	0.46	U
67-66-3	Chloroform	1	6.5	6.5	0.19	U
74-87-3	Chloromethane	1	6.5	6.5	0.32	U
110-82-7	Cyclohexane	1	13	13	0.90	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.5	6.5	0.46	U
106-93-4	1,2-Dibromoethane	1	6.5	6.5	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.5	6.5	0.32	U
541-73-1	1,3-Dichlorobenzene	1	6.5	6.5	0.31	U
106-46-7	1,4-Dichlorobenzene	1	6.5	6.5	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.5	6.5	0.43	U
75-34-3	1,1-Dichloroethane	1	6.5	6.5	0.25	U
107-06-2	1,2-Dichloroethane	1	6.5	6.5	0.39	U
75-35-4	1,1-Dichloroethene	1	6.5	6.5	0.49	U
156-59-2	cis-1,2-Dichloroethene	1	6.5	6.5	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.5	6.5	0.30	U
78-87-5	1,2-Dichloropropane	1	6.5	6.5	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.5	6.5	0.33	U
10061-02-6	trans-1,3-Dichloropropene	1	6.5	6.5	1.1	U
100-41-4	Ethylbenzene	1	6.5	6.5	0.16	U
591-78-6	2-Hexanone	1	13	13	3.9	U
98-82-8	Isopropylbenzene	1	6.5	6.5	0.16	U
79-20-9	Methyl Acetate	1	12	26	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.5	6.5	0.31	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U
75-09-2	Methylene Chloride	1	26	26	5.2	U
78-93-3	2-Butanone (MEK)	1	11	26	3.2	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB4AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-06 File ID: 23306.D

Sampled: 01/11/08 12:05 Prepared: 01/16/08 07:00 Analyzed: 01/16/08 15:59

Solids: 76.38 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011735 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.5	6.5	0.29	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.5	6.5	0.26	U
127-18-4	Tetrachloroethene	1	6.5	6.5	0.58	U
108-88-3	Toluene	1	6.5	6.5	0.53	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.5	6.5	0.32	U
71-55-6	1,1,1-Trichloroethane	1	6.5	6.5	0.27	U
79-00-5	1,1,2-Trichloroethane	1	6.5	6.5	0.90	U
79-01-6	Trichloroethene	1	6.5	6.5	0.73	U
75-69-4	Trichlorofluoromethane	1	6.5	6.5	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.5	6.5	0.43	U
75-01-4	Vinyl Chloride	1	6.5	6.5	0.60	U
1330-20-7	Xylene (Total)	1	6.5	6.5	0.77	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.5	111	78 - 121	
1,2-Dichloroethane-d4	40.0	46.7	117	66 - 124	
Toluene-d8	40.0	39.5	99	85 - 115	
4-Bromofluorobenzene	40.0	35.7	89	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	688454	7.34	846261	7.3	
Chlorobenzene-d5	273438	17.39	353868	17.36	
1,4-Dichlorobenzene-d4	228284	22.43	422284	22.41	

* Values outside of QC limits

61944

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-07 File ID: 23307.D

Sampled: 01/11/08 12:40 Prepared: 01/16/08 12:00 Analyzed: 01/16/08 23:05

Solids: 78.19 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011742 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	45	26	5.4	
71-43-2	Benzene	1	6.4	6.4	0.16	U
74-97-5	Bromochloromethane	1	26	26	0.16	U
75-27-4	Bromodichloromethane	1	6.4	6.4	0.32	U
75-25-2	Bromoform	1	6.4	6.4	0.62	U
74-83-9	Bromomethane	1	6.4	6.4	1.6	U
75-15-0	Carbon Disulfide	1	6.4	6.4	0.34	U
56-23-5	Carbon Tetrachloride	1	6.4	6.4	0.37	U
108-90-7	Chlorobenzene	1	6.4	6.4	0.26	U
75-00-3	Chloroethane	1	26	26	0.45	U
67-66-3	Chloroform	1	6.4	6.4	0.19	U
74-87-3	Chloromethane	1	6.4	6.4	0.31	U
110-82-7	Cyclohexane	1	13	13	0.88	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.0	U
124-48-1	Dibromochloromethane	1	6.4	6.4	0.45	U
106-93-4	1,2-Dibromoethane	1	6.4	6.4	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.4	6.4	0.31	U
541-73-1	1,3-Dichlorobenzene	1	6.4	6.4	0.30	U
106-46-7	1,4-Dichlorobenzene	1	6.4	6.4	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.4	6.4	0.42	U
75-34-3	1,1-Dichloroethane	1	6.4	6.4	0.25	U
107-06-2	1,2-Dichloroethane	1	6.4	6.4	0.38	U
75-35-4	1,1-Dichloroethene	1	6.4	6.4	0.47	U
156-59-2	cis-1,2-Dichloroethene	1	6.4	6.4	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.4	6.4	0.29	U
78-87-5	1,2-Dichloropropane	1	6.4	6.4	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.4	6.4	0.32	U
10061-02-6	trans-1,3-Dichloropropene	1	6.4	6.4	1.1	U
100-41-4	Ethylbenzene	1	6.4	6.4	0.16	U
591-78-6	2-Hexanone	1	13	13	3.8	U
98-82-8	Isopropylbenzene	1	6.4	6.4	0.16	U
79-20-9	Methyl Acetate	1	2.0	26	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.4	6.4	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U
75-09-2	Methylene Chloride	1	26	26	5.1	U
78-93-3	2-Butanone (MEK)	1	26	26	3.1	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U

01953

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-07 File ID: 23307.D

Sampled: 01/11/08 12:40 Prepared: 01/16/08 12:00 Analyzed: 01/16/08 23:05

Solids: 78.19 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011742 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.4	6.4	0.28	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.4	6.4	0.26	U
127-18-4	Tetrachloroethene	1	6.4	6.4	0.57	U
108-88-3	Toluene	1	6.4	6.4	0.51	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.26	U
120-82-1	1,2,4-Trichlorobenzene	1	6.4	6.4	0.31	U
71-55-6	1,1,1-Trichloroethane	1	6.4	6.4	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.4	6.4	0.88	U
79-01-6	Trichloroethene	1	6.4	6.4	0.72	U
75-69-4	Trichlorofluoromethane	1	6.4	6.4	0.27	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.4	6.4	0.42	U
75-01-4	Vinyl Chloride	1	6.4	6.4	0.58	U
1330-20-7	Xylene (Total)	1	6.4	6.4	0.75	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.5	106	78 - 121	
1,2-Dichloroethane-d4	40.0	43.7	109	66 - 124	
Toluene-d8	40.0	39.6	99	85 - 115	
4-Bromofluorobenzene	40.0	39.4	98	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	771023	7.35	867670	7.33	
Chlorobenzene-d5	332598	17.39	368023	17.38	
1,4-Dichlorobenzene-d4	351322	22.43	430366	22.43	

* Values outside of QC limits

61954

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB4C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-08 File ID: 23308.D

Sampled: 01/11/08 13:00 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 10:51

Solids: 78.10 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	60	26	5.4	
71-43-2	Benzene	1	6.4	6.4	0.16	U
74-97-5	Bromochloromethane	1	26	26	0.16	U
75-27-4	Bromodichloromethane	1	6.4	6.4	0.32	U
75-25-2	Bromoform	1	6.4	6.4	0.62	U
74-83-9	Bromomethane	1	6.4	6.4	1.6	U
75-15-0	Carbon Disulfide	1	6.4	6.4	0.34	U
56-23-5	Carbon Tetrachloride	1	6.4	6.4	0.37	U
108-90-7	Chlorobenzene	1	6.4	6.4	0.26	U
75-00-3	Chloroethane	1	26	26	0.45	U
67-66-3	Chloroform	1	6.4	6.4	0.19	U
74-87-3	Chloromethane	1	6.4	6.4	0.31	U
110-82-7	Cyclohexane	1	13	13	0.88	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.0	U
124-48-1	Dibromochloromethane	1	6.4	6.4	0.45	U
106-93-4	1,2-Dibromoethane	1	6.4	6.4	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.4	6.4	0.31	U
541-73-1	1,3-Dichlorobenzene	1	6.4	6.4	0.30	U
106-46-7	1,4-Dichlorobenzene	1	6.4	6.4	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.4	6.4	0.42	U
75-34-3	1,1-Dichloroethane	1	6.4	6.4	0.25	U
107-06-2	1,2-Dichloroethane	1	6.4	6.4	0.38	U
75-35-4	1,1-Dichloroethene	1	6.4	6.4	0.48	U
156-59-2	cis-1,2-Dichloroethene	1	6.4	6.4	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.4	6.4	0.29	U
78-87-5	1,2-Dichloropropane	1	6.4	6.4	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.4	6.4	0.32	U
10061-02-6	trans-1,3-Dichloropropene	1	6.4	6.4	1.1	U
100-41-4	Ethylbenzene	1	6.4	6.4	0.16	U
591-78-6	2-Hexanone	1	13	13	3.8	U
98-82-8	Isopropylbenzene	1	6.4	6.4	0.16	U
79-20-9	Methyl Acetate	1	26	26	1.1	U
1634-04-4	Methyl tert-Butyl Ether	1	6.4	6.4	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U
75-09-2	Methylene Chloride	1	26	26	5.1	U
78-93-3	2-Butanone (MEK)	1	26	26	3.1	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U

01961

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB4C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-08 File ID: 23308.D

Sampled: 01/11/08 13:00 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 10:51

Solids: 78.10 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.4	6.4	0.28	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.4	6.4	0.26	U
127-18-4	Tetrachloroethene	1	6.4	6.4	0.57	U
108-88-3	Toluene	1	6.4	6.4	0.51	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.26	U
120-82-1	1,2,4-Trichlorobenzene	1	6.4	6.4	0.31	U
71-55-6	1,1,1-Trichloroethane	1	6.4	6.4	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.4	6.4	0.88	U
79-01-6	Trichloroethene	1	6.4	6.4	0.72	U
75-69-4	Trichlorofluoromethane	1	6.4	6.4	0.27	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.4	6.4	0.42	U
75-01-4	Vinyl Chloride	1	6.4	6.4	0.58	U
1330-20-7	Xylene (Total)	1	6.4	6.4	0.75	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.4	106	78 - 121	
1,2-Dichloroethane-d4	40.0	44.0	110	66 - 124	
Toluene-d8	40.0	42.0	105	85 - 115	
4-Bromofluorobenzene	40.0	40.4	101	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	809511	7.38	893757	7.36	
Chlorobenzene-d5	349949	17.43	379762	17.41	
1,4-Dichlorobenzene-d4	382552	22.45	446152	22.44	

* Values outside of QC limits

01962

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-09 File ID: 23309.D

Sampled: 01/11/08 00:00 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 11:24

Solids: 80.32 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	76	25	5.3	
71-43-2	Benzene	1	6.2	6.2	0.16	U
74-97-5	Bromochloromethane	1	25	25	0.16	U
75-27-4	Bromodichloromethane	1	6.2	6.2	0.31	U
75-25-2	Bromoform	1	6.2	6.2	0.60	U
74-83-9	Bromomethane	1	6.2	6.2	1.5	U
75-15-0	Carbon Disulfide	1	1.2	6.2	0.33	J JC
56-23-5	Carbon Tetrachloride	1	6.2	6.2	0.36	U
108-90-7	Chlorobenzene	1	6.2	6.2	0.25	U
75-00-3	Chloroethane	1	25	25	0.44	U
67-66-3	Chloroform	1	6.2	6.2	0.18	U
74-87-3	Chloromethane	1	6.2	6.2	0.30	U
110-82-7	Cyclohexane	1	12	12	0.86	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	1.0	U
124-48-1	Dibromochloromethane	1	6.2	6.2	0.44	U
106-93-4	1,2-Dibromoethane	1	6.2	6.2	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.2	6.2	0.31	U
541-73-1	1,3-Dichlorobenzene	1	6.2	6.2	0.30	U
106-46-7	1,4-Dichlorobenzene	1	6.2	6.2	0.27	U
75-71-8	Dichlorodifluoromethane	1	6.2	6.2	0.41	U
75-34-3	1,1-Dichloroethane	1	6.2	6.2	0.24	U
107-06-2	1,2-Dichloroethane	1	6.2	6.2	0.37	U
75-35-4	1,1-Dichloroethene	1	6.2	6.2	0.46	U
156-59-2	cis-1,2-Dichloroethene	1	6.2	6.2	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.2	6.2	0.28	U
78-87-5	1,2-Dichloropropane	1	6.2	6.2	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.2	6.2	0.31	U
10061-02-6	trans-1,3-Dichloropropene	1	6.2	6.2	1.0	U
100-41-4	Ethylbenzene	1	6.2	6.2	0.16	U
591-78-6	2-Hexanone	1	12	12	3.7	U
98-82-8	Isopropylbenzene	1	6.2	6.2	0.15	U
79-20-9	Methyl Acetate	1	3.1	25	1.0	J
1634-04-4	Methyl tert-Butyl Ether	1	6.2	6.2	0.29	U
108-87-2	Methylcyclohexane	1	12	12	0.99	U
75-09-2	Methylene Chloride	1	25	25	4.9	U
78-93-3	2-Butanone (MEK)	1	9.2	25	3.0	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U

01968

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-09 File ID: 23309.D

Sampled: 01/11/08 00:00 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 11:24

Solids: 80.32 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.2	6.2	0.28	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.2	6.2	0.25	U
127-18-4	Tetrachloroethene	1	6.2	6.2	0.55	U
108-88-3	Toluene	1	6.2	6.2	0.50	U
87-61-6	1,2,3-Trichlorobenzene	1	25	25	0.26	U
120-82-1	1,2,4-Trichlorobenzene	1	6.2	6.2	0.30	U
71-55-6	1,1,1-Trichloroethane	1	6.2	6.2	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.2	6.2	0.86	U
79-01-6	Trichloroethene	1	6.2	6.2	0.70	U
75-69-4	Trichlorofluoromethane	1	6.2	6.2	0.27	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.2	6.2	0.41	U
75-01-4	Vinyl Chloride	1	6.2	6.2	0.57	U
1330-20-7	Xylene (Total)	1	6.2	6.2	0.73	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.7	104	78 - 121	
1,2-Dichloroethane-d4	40.0	41.8	104	66 - 124	
Toluene-d8	40.0	39.0	98	85 - 115	
4-Bromofluorobenzene	40.0	34.2	85	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	716706	7.4	893757	7.36	
Chlorobenzene-d5	289884	17.44	379762	17.41	
1,4-Dichlorobenzene-d4	244416	22.46	446152	22.44	

* Values outside of QC limits

01969

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801250-01 File ID: 25001.D

Sampled: 01/14/08 14:30 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 17:25

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	2.5	20	1.2	J B7Z
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	0.84	1.0	0.061	J
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	0.62	5.0	0.051	J B1Y
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

01977

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801250-01 File ID: 25001.D

Sampled: 01/14/08 14:30 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 17:25

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.090	1.0	0.072	J B1
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.3	101	85 - 115	
1,2-Dichloroethane-d4	40.0	43.0	107	70 - 120	
Toluene-d8	40.0	40.1	100	85 - 120	
4-Bromofluorobenzene	40.0	36.1	90	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	1014983	5.16	1106369	5.15	
Chlorobenzene-d5	863755	8.09	945467	8.09	
1,4-Dichlorobenzene-d4	316721	10.39	442622	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801250-02 File ID: 25002.D

Sampled: 01/14/08 14:30 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 18:01

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	3.2	20	1.2	J P7E
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	0.67	5.0	0.051	J
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801250-02 File ID: 25002.D

Sampled: 01/14/08 14:30 Prepared: 01/16/08 08:00 Analyzed: 01/16/08 18:01

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.15	1.0	0.072	J
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.4	101	85 - 115	
1,2-Dichloroethane-d4	40.0	42.6	106	70 - 120	
Toluene-d8	40.0	40.1	100	85 - 120	
4-Bromofluorobenzene	40.0	35.8	89	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	1015439	5.16	1106369	5.15	
Chlorobenzene-d5	857312	8.09	945467	8.09	
1,4-Dichlorobenzene-d4	308931	10.38	442622	10.38	

* Values outside of QC limits

01985

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-01 File ID: 25301.D

Sampled: 01/14/08 12:55 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 11:57

Solids: 73.68 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	40	27	5.7	
71-43-2	Benzene	1	6.8	6.8	0.17	U
74-97-5	Bromochloromethane	1	27	27	0.17	U
75-27-4	Bromodichloromethane	1	6.8	6.8	0.34	U
75-25-2	Bromoform	1	6.8	6.8	0.66	U
74-83-9	Bromomethane	1	6.8	6.8	1.7	U
75-15-0	Carbon Disulfide	1	5.2	6.8	0.36	J JC
56-23-5	Carbon Tetrachloride	1	6.8	6.8	0.39	U
108-90-7	Chlorobenzene	1	6.8	6.8	0.27	U
75-00-3	Chloroethane	1	27	27	0.48	U
67-66-3	Chloroform	1	6.8	6.8	0.20	U
74-87-3	Chloromethane	1	6.8	6.8	0.33	U
110-82-7	Cyclohexane	1	14	14	0.93	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.1	U
124-48-1	Dibromochloromethane	1	6.8	6.8	0.48	U
106-93-4	1,2-Dibromoethane	1	6.8	6.8	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.8	6.8	0.33	U
541-73-1	1,3-Dichlorobenzene	1	6.8	6.8	0.32	U
106-46-7	1,4-Dichlorobenzene	1	6.8	6.8	0.29	U
75-71-8	Dichlorodifluoromethane	1	6.8	6.8	0.45	U
75-34-3	1,1-Dichloroethane	1	6.8	6.8	0.26	U
107-06-2	1,2-Dichloroethane	1	6.8	6.8	0.40	U
75-35-4	1,1-Dichloroethene	1	6.8	6.8	0.50	U
156-59-2	cis-1,2-Dichloroethene	1	6.8	6.8	0.22	U
156-60-5	trans-1,2-Dichloroethene	1	6.8	6.8	0.31	U
78-87-5	1,2-Dichloropropane	1	6.8	6.8	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.8	6.8	0.34	U
10061-02-6	trans-1,3-Dichloropropene	1	6.8	6.8	1.1	U
100-41-4	Ethylbenzene	1	6.8	6.8	0.17	U
591-78-6	2-Hexanone	1	14	14	4.1	U
98-82-8	Isopropylbenzene	1	6.8	6.8	0.17	U
79-20-9	Methyl Acetate	1	4.7	27	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.8	6.8	0.32	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U
75-09-2	Methylene Chloride	1	27	27	5.4	U
78-93-3	2-Butanone (MEK)	1	27	27	3.3	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.5	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-01 File ID: 25301.D

Sampled: 01/14/08 12:55 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 11:57

Solids: 73.68 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.8	6.8	0.30	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.8	6.8	0.27	U
127-18-4	Tetrachloroethene	1	6.8	6.8	0.60	U
108-88-3	Toluene	1	6.8	6.8	0.55	U
87-61-6	1,2,3-Trichlorobenzene	1	27	27	0.28	U
120-82-1	1,2,4-Trichlorobenzene	1	6.8	6.8	0.33	U
71-55-6	1,1,1-Trichloroethane	1	6.8	6.8	0.28	U
79-00-5	1,1,2-Trichloroethane	1	6.8	6.8	0.93	U
79-01-6	Trichloroethene	1	6.8	6.8	0.76	U
75-69-4	Trichlorofluoromethane	1	6.8	6.8	0.29	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.8	6.8	0.45	U
75-01-4	Vinyl Chloride	1	6.8	6.8	0.62	U
1330-20-7	Xylene (Total)	1	6.8	6.8	0.79	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.1	110	78 - 121	
1,2-Dichloroethane-d4	40.0	44.8	112	66 - 124	
Toluene-d8	40.0	40.3	101	85 - 115	
4-Bromofluorobenzene	40.0	35.5	89	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	740053	7.4	893757	7.36	
Chlorobenzene-d5	296130	17.45	379762	17.41	
1,4-Dichlorobenzene-d4	254695	22.47	446152	22.44	

* Values outside of QC limits

01992

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB5AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-02 File ID: 25302.D

Sampled: 01/14/08 12:55 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 12:29

Solids: 75.19 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	36	27	5.6	
71-43-2	Benzene	1	6.6	6.6	0.17	U
74-97-5	Bromochloromethane	1	27	27	0.17	U
75-27-4	Bromodichloromethane	1	6.6	6.6	0.33	U
75-25-2	Bromoform	1	6.6	6.6	0.64	U
74-83-9	Bromomethane	1	6.6	6.6	1.6	U
75-15-0	Carbon Disulfide	1	2.7	6.6	0.35	J JC
56-23-5	Carbon Tetrachloride	1	6.6	6.6	0.38	U
108-90-7	Chlorobenzene	1	6.6	6.6	0.27	U
75-00-3	Chloroethane	1	27	27	0.47	U
67-66-3	Chloroform	1	6.6	6.6	0.20	U
74-87-3	Chloromethane	1	6.6	6.6	0.32	U
110-82-7	Cyclohexane	1	13	13	0.91	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.6	6.6	0.47	U
106-93-4	1,2-Dibromoethane	1	6.6	6.6	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.6	6.6	0.33	U
541-73-1	1,3-Dichlorobenzene	1	6.6	6.6	0.32	U
106-46-7	1,4-Dichlorobenzene	1	6.6	6.6	0.29	U
75-71-8	Dichlorodifluoromethane	1	6.6	6.6	0.44	U
75-34-3	1,1-Dichloroethane	1	6.6	6.6	0.26	U
107-06-2	1,2-Dichloroethane	1	6.6	6.6	0.39	U
75-35-4	1,1-Dichloroethene	1	6.6	6.6	0.49	U
156-59-2	cis-1,2-Dichloroethene	1	6.6	6.6	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.6	6.6	0.30	U
78-87-5	1,2-Dichloropropane	1	6.6	6.6	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.6	6.6	0.34	U
10061-02-6	trans-1,3-Dichloropropene	1	6.6	6.6	1.1	U
100-41-4	Ethylbenzene	1	6.6	6.6	0.17	U
591-78-6	2-Hexanone	1	13	13	4.0	U
98-82-8	Isopropylbenzene	1	6.6	6.6	0.16	U UJ ji
79-20-9	Methyl Acetate	1	2.8	27	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.6	6.6	0.31	U
108-87-2	Methylcyclohexane	1	13	13	1.1	U
75-09-2	Methylene Chloride	1	27	27	5.3	U
78-93-3	2-Butanone (MEK)	1	27	27	3.2	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.5	U

02000

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB5AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-02 File ID: 25302.D

Sampled: 01/14/08 12:55 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 12:29

Solids: 75.19 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.6	6.6	0.29	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.6	6.6	0.27	U UJ, i
127-18-4	Tetrachloroethene	1	0.88	6.6	0.59	J
108-88-3	Toluene	1	6.6	6.6	0.53	U
87-61-6	1,2,3-Trichlorobenzene	1	27	27	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.6	6.6	0.32	U
71-55-6	1,1,1-Trichloroethane	1	6.6	6.6	0.27	U
79-00-5	1,1,2-Trichloroethane	1	6.6	6.6	0.91	U
79-01-6	Trichloroethene	1	7.1	6.6	0.75	
75-69-4	Trichlorofluoromethane	1	6.6	6.6	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.6	6.6	0.44	U
75-01-4	Vinyl Chloride	1	6.6	6.6	0.61	U
1330-20-7	Xylene (Total)	1	6.6	6.6	0.78	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.6	111	78 - 121	
1,2-Dichloroethane-d4	40.0	42.4	106	66 - 124	
Toluene-d8	40.0	39.0	98	85 - 115	
4-Bromofluorobenzene	40.0	35.1	88	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	690389	7.4	893757	7.36	
Chlorobenzene-d5	268405	17.44	379762	17.41	
1,4-Dichlorobenzene-d4	221897	22.47	446152	22.44	*

* Values outside of QC limits

02001

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-03 File ID: 25303.D

Sampled: 01/14/08 14:00 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 13:02

Solids: 71.94 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	40	28	5.9	
71-43-2	Benzene	1	0.19	6.9	0.18	J
74-97-5	Bromochloromethane	1	28	28	0.18	U
75-27-4	Bromodichloromethane	1	6.9	6.9	0.34	U
75-25-2	Bromoform	1	6.9	6.9	0.67	U
74-83-9	Bromomethane	1	6.9	6.9	1.7	U
75-15-0	Carbon Disulfide	1	1.2	6.9	0.37	J JC
56-23-5	Carbon Tetrachloride	1	6.9	6.9	0.40	U
108-90-7	Chlorobenzene	1	6.9	6.9	0.28	U
75-00-3	Chloroethane	1	28	28	0.49	U
67-66-3	Chloroform	1	6.9	6.9	0.20	U
74-87-3	Chloromethane	1	6.9	6.9	0.34	U
110-82-7	Cyclohexane	1	14	14	0.95	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.1	U
124-48-1	Dibromochloromethane	1	6.9	6.9	0.49	U
106-93-4	1,2-Dibromoethane	1	6.9	6.9	1.2	U
95-50-1	1,2-Dichlorobenzene	1	6.9	6.9	0.34	U
541-73-1	1,3-Dichlorobenzene	1	6.9	6.9	0.33	U
106-46-7	1,4-Dichlorobenzene	1	6.9	6.9	0.30	U
75-71-8	Dichlorodifluoromethane	1	6.9	6.9	0.46	U
75-34-3	1,1-Dichloroethane	1	6.9	6.9	0.27	U
107-06-2	1,2-Dichloroethane	1	6.9	6.9	0.41	U
75-35-4	1,1-Dichloroethene	1	6.9	6.9	0.52	U
156-59-2	cis-1,2-Dichloroethene	1	6.9	6.9	0.22	U
156-60-5	trans-1,2-Dichloroethene	1	6.9	6.9	0.31	U
78-87-5	1,2-Dichloropropane	1	6.9	6.9	1.3	U
10061-01-5	cis-1,3-Dichloropropene	1	6.9	6.9	0.35	U
10061-02-6	trans-1,3-Dichloropropene	1	6.9	6.9	1.2	U
100-41-4	Ethylbenzene	1	6.9	6.9	0.17	U
591-78-6	2-Hexanone	1	14	14	4.2	U
98-82-8	Isopropylbenzene	1	6.9	6.9	0.17	U
79-20-9	Methyl Acetate	1	28	28	1.2	U
1634-04-4	Methyl tert-Butyl Ether	1	6.9	6.9	0.33	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U
75-09-2	Methylene Chloride	1	28	28	5.5	U
78-93-3	2-Butanone (MEK)	1	28	28	3.4	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.6	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-03 File ID: 25303.D

Sampled: 01/14/08 14:00 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 13:02

Solids: 71.94 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.9	6.9	0.31	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.9	6.9	0.28	U
127-18-4	Tetrachloroethene	1	6.9	6.9	0.61	U
108-88-3	Toluene	1	6.9	6.9	0.56	U
87-61-6	1,2,3-Trichlorobenzene	1	28	28	0.29	U
120-82-1	1,2,4-Trichlorobenzene	1	6.9	6.9	0.33	U
71-55-6	1,1,1-Trichloroethane	1	6.9	6.9	0.28	U
79-00-5	1,1,2-Trichloroethane	1	6.9	6.9	0.95	U
79-01-6	Trichloroethene	1	6.9	6.9	0.78	U
75-69-4	Trichlorofluoromethane	1	6.9	6.9	0.30	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.9	6.9	0.46	U
75-01-4	Vinyl Chloride	1	6.9	6.9	0.63	U
1330-20-7	Xylene (Total)	1	6.9	6.9	0.81	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.8	110	78 - 121	
1,2-Dichloroethane-d4	40.0	43.0	108	66 - 124	
Toluene-d8	40.0	40.5	101	85 - 115	
4-Bromofluorobenzene	40.0	35.8	90	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	744112	7.42	893757	7.36	
Chlorobenzene-d5	306655	17.45	379762	17.41	
1,4-Dichlorobenzene-d4	268041	22.47	446152	22.44	

* Values outside of QC limits

02011

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-04 File ID: 25304.D

Sampled: 01/14/08 14:10 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 13:35

Solids: 77.24 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	8.2	26	5.5	J
71-43-2	Benzene	1	0.25	6.5	0.17	J
74-97-5	Bromochloromethane	1	26	26	0.17	U
75-27-4	Bromodichloromethane	1	6.5	6.5	0.32	U
75-25-2	Bromoform	1	6.5	6.5	0.63	U
74-83-9	Bromomethane	1	6.5	6.5	1.6	U
75-15-0	Carbon Disulfide	1	6.5	6.5	0.34	U
56-23-5	Carbon Tetrachloride	1	6.5	6.5	0.37	U
108-90-7	Chlorobenzene	1	6.5	6.5	0.26	U
75-00-3	Chloroethane	1	26	26	0.45	U
67-66-3	Chloroform	1	6.5	6.5	0.19	U
74-87-3	Chloromethane	1	6.5	6.5	0.31	U
110-82-7	Cyclohexane	1	13	13	0.89	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.5	6.5	0.45	U
106-93-4	1,2-Dibromoethane	1	6.5	6.5	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.5	6.5	0.32	U
541-73-1	1,3-Dichlorobenzene	1	6.5	6.5	0.31	U
106-46-7	1,4-Dichlorobenzene	1	6.5	6.5	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.5	6.5	0.43	U
75-34-3	1,1-Dichloroethane	1	6.5	6.5	0.25	U
107-06-2	1,2-Dichloroethane	1	6.5	6.5	0.38	U
75-35-4	1,1-Dichloroethene	1	6.5	6.5	0.48	U
156-59-2	cis-1,2-Dichloroethene	1	6.5	6.5	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.5	6.5	0.29	U
78-87-5	1,2-Dichloropropane	1	6.5	6.5	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.5	6.5	0.33	U
10061-02-6	trans-1,3-Dichloropropene	1	6.5	6.5	1.1	U
100-41-4	Ethylbenzene	1	6.5	6.5	0.16	U
591-78-6	2-Hexanone	1	13	13	3.9	U
98-82-8	Isopropylbenzene	1	6.5	6.5	0.16	U
79-20-9	Methyl Acetate	1	3.4	26	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.5	6.5	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U
75-09-2	Methylene Chloride	1	26	26	5.1	U
78-93-3	2-Butanone (MEK)	1	26	26	3.1	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U

02020

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-04 File ID: 25304.D

Sampled: 01/14/08 14:10 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 13:35

Solids: 77.24 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.5	6.5	0.29	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.5	6.5	0.26	U
127-18-4	Tetrachloroethene	1	6.5	6.5	0.57	U
108-88-3	Toluene	1	6.5	6.5	0.52	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.5	6.5	0.31	U
71-55-6	1,1,1-Trichloroethane	1	6.5	6.5	0.27	U
79-00-5	1,1,2-Trichloroethane	1	6.5	6.5	0.89	U
79-01-6	Trichloroethene	1	6.5	6.5	0.73	U
75-69-4	Trichlorofluoromethane	1	6.5	6.5	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.5	6.5	0.43	U
75-01-4	Vinyl Chloride	1	6.5	6.5	0.59	U
1330-20-7	Xylene (Total)	1	6.5	6.5	0.76	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.4	111	78 - 121	
1,2-Dichloroethane-d4	40.0	44.3	111	66 - 124	
Toluene-d8	40.0	39.5	99	85 - 115	
4-Bromofluorobenzene	40.0	35.3	88	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	739164	7.42	893757	7.36	
Chlorobenzene-d5	301326	17.46	379762	17.41	
1,4-Dichlorobenzene-d4	259825	22.47	446152	22.44	

* Values outside of QC limits

02021

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-06 File ID: 25306.D

Sampled: 01/14/08 00:00 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 14:08

Solids: 74.13 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	39	27	5.7	
71-43-2	Benzene	1	6.7	6.7	0.17	U
74-97-5	Bromochloromethane	1	27	27	0.17	U
75-27-4	Bromodichloromethane	1	6.7	6.7	0.33	U
75-25-2	Bromoform	1	6.7	6.7	0.65	U
74-83-9	Bromomethane	1	6.7	6.7	1.6	U
75-15-0	Carbon Disulfide	1	2.8	6.7	0.35	J JC
56-23-5	Carbon Tetrachloride	1	6.7	6.7	0.39	U
108-90-7	Chlorobenzene	1	6.7	6.7	0.27	U
75-00-3	Chloroethane	1	27	27	0.47	U
67-66-3	Chloroform	1	6.7	6.7	0.20	U
74-87-3	Chloromethane	1	6.7	6.7	0.33	U
110-82-7	Cyclohexane	1	13	13	0.93	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.7	6.7	0.47	U
106-93-4	1,2-Dibromoethane	1	6.7	6.7	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.7	6.7	0.33	U
541-73-1	1,3-Dichlorobenzene	1	6.7	6.7	0.32	U
106-46-7	1,4-Dichlorobenzene	1	6.7	6.7	0.29	U
75-71-8	Dichlorodifluoromethane	1	6.7	6.7	0.45	U
75-34-3	1,1-Dichloroethane	1	6.7	6.7	0.26	U
107-06-2	1,2-Dichloroethane	1	6.7	6.7	0.40	U
75-35-4	1,1-Dichloroethene	1	6.7	6.7	0.50	U
156-59-2	cis-1,2-Dichloroethene	1	6.7	6.7	0.22	U
156-60-5	trans-1,2-Dichloroethene	1	6.7	6.7	0.30	U
78-87-5	1,2-Dichloropropane	1	6.7	6.7	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.7	6.7	0.34	U
10061-02-6	trans-1,3-Dichloropropene	1	6.7	6.7	1.1	U
100-41-4	Ethylbenzene	1	6.7	6.7	0.17	U
591-78-6	2-Hexanone	1	13	13	4.0	U
98-82-8	Isopropylbenzene	1	6.7	6.7	0.17	U
79-20-9	Methyl Acetate	1	2.4	27	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.7	6.7	0.32	U
108-87-2	Methylcyclohexane	1	13	13	1.1	U
75-09-2	Methylene Chloride	1	6.2	27	5.3	J B U
78-93-3	2-Butanone (MEK)	1	27	27	3.3	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.5	U

02029

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-06 File ID: 25306.D

Sampled: 01/14/08 00:00 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 14:08

Solids: 74.13 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.7	6.7	0.30	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.7	6.7	0.27	U
127-18-4	Tetrachloroethene	1	6.7	6.7	0.60	U
108-88-3	Toluene	1	6.7	6.7	0.54	U
87-61-6	1,2,3-Trichlorobenzene	1	27	27	0.28	U
120-82-1	1,2,4-Trichlorobenzene	1	6.7	6.7	0.33	U
71-55-6	1,1,1-Trichloroethane	1	6.7	6.7	0.28	U
79-00-5	1,1,2-Trichloroethane	1	6.7	6.7	0.93	U
79-01-6	Trichloroethene	1	6.7	6.7	0.76	U
75-69-4	Trichlorofluoromethane	1	6.7	6.7	0.29	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.7	6.7	0.45	U
75-01-4	Vinyl Chloride	1	6.7	6.7	0.62	U
1330-20-7	Xylene (Total)	1	6.7	6.7	0.79	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	45.0	113	78 - 121	
1,2-Dichloroethane-d4	40.0	44.2	110	66 - 124	
Toluene-d8	40.0	40.2	101	85 - 115	
4-Bromofluorobenzene	40.0	38.4	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	734645	7.42	893757	7.36	
Chlorobenzene-d5	297829	17.46	379762	17.41	
1,4-Dichlorobenzene-d4	267461	22.47	446152	22.44	

* Values outside of QC limits

02030

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-07 File ID: 25307.D

Sampled: 01/14/08 15:10 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 14:41

Solids: 71.41 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	34	28	5.9	
71-43-2	Benzene	1	7.0	7.0	0.18	U
74-97-5	Bromochloromethane	1	28	28	0.18	U
75-27-4	Bromodichloromethane	1	7.0	7.0	0.35	U
75-25-2	Bromoform	1	7.0	7.0	0.68	U
74-83-9	Bromomethane	1	7.0	7.0	1.7	U
75-15-0	Carbon Disulfide	1	0.64	7.0	0.37	J JC
56-23-5	Carbon Tetrachloride	1	7.0	7.0	0.40	U
108-90-7	Chlorobenzene	1	7.0	7.0	0.28	U
75-00-3	Chloroethane	1	28	28	0.49	U
67-66-3	Chloroform	1	7.0	7.0	0.21	U
74-87-3	Chloromethane	1	7.0	7.0	0.34	U
110-82-7	Cyclohexane	1	14	14	0.96	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.1	U
124-48-1	Dibromochloromethane	1	7.0	7.0	0.49	U
106-93-4	1,2-Dibromoethane	1	7.0	7.0	1.2	U
95-50-1	1,2-Dichlorobenzene	1	7.0	7.0	0.34	U
541-73-1	1,3-Dichlorobenzene	1	7.0	7.0	0.33	U
106-46-7	1,4-Dichlorobenzene	1	7.0	7.0	0.30	U
75-71-8	Dichlorodifluoromethane	1	7.0	7.0	0.46	U
75-34-3	1,1-Dichloroethane	1	7.0	7.0	0.27	U
107-06-2	1,2-Dichloroethane	1	7.0	7.0	0.41	U
75-35-4	1,1-Dichloroethene	1	7.0	7.0	0.52	U
156-59-2	cis-1,2-Dichloroethene	1	7.0	7.0	0.23	U
156-60-5	trans-1,2-Dichloroethene	1	7.0	7.0	0.32	U
78-87-5	1,2-Dichloropropane	1	7.0	7.0	1.3	U
10061-01-5	cis-1,3-Dichloropropene	1	7.0	7.0	0.35	U
10061-02-6	trans-1,3-Dichloropropene	1	7.0	7.0	1.2	U
100-41-4	Ethylbenzene	1	7.0	7.0	0.18	U
591-78-6	2-Hexanone	1	14	14	4.2	U
98-82-8	Isopropylbenzene	1	7.0	7.0	0.17	U
79-20-9	Methyl Acetate	1	8.0	28	1.2	J
1634-04-4	Methyl tert-Butyl Ether	1	7.0	7.0	0.33	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U
75-09-2	Methylene Chloride	1	28	28	5.5	U
78-93-3	2-Butanone (MEK)	1	28	28	3.4	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.6	U

02039

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-07 File ID: 25307.D

Sampled: 01/14/08 15:10 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 14:41

Solids: 71.41 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	7.0	7.0	0.31	U
79-34-5	1,1,2,2-Tetrachloroethane	1	7.0	7.0	0.28	U
127-18-4	Tetrachloroethene	1	7.0	7.0	0.62	U
108-88-3	Toluene	1	7.0	7.0	0.56	U
87-61-6	1,2,3-Trichlorobenzene	1	28	28	0.29	U
120-82-1	1,2,4-Trichlorobenzene	1	7.0	7.0	0.34	U
71-55-6	1,1,1-Trichloroethane	1	7.0	7.0	0.29	U
79-00-5	1,1,2-Trichloroethane	1	7.0	7.0	0.96	U
79-01-6	Trichloroethene	1	7.0	7.0	0.79	U
75-69-4	Trichlorofluoromethane	1	7.0	7.0	0.30	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	7.0	7.0	0.46	U
75-01-4	Vinyl Chloride	1	7.0	7.0	0.64	U
1330-20-7	Xylene (Total)	1	7.0	7.0	0.82	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.1	108	78 - 121	
1,2-Dichloroethane-d4	40.0	42.2	105	66 - 124	
Toluene-d8	40.0	38.3	96	85 - 115	
4-Bromofluorobenzene	40.0	34.4	86	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	750436	7.42	893757	7.36	
Chlorobenzene-d5	292230	17.46	379762	17.41	
1,4-Dichlorobenzene-d4	225078	22.48	446152	22.44	

* Values outside of QC limits

02846

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB8AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-08 File ID: 25308.D

Sampled: 01/14/08 15:10 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 15:14

Solids: 77.53 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	190	26	5.5	JIM
71-43-2	Benzene	1	6.4	6.4	0.17	U
74-97-5	Bromochloromethane	1	26	26	0.17	U
75-27-4	Bromodichloromethane	1	6.4	6.4	0.32	U
75-25-2	Bromoform	1	6.4	6.4	0.62	U
74-83-9	Bromomethane	1	6.4	6.4	1.6	U
75-15-0	Carbon Disulfide	1	6.4	6.4	0.34	U
56-23-5	Carbon Tetrachloride	1	6.4	6.4	0.37	U
108-90-7	Chlorobenzene	1	6.4	6.4	0.26	U
75-00-3	Chloroethane	1	26	26	0.45	U
67-66-3	Chloroform	1	6.4	6.4	0.19	U
74-87-3	Chloromethane	1	6.4	6.4	0.31	U
110-82-7	Cyclohexane	1	13	13	0.89	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.1	U
124-48-1	Dibromochloromethane	1	6.4	6.4	0.45	U
106-93-4	1,2-Dibromoethane	1	6.4	6.4	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.4	6.4	0.32	U
541-73-1	1,3-Dichlorobenzene	1	6.4	6.4	0.31	U
106-46-7	1,4-Dichlorobenzene	1	6.4	6.4	0.28	U
75-71-8	Dichlorodifluoromethane	1	6.4	6.4	0.43	U
75-34-3	1,1-Dichloroethane	1	6.4	6.4	0.25	U
107-06-2	1,2-Dichloroethane	1	6.4	6.4	0.38	U
75-35-4	1,1-Dichloroethene	1	6.4	6.4	0.48	U
156-59-2	cis-1,2-Dichloroethene	1	6.4	6.4	0.21	U
156-60-5	trans-1,2-Dichloroethene	1	6.4	6.4	0.29	U
78-87-5	1,2-Dichloropropane	1	6.4	6.4	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.4	6.4	0.33	U
10061-02-6	trans-1,3-Dichloropropene	1	6.4	6.4	1.1	U
100-41-4	Ethylbenzene	1	6.4	6.4	0.16	U
591-78-6	2-Hexanone	1	13	13	3.9	U
98-82-8	Isopropylbenzene	1	6.4	6.4	0.16	U
79-20-9	Methyl Acetate	1	3.5	26	1.1	J JIM
1634-04-4	Methyl tert-Butyl Ether	1	6.4	6.4	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U UJ IM
75-09-2	Methylene Chloride	1	26	26	5.1	U
78-93-3	2-Butanone (MEK)	1	26	26	3.1	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U

02048

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB8AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-08 File ID: 25308.D

Sampled: 01/14/08 15:10 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 15:14

Solids: 77.53 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.4	6.4	0.29	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.4	6.4	0.26	U
127-18-4	Tetrachloroethene	1	6.4	6.4	0.57	U
108-88-3	Toluene	1	6.4	6.4	0.52	U
87-61-6	1,2,3-Trichlorobenzene	1	26	26	0.27	U
120-82-1	1,2,4-Trichlorobenzene	1	6.4	6.4	0.31	U UJ, M7
71-55-6	1,1,1-Trichloroethane	1	6.4	6.4	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.4	6.4	0.89	U
79-01-6	Trichloroethene	1	6.4	6.4	0.72	U
75-69-4	Trichlorofluoromethane	1	6.4	6.4	0.28	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.4	6.4	0.43	U UJ, M
75-01-4	Vinyl Chloride	1	6.4	6.4	0.59	U
1330-20-7	Xylene (Total)	1	6.4	6.4	0.75	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.7	107	78 - 121	
1,2-Dichloroethane-d4	40.0	42.6	107	66 - 124	
Toluene-d8	40.0	38.9	97	85 - 115	
4-Bromofluorobenzene	40.0	37.6	94	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	780242	7.43	893757	7.36	
Chlorobenzene-d5	303685	17.46	379762	17.41	
1,4-Dichlorobenzene-d4	282713	22.48	446152	22.44	

* Values outside of QC limits

02049

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-09 File ID: 25309.D

Sampled: 01/14/08 15:30 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 15:47

Solids: 74.00 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	230	27	5.7	
71-43-2	Benzene	1	6.8	6.8	0.17	U
74-97-5	Bromochloromethane	1	27	27	0.17	U
75-27-4	Bromodichloromethane	1	6.8	6.8	0.34	U
75-25-2	Bromoform	1	6.8	6.8	0.65	U
74-83-9	Bromomethane	1	6.8	6.8	1.6	U
75-15-0	Carbon Disulfide	1	2.7	6.8	0.36	J JIC
56-23-5	Carbon Tetrachloride	1	6.8	6.8	0.39	U
108-90-7	Chlorobenzene	1	6.8	6.8	0.27	U
75-00-3	Chloroethane	1	27	27	0.47	U
67-66-3	Chloroform	1	6.8	6.8	0.20	U
74-87-3	Chloromethane	1	6.8	6.8	0.33	U
110-82-7	Cyclohexane	1	14	14	0.93	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.1	U
124-48-1	Dibromochloromethane	1	6.8	6.8	0.47	U
106-93-4	1,2-Dibromoethane	1	6.8	6.8	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.8	6.8	0.33	U
541-73-1	1,3-Dichlorobenzene	1	6.8	6.8	0.32	U
106-46-7	1,4-Dichlorobenzene	1	6.8	6.8	0.29	U
75-71-8	Dichlorodifluoromethane	1	6.8	6.8	0.45	U
75-34-3	1,1-Dichloroethane	1	6.8	6.8	0.26	U
107-06-2	1,2-Dichloroethane	1	6.8	6.8	0.40	U
75-35-4	1,1-Dichloroethene	1	6.8	6.8	0.50	U
156-59-2	cis-1,2-Dichloroethene	1	6.8	6.8	0.22	U
156-60-5	trans-1,2-Dichloroethene	1	6.8	6.8	0.31	U
78-87-5	1,2-Dichloropropane	1	6.8	6.8	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.8	6.8	0.34	U
10061-02-6	trans-1,3-Dichloropropene	1	6.8	6.8	1.1	U
100-41-4	Ethylbenzene	1	6.8	6.8	0.17	U
591-78-6	2-Hexanone	1	14	14	4.0	U
98-82-8	Isopropylbenzene	1	6.8	6.8	0.17	U
79-20-9	Methyl Acetate	1	33	27	1.1	
1634-04-4	Methyl tert-Butyl Ether	1	6.8	6.8	0.32	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U
75-09-2	Methylene Chloride	1	27	27	5.3	U
78-93-3	2-Butanone (MEK)	1	27	27	3.3	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.5	U

02057

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-09 File ID: 25309.D

Sampled: 01/14/08 15:30 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 15:47

Solids: 74.00 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.8	6.8	0.30	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.8	6.8	0.27	U
127-18-4	Tetrachloroethene	1	6.8	6.8	0.60	U
108-88-3	Toluene	1	6.8	6.8	0.54	U
87-61-6	1,2,3-Trichlorobenzene	1	27	27	0.28	U
120-82-1	1,2,4-Trichlorobenzene	1	6.8	6.8	0.33	U
71-55-6	1,1,1-Trichloroethane	1	6.8	6.8	0.28	U
79-00-5	1,1,2-Trichloroethane	1	6.8	6.8	0.93	U
79-01-6	Trichloroethene	1	6.8	6.8	0.76	U
75-69-4	Trichlorofluoromethane	1	6.8	6.8	0.29	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.8	6.8	0.45	U
75-01-4	Vinyl Chloride	1	6.8	6.8	0.62	U
1330-20-7	Xylene (Total)	1	6.8	6.8	0.79	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.3	108	78 - 121	
1,2-Dichloroethane-d4	40.0	42.4	106	66 - 124	
Toluene-d8	40.0	39.0	98	85 - 115	
4-Bromofluorobenzene	40.0	35.0	88	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	738560	7.42	893757	7.36	
Chlorobenzene-d5	291000	17.47	379762	17.41	
1,4-Dichlorobenzene-d4	234319	22.48	446152	22.44	

* Values outside of QC limits

02058

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-10 File ID: 25310.D

Sampled: 01/14/08 15:35 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 16:19

Solids: 73.53 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	130	27	5.8	
71-43-2	Benzene	1	6.8	6.8	0.17	U
74-97-5	Bromochloromethane	1	27	27	0.17	U
75-27-4	Bromodichloromethane	1	6.8	6.8	0.34	U
75-25-2	Bromoform	1	6.8	6.8	0.66	U
74-83-9	Bromomethane	1	6.8	6.8	1.7	U
75-15-0	Carbon Disulfide	1	0.72	6.8	0.36	J JC
56-23-5	Carbon Tetrachloride	1	6.8	6.8	0.39	U
108-90-7	Chlorobenzene	1	6.8	6.8	0.27	U
75-00-3	Chloroethane	1	27	27	0.48	U
67-66-3	Chloroform	1	6.8	6.8	0.20	U
74-87-3	Chloromethane	1	6.8	6.8	0.33	U
110-82-7	Cyclohexane	1	14	14	0.93	U
96-12-8	1,2-Dibromo-3-chloropropane	1	14	14	1.1	U
124-48-1	Dibromochloromethane	1	6.8	6.8	0.48	U
106-93-4	1,2-Dibromoethane	1	6.8	6.8	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.8	6.8	0.33	U
541-73-1	1,3-Dichlorobenzene	1	6.8	6.8	0.32	U
106-46-7	1,4-Dichlorobenzene	1	6.8	6.8	0.30	U
75-71-8	Dichlorodifluoromethane	1	6.8	6.8	0.45	U
75-34-3	1,1-Dichloroethane	1	6.8	6.8	0.26	U
107-06-2	1,2-Dichloroethane	1	6.8	6.8	0.40	U
75-35-4	1,1-Dichloroethene	1	6.8	6.8	0.50	U
156-59-2	cis-1,2-Dichloroethene	1	6.8	6.8	0.22	U
156-60-5	trans-1,2-Dichloroethene	1	6.8	6.8	0.31	U
78-87-5	1,2-Dichloropropane	1	6.8	6.8	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.8	6.8	0.34	U
10061-02-6	trans-1,3-Dichloropropene	1	6.8	6.8	1.1	U
100-41-4	Ethylbenzene	1	6.8	6.8	0.17	U
591-78-6	2-Hexanone	1	14	14	4.1	U
98-82-8	Isopropylbenzene	1	6.8	6.8	0.17	U
79-20-9	Methyl Acetate	1	6.1	27	1.1	J
1634-04-4	Methyl tert-Butyl Ether	1	6.8	6.8	0.32	U
108-87-2	Methylcyclohexane	1	14	14	1.1	U
75-09-2	Methylene Chloride	1	27	27	5.4	U
78-93-3	2-Butanone (MEK)	1	27	27	3.3	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	14	14	2.5	U

02066

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-10 File ID: 25310.D

Sampled: 01/14/08 15:35 Prepared: 01/17/08 08:00 Analyzed: 01/17/08 16:19

Solids: 73.53 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0800595 Sequence: 8011744 Calibration: 8A16008 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.8	6.8	0.30	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.8	6.8	0.27	U
127-18-4	Tetrachloroethene	1	6.8	6.8	0.60	U
108-88-3	Toluene	1	6.8	6.8	0.55	U
87-61-6	1,2,3-Trichlorobenzene	1	27	27	0.28	U
120-82-1	1,2,4-Trichlorobenzene	1	6.8	6.8	0.33	U
71-55-6	1,1,1-Trichloroethane	1	6.8	6.8	0.28	U
79-00-5	1,1,2-Trichloroethane	1	6.8	6.8	0.93	U
79-01-6	Trichloroethene	1	6.8	6.8	0.76	U
75-69-4	Trichlorofluoromethane	1	6.8	6.8	0.29	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.8	6.8	0.45	U
75-01-4	Vinyl Chloride	1	6.8	6.8	0.62	U
1330-20-7	Xylene (Total)	1	6.8	6.8	0.80	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.5	106	78 - 121	
1,2-Dichloroethane-d4	40.0	42.2	106	66 - 124	
Toluene-d8	40.0	38.4	96	85 - 115	
4-Bromofluorobenzene	40.0	35.2	88	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	688500	7.43	893757	7.36	
Chlorobenzene-d5	270261	17.47	379762	17.41	
1,4-Dichlorobenzene-d4	233650	22.48	446152	22.44	

* Values outside of QC limits

02067

SAMPLE ID SUMMARY

USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB6A	0801213-10
57SB6AB	0801213-11
57SB6B	0801213-12
EQBK-4	0801230-01
57SB6C	0801233-01
57SB7A	0801233-02
57SB7AB	0801233-03
57SB7B	0801233-04
57SB7C	0801233-05
57SB4AB	0801233-06
57SB4B	0801233-07
57SB4C	0801233-08
DUP-5	0801233-09
EQBK-5	0801250-01
57SB5A	0801253-01
57SB5AB	0801253-02
57SB5B	0801253-03
57SB5C	0801253-04
DUP-6	0801253-06
57SB8A	0801253-07
57SB8AB	0801253-08
57SB8B	0801253-09
57SB8C	0801253-10

02421

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-10 File ID: 80121310.D

Sampled: 01/10/08 15:40 Prepared: 01/23/08 08:02 Analyzed: 01/25/08 01:18

Solids: 28.65 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	12	59	1.4	J
208-96-8	Acenaphthylene	1	59	59	2.1	U
98-86-2	Acetophenone	1	590	590	23	U
120-12-7	Anthracene	1	20	59	1.5	J
1912-24-9	Atrazine	1	590	590	5.2	U
100-52-7	Benzaldehyde	1	590	590	91	U
56-55-3	Benzo(a)anthracene	1	42	59	1.9	J
50-32-8	Benzo(a)pyrene	1	31	59	3.6	J
205-99-2	Benzo(b)fluoranthene	1	51	59	3.0	J
207-08-9	Benzo(k)fluoranthene	1	19	59	2.5	J
191-24-2	Benzo(g,h,i)perylene	1	15	230	8.0	J
92-52-4	1,1'-Biphenyl	1	590	590	1.6	U
101-55-3	4-Bromophenyl Phenyl Ether	1	590	590	4.4	U
85-68-7	Butyl Benzyl Phthalate	1	590	590	7.3	U
105-60-2	Caprolactam	1	1200	1200	80	U
86-74-8	Carbazole	1	590	590	1.7	U
59-50-7	4-Chloro-3-methylphenol	1	590	590	6.2	U
106-47-8	4-Chloroaniline	1	590	590	68	U
111-91-1	Bis(2-chloroethoxy)methane	1	590	590	2.8	U
111-44-4	Bis(2-chloroethyl) Ether	1	590	590	3.1	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	590	590	1.1	U
91-58-7	2-Chloronaphthalene	1	590	590	1.5	U
95-57-8	2-Chlorophenol	1	590	590	1.3	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	590	590	1.6	U
218-01-9	Chrysene	1	40	59	1.7	J
53-70-3	Dibenz(a,h)anthracene	1	3.5	230	1.9	J
132-64-9	Dibenzofuran	1	5.8	590	0.92	J
84-74-2	Di-n-butyl Phthalate	1	51	590	4.2	J
91-94-1	3,3'-Dichlorobenzidine	1	1200	1200	270	U
120-83-2	2,4-Dichlorophenol	1	590	590	23	U
84-66-2	Diethyl Phthalate	1	590	590	1.3	U
105-67-9	2,4-Dimethylphenol	1	590	590	20	U
131-11-3	Dimethyl Phthalate	1	590	590	1.2	U
534-52-1	4,6-Dinitro-2-methylphenol	1	590	590	130	U
51-28-5	2,4-Dinitrophenol	1	1200	1200	120	U
121-14-2	2,4-Dinitrotoluene	1	590	590	46	U
606-20-2	2,6-Dinitrotoluene	1	590	590	5.7	U

02487

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-10 File ID: 80121310.D

Sampled: 01/10/08 15:40 Prepared: 01/23/08 08:02 Analyzed: 01/25/08 01:18

Solids: 28.65 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	590	590	34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	560	590	4.5	J
206-44-0	Fluoranthene	1	99	59	13	
86-73-7	Fluorene	1	10	59	0.98	J
118-74-1	Hexachlorobenzene	1	590	590	2.8	U
87-68-3	Hexachlorobutadiene	1	590	590	2.4	U
77-47-4	Hexachlorocyclopentadiene	1	590	590	14	U
67-72-1	Hexachloroethane	1	590	590	2.8	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	19	230	2.4	J
78-59-1	Isophorone	1	590	590	1.4	U
91-57-6	2-Methylnaphthalene	1	8.1	590	1.7	J
95-48-7	2-Methylphenol	1	590	590	28	U
106-44-5	4-Methylphenol	1	590	590	32	U
91-20-3	Naphthalene	1	7.0	59	0.81	J
88-74-4	2-Nitroaniline	1	590	590	46	U
99-09-2	3-Nitroaniline	1	590	590	38	U
100-01-6	4-Nitroaniline	1	590	590	80	U
98-95-3	Nitrobenzene	1	590	590	5.2	U
100-02-7	4-Nitrophenol	1	1200	1200	39	U
88-75-5	2-Nitrophenol	1	590	590	43	U
86-30-6	N-Nitroso-diphenylamine	1	590	590	2.8	U
621-64-7	N-Nitroso-di-n-propylamine	1	590	590	2.5	U
87-86-5	Pentachlorophenol	1	1200	1200	13	U
85-01-8	Phenanthrene	1	97	59	13	
108-95-2	Phenol	1	590	590	2.4	U
129-00-0	Pyrene	1	81	59	1.1	
95-94-3	1,2,4,5-Tetrachlorobenzene	1	590	590	2.8	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	590	590	57	U
88-06-2	2,4,6-Trichlorophenol	1	590	590	16	U
95-95-4	2,4,5-Trichlorophenol	1	590	590	21	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	2350	1870	80	35 - 105	
Phenol-d6	2330	1940	83	40 - 100	
Nitrobenzene-d5	1210	1030	85	35 - 100	
2-Fluorobiphenyl	1160	996	86	45 - 105	
2,4,6-Tribromophenol	2340	1880	80	35 - 125	
o-Terphenyl	1160	1110	96	30 - 125	

02488

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-10 File ID: 80121310.D

Sampled: 01/10/08 15:40 Prepared: 01/23/08 08:02 Analyzed: 01/25/08 01:18

Solids: 28.65 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	203263	8.1	196503	8.05	
Naphthalene-d8	622871	10.87	634629	10.86	
Acenaphthene-d10	327328	15.01	352151	15.01	
Phenanthrene-d10	397037	18.35	458536	18.34	
Chrysene-d12	288106	21.88	353190	21.87	
Perylene-d12	303068	23.77	340969	23.75	

* Values outside of QC limits

02489

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB6AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-11 File ID: 80121311.D

Sampled: 01/10/08 15:40 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 17:16

Solids: 77.38 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	22	22	0.52	U
208-96-8	Acenaphthylene	1	22	22	0.78	U
98-86-2	Acetophenone	1	220	220	8.7	U
120-12-7	Anthracene	1	22	22	0.55	U
1912-24-9	Atrazine	1	220	220	1.9	U
100-52-7	Benzaldehyde	1	220	220	34	U
56-55-3	Benzo(a)anthracene	1	0.86	22	0.69	J
50-32-8	Benzo(a)pyrene	1	22	22	1.3	U
205-99-2	Benzo(b)fluoranthene	1	22	22	1.1	U
207-08-9	Benzo(k)fluoranthene	1	22	22	0.93	U
191-24-2	Benzo(g,h,i)perylene	1	87	87	3.0	U
92-52-4	1,1'-Biphenyl	1	220	220	0.59	U
101-55-3	4-Bromophenyl Phenyl Ether	1	220	220	1.6	U
85-68-7	Butyl Benzyl Phthalate	1	220	220	2.7	U
105-60-2	Caprolactam	1	430	430	30	U
86-74-8	Carbazole	1	220	220	0.64	U
59-50-7	4-Chloro-3-methylphenol	1	220	220	2.3	U
106-47-8	4-Chloroaniline	1	220	220	25	U
111-91-1	Bis(2-chloroethoxy)methane	1	220	220	1.0	U
111-44-4	Bis(2-chloroethyl) Ether	1	220	220	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	220	220	0.40	U
91-58-7	2-Chloronaphthalene	1	220	220	0.56	U
95-57-8	2-Chlorophenol	1	220	220	0.49	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	220	220	0.58	U
218-01-9	Chrysene	1	0.86	22	0.62	J
53-70-3	Dibenz(a,h)anthracene	1	87	87	0.69	U
132-64-9	Dibenzofuran	1	220	220	0.34	U
84-74-2	Di-n-butyl Phthalate	1	19	220	1.6	J
91-94-1	3,3'-Dichlorobenzidine	1	430	430	100	U
120-83-2	2,4-Dichlorophenol	1	220	220	8.5	U
84-66-2	Diethyl Phthalate	1	1.7	220	0.48	J
105-67-9	2,4-Dimethylphenol	1	220	220	7.4	U
131-11-3	Dimethyl Phthalate	1	220	220	0.44	U
534-52-1	4,6-Dinitro-2-methylphenol	1	220	220	47	U
51-28-5	2,4-Dinitrophenol	1	430	430	43	U
121-14-2	2,4-Dinitrotoluene	1	220	220	17	U
606-20-2	2,6-Dinitrotoluene	1	220	220	2.1	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB6AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-11 File ID: 80121311.D

Sampled: 01/10/08 15:40 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 17:16

Solids: 77.38 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	220	220	13	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	47	220	1.7	J
206-44-0	Fluoranthene	1	22	22	4.9	U
86-73-7	Fluorene	1	22	22	0.36	U
118-74-1	Hexachlorobenzene	1	220	220	1.0	U
87-68-3	Hexachlorobutadiene	1	220	220	0.89	U
77-47-4	Hexachlorocyclopentadiene	1	220	220	5.1	U
67-72-1	Hexachloroethane	1	220	220	1.0	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	87	87	0.90	U
78-59-1	Isophorone	1	220	220	0.52	U
91-57-6	2-Methylnaphthalene	1	220	220	0.62	U
95-48-7	2-Methylphenol	1	220	220	10	U
106-44-5	4-Methylphenol	1	220	220	12	U
91-20-3	Naphthalene	1	0.43	22	0.30	J
88-74-4	2-Nitroaniline	1	220	220	17	U
99-09-2	3-Nitroaniline	1	220	220	14	U
100-01-6	4-Nitroaniline	1	220	220	30	U
98-95-3	Nitrobenzene	1	220	220	1.9	U
100-02-7	4-Nitrophenol	1	430	430	14	U
88-75-5	2-Nitrophenol	1	220	220	16	U
86-30-6	N-Nitroso-diphenylamine	1	220	220	1.0	U
621-64-7	N-Nitroso-di-n-propylamine	1	220	220	0.92	U
87-86-5	Pentachlorophenol	1	430	430	4.8	U
85-01-8	Phenanthrene	1	22	22	4.7	U
108-95-2	Phenol	1	220	220	0.90	U
129-00-0	Pyrene	1	0.43	22	0.41	J
95-94-3	1,2,4,5-Tetrachlorobenzene	1	220	220	1.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	220	220	21	U
88-06-2	2,4,6-Trichlorophenol	1	220	220	5.9	U
95-95-4	2,4,5-Trichlorophenol	1	220	220	7.8	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	870	679	78	35 - 105	
Phenol-d6	862	772	90	40 - 100	
Nitrobenzene-d5	448	406	91	35 - 100	
2-Fluorobiphenyl	431	414	96	45 - 105	
2,4,6-Tribromophenol	866	715	83	35 - 125	
o-Terphenyl	431	436	101	30 - 125	

02516

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB6AB

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47 4MD
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0801213-11
File ID: 80121311.D
Sampled: 01/10/08 15:40
Prepared: 01/23/08 08:02
Analyzed: 01/24/08 17:16
Solids: 77.38
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 1 mL
QC Batch: 0800817
Sequence: 8012605
Calibration: 8A23018
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	200621	8.09	196503	8.05	
Naphthalene-d8	643472	10.86	634629	10.86	
Acenaphthene-d10	361679	15	352151	15.01	
Phenanthrene-d10	454370	18.34	458536	18.34	
Chrysene-d12	347788	21.87	353190	21.87	
Perylene-d12	284433	23.74	340969	23.75	

* Values outside of QC limits

02517

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-12 File ID: 80121312.D

Sampled: 01/10/08 17:00 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 17:51

Solids: 69.91 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	24	24	0.57	U
208-96-8	Acenaphthylene	1	24	24	0.86	U
98-86-2	Acetophenone	1	240	240	9.6	U
120-12-7	Anthracene	1	24	24	0.61	U
1912-24-9	Atrazine	1	240	240	2.1	U
100-52-7	Benzaldehyde	1	240	240	37	U
56-55-3	Benzo(a)anthracene	1	1.4	24	0.77	J
50-32-8	Benzo(a)pyrene	1	24	24	1.5	U
205-99-2	Benzo(b)fluoranthene	1	24	24	1.2	U
207-08-9	Benzo(k)fluoranthene	1	24	24	1.0	U
191-24-2	Benzo(g,h,i)perylene	1	96	96	3.3	U
92-52-4	1,1'-Biphenyl	1	240	240	0.66	U
101-55-3	4-Bromophenyl Phenyl Ether	1	240	240	1.8	U
85-68-7	Butyl Benzyl Phthalate	1	4.8	240	3.0	J
105-60-2	Caprolactam	1	470	470	33	U
86-74-8	Carbazole	1	240	240	0.71	U
59-50-7	4-Chloro-3-methylphenol	1	240	240	2.6	U
106-47-8	4-Chloroaniline	1	240	240	28	U
111-91-1	Bis(2-chloroethoxy)methane	1	240	240	1.1	U
111-44-4	Bis(2-chloroethyl) Ether	1	240	240	1.3	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	240	240	0.45	U
91-58-7	2-Chloronaphthalene	1	240	240	0.62	U
95-57-8	2-Chlorophenol	1	240	240	0.55	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	240	240	0.64	U
218-01-9	Chrysene	1	0.95	24	0.68	J
53-70-3	Dibenz(a,h)anthracene	1	96	96	0.77	U
132-64-9	Dibenzofuran	1	240	240	0.38	U
84-74-2	Di-n-butyl Phthalate	1	14	240	1.7	J
91-94-1	3,3'-Dichlorobenzidine	1	470	470	110	U
120-83-2	2,4-Dichlorophenol	1	240	240	9.4	U
84-66-2	Diethyl Phthalate	1	2.4	240	0.53	J
105-67-9	2,4-Dimethylphenol	1	240	240	8.2	U
131-11-3	Dimethyl Phthalate	1	240	240	0.48	U
534-52-1	4,6-Dinitro-2-methylphenol	1	240	240	52	U
51-28-5	2,4-Dinitrophenol	1	470	470	47	U
121-14-2	2,4-Dinitrotoluene	1	240	240	19	U
606-20-2	2,6-Dinitrotoluene	1	240	240	2.3	U

02530

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-12 File ID: 80121312.D

Sampled: 01/10/08 17:00 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 17:51

Solids: 69.91 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	240	240	14	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	77	240	1.9	J
206-44-0	Fluoranthene	1	24	24	5.4	U
86-73-7	Fluorene	1	24	24	0.40	U
118-74-1	Hexachlorobenzene	1	240	240	1.1	U
87-68-3	Hexachlorobutadiene	1	240	240	0.99	U
77-47-4	Hexachlorocyclopentadiene	1	240	240	5.6	U
67-72-1	Hexachloroethane	1	240	240	1.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	96	96	1.0	U
78-59-1	Isophorone	1	240	240	0.57	U
91-57-6	2-Methylnaphthalene	1	1.4	240	0.68	J
95-48-7	2-Methylphenol	1	240	240	12	U
106-44-5	4-Methylphenol	1	240	240	13	U
91-20-3	Naphthalene	1	0.95	24	0.33	J
88-74-4	2-Nitroaniline	1	240	240	19	U
99-09-2	3-Nitroaniline	1	240	240	16	U
100-01-6	4-Nitroaniline	1	240	240	33	U
98-95-3	Nitrobenzene	1	240	240	2.1	U
100-02-7	4-Nitrophenol	1	470	470	16	U
88-75-5	2-Nitrophenol	1	240	240	17	U
86-30-6	N-Nitroso-diphenylamine	1	240	240	1.1	U
621-64-7	N-Nitroso-di-n-propylamine	1	240	240	1.0	U
87-86-5	Pentachlorophenol	1	470	470	5.3	U
85-01-8	Phenanthrene	1	24	24	5.2	U
108-95-2	Phenol	1	240	240	1.0	U
129-00-0	Pyrene	1	1.9	24	0.45	J
95-94-3	1,2,4,5-Tetrachlorobenzene	1	240	240	1.1	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	240	240	23	U
88-06-2	2,4,6-Trichlorophenol	1	240	240	6.6	U
95-95-4	2,4,5-Trichlorophenol	1	240	240	8.6	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	963	749	78	35 - 105	
Phenol-d6	954	826	87	40 - 100	
Nitrobenzene-d5	496	444	90	35 - 100	
2-Fluorobiphenyl	477	457	96	45 - 105	
2,4,6-Tribromophenol	958	810	84	35 - 125	
o-Terphenyl	477	483	101	30 - 125	

02531

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB6B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47 4MD
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0801213-12
File ID: 80121312.D
Sampled: 01/10/08 17:00
Prepared: 01/23/08 08:02
Analyzed: 01/24/08 17:51
Solids: 69.91
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 1 mL
QC Batch: 0800817
Sequence: 8012605
Calibration: 8A23018
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	192539	8.1	196503	8.05	
Naphthalene-d8	620153	10.86	634629	10.86	
Acenaphthene-d10	342610	15	352151	15.01	
Phenanthrene-d10	429403	18.35	458536	18.34	
Chrysene-d12	334774	21.87	353190	21.87	
Perylene-d12	299114	23.74	340969	23.75	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801230-01 File ID: 80123001.D

Sampled: 01/11/08 13:40 Prepared: 01/18/08 08:05 Analyzed: 01/22/08 21:32

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0800629 Sequence: 8012344 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	0.075	5.0	0.043	J
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	5.0	5.0	0.051	U
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	5.0	5.0	0.029	U
105-60-2	Caprolactam	1	5.0	5.0	0.14	U
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	0.72	5.0	0.38	J B
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	5.0	5.0	0.034	U
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

02549

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801230-01 File ID: 80123001.D

Sampled: 01/11/08 13:40 Prepared: 01/18/08 08:05 Analyzed: 01/22/08 21:32

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0800629 Sequence: 8012344 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	5.0	5.0	0.41	U
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	5.0	5.0	0.031	U
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.50	0.50	0.023	U
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.50	0.50	0.015	U
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.1	8.95	47	20 - 110	
Phenol-d6	18.9	5.98	32	10 - 115	
Nitrobenzene-d5	9.81	7.63	78	40 - 110	
2-Fluorobiphenyl	9.43	6.16	65	50 - 110	
2,4,6-Tribromophenol	19.0	14.5	76	40 - 125	
o-Terphenyl	9.43	7.52	80	50 - 135	

02556

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-4

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47 4MD
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0801230-01
File ID: 80123001.D
Sampled: 01/11/08 13:40
Prepared: 01/18/08 08:05
Analyzed: 01/22/08 21:32
Solids:
Preparation: 3510C Liquid-Liquid Ext
Initial/Final: 1060 mL / 1 mL
QC Batch: 0800629
Sequence: 8012344
Calibration: 8A23018
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	236710	8.13	202723	8.13	
Naphthalene-d8	754313	10.93	632326	10.94	
Acenaphthene-d10	440398	15.08	351133	15.09	
Phenanthrene-d10	560972	18.4	465609	18.4	
Chrysene-d12	450124	21.91	314206	21.92	
Perylene-d12	434278	23.8	312328	23.81	

* Values outside of QC limits

02551

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-01 File ID: 80123301.D

Sampled: 01/11/08 08:15 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 18:25

Solids: 73.67 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	23	23	0.54	U
208-96-8	Acenaphthylene	1	23	23	0.81	U
98-86-2	Acetophenone	1	230	230	9.1	U
120-12-7	Anthracene	1	23	23	0.58	U
1912-24-9	Atrazine	1	230	230	2.0	U
100-52-7	Benzaldehyde	1	230	230	36	U
56-55-3	Benzo(a)anthracene	1	23	23	0.73	U
50-32-8	Benzo(a)pyrene	1	23	23	1.4	U
205-99-2	Benzo(b)fluoranthene	1	23	23	1.2	U
207-08-9	Benzo(k)fluoranthene	1	23	23	0.97	U
191-24-2	Benzo(g,h,i)perylene	1	91	91	3.1	U
92-52-4	1,1'-Biphenyl	1	230	230	0.62	U
101-55-3	4-Bromophenyl Phenyl Ether	1	230	230	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	230	230	2.9	U
105-60-2	Caprolactam	1	450	450	31	U
86-74-8	Carbazole	1	230	230	0.68	U
59-50-7	4-Chloro-3-methylphenol	1	230	230	2.4	U
106-47-8	4-Chloroaniline	1	230	230	27	U
111-91-1	Bis(2-chloroethoxy)methane	1	230	230	1.1	U
111-44-4	Bis(2-chloroethyl) Ether	1	230	230	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	230	230	0.42	U
91-58-7	2-Chloronaphthalene	1	230	230	0.59	U
95-57-8	2-Chlorophenol	1	230	230	0.52	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	230	230	0.61	U
218-01-9	Chrysene	1	23	23	0.65	U
53-70-3	Dibenz(a,h)anthracene	1	91	91	0.73	U
132-64-9	Dibenzofuran	1	230	230	0.36	U
84-74-2	Di-n-butyl Phthalate	1	9.0	230	1.6	J B,Z
91-94-1	3,3'-Dichlorobenzidine	1	450	450	110	U
120-83-2	2,4-Dichlorophenol	1	230	230	8.9	U
84-66-2	Diethyl Phthalate	1	0.90	230	0.50	J
105-67-9	2,4-Dimethylphenol	1	230	230	7.7	U
131-11-3	Dimethyl Phthalate	1	230	230	0.46	U
534-52-1	4,6-Dinitro-2-methylphenol	1	230	230	49	U
51-28-5	2,4-Dinitrophenol	1	450	450	45	U
121-14-2	2,4-Dinitrotoluene	1	230	230	18	U
606-20-2	2,6-Dinitrotoluene	1	230	230	2.2	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-01 File ID: 80123301.D

Sampled: 01/11/08 08:15 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 18:25

Solids: 73.67 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	230	230	13	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	62	230	1.8	J
206-44-0	Fluoranthene	1	23	23	5.1	U
86-73-7	Fluorene	1	23	23	0.38	U
118-74-1	Hexachlorobenzene	1	230	230	1.1	U
87-68-3	Hexachlorobutadiene	1	230	230	0.94	U
77-47-4	Hexachlorocyclopentadiene	1	230	230	5.3	U
67-72-1	Hexachloroethane	1	230	230	1.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	91	91	0.95	U
78-59-1	Isophorone	1	230	230	0.54	U
91-57-6	2-Methylnaphthalene	1	0.90	230	0.65	J
95-48-7	2-Methylphenol	1	230	230	11	U
106-44-5	4-Methylphenol	1	230	230	12	U
91-20-3	Naphthalene	1	0.45	23	0.32	J
88-74-4	2-Nitroaniline	1	230	230	18	U
99-09-2	3-Nitroaniline	1	230	230	15	U
100-01-6	4-Nitroaniline	1	230	230	31	U
98-95-3	Nitrobenzene	1	230	230	2.0	U
100-02-7	4-Nitrophenol	1	450	450	15	U
88-75-5	2-Nitrophenol	1	230	230	17	U
86-30-6	N-Nitroso-diphenylamine	1	230	230	1.1	U
621-64-7	N-Nitroso-di-n-propylamine	1	230	230	0.97	U
87-86-5	Pentachlorophenol	1	450	450	5.0	U
85-01-8	Phenanthrene	1	23	23	4.9	U
108-95-2	Phenol	1	230	230	0.95	U
129-00-0	Pyrene	1	23	23	0.43	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	230	230	1.1	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	230	230	22	U
88-06-2	2,4,6-Trichlorophenol	1	230	230	6.2	U
95-95-4	2,4,5-Trichlorophenol	1	230	230	8.1	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	914	663	73	35 - 105	
Phenol-d6	905	761	84	40 - 100	
Nitrobenzene-d5	471	416	88	35 - 100	
2-Fluorobiphenyl	452	430	95	45 - 105	
2,4,6-Tribromophenol	909	603	66	35 - 125	
o-Terphenyl	452	447	99	30 - 125	

02560

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-01 File ID: 80123301.D

Sampled: 01/11/08 08:15 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 18:25

Solids: 73.67 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	191258	8.1	196503	8.05	
Naphthalene-d8	605591	10.86	634629	10.86	
Acenaphthene-d10	343445	15	352151	15.01	
Phenanthrene-d10	431924	18.34	458536	18.34	
Chrysene-d12	321591	21.87	353190	21.87	
Perylene-d12	269963	23.74	340969	23.75	

* Values outside of QC limits

02561

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-02 File ID: 80123302.D

Sampled: 01/11/08 09:05 Prepared: 01/23/08 08:02 Analyzed: 01/25/08 01:53

Solids: 37.36 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	1.8	45	1.1	J
208-96-8	Acenaphthylene	1	45	45	1.6	U
98-86-2	Acetophenone	1	450	450	18	U
120-12-7	Anthracene	1	45	45	1.1	U
1912-24-9	Atrazine	1	450	450	4.0	U
100-52-7	Benzaldehyde	1	450	450	70	U
56-55-3	Benzo(a)anthracene	1	4.5	45	1.4	J
50-32-8	Benzo(a)pyrene	1	8.9	45	2.8	J
205-99-2	Benzo(b)fluoranthene	1	7.1	45	2.3	J
207-08-9	Benzo(k)fluoranthene	1	7.1	45	1.9	J
191-24-2	Benzo(g,h,i)perylene	1	8.0	180	6.1	J
92-52-4	1,1'-Biphenyl	1	450	450	1.2	U
101-55-3	4-Bromophenyl Phenyl Ether	1	450	450	3.3	U
85-68-7	Butyl Benzyl Phthalate	1	450	450	5.6	U
105-60-2	Caprolactam	1	880	880	61	U
86-74-8	Carbazole	1	450	450	1.3	U
59-50-7	4-Chloro-3-methylphenol	1	450	450	4.8	U
106-47-8	4-Chloroaniline	1	450	450	52	U
111-91-1	Bis(2-chloroethoxy)methane	1	450	450	2.1	U
111-44-4	Bis(2-chloroethyl) Ether	1	450	450	2.4	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	450	450	0.84	U
91-58-7	2-Chloronaphthalene	1	450	450	1.2	U
95-57-8	2-Chlorophenol	1	450	450	1.0	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	450	450	1.2	U
218-01-9	Chrysene	1	8.9	45	1.3	J
53-70-3	Dibenz(a,h)anthracene	1	2.7	180	1.4	J
132-64-9	Dibenzofuran	1	450	450	0.70	U
84-74-2	Di-n-butyl Phthalate	1	15	450	3.2	J
91-94-1	3,3'-Dichlorobenzidine	1	880	880	210	U
120-83-2	2,4-Dichlorophenol	1	450	450	18	U
84-66-2	Diethyl Phthalate	1	3.6	450	1.0	J
105-67-9	2,4-Dimethylphenol	1	450	450	15	U
131-11-3	Dimethyl Phthalate	1	450	450	0.91	U
534-52-1	4,6-Dinitro-2-methylphenol	1	450	450	97	U
51-28-5	2,4-Dinitrophenol	1	880	880	89	U
121-14-2	2,4-Dinitrotoluene	1	450	450	35	U
606-20-2	2,6-Dinitrotoluene	1	450	450	4.3	U

02572

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-02 File ID: 80123302.D

Sampled: 01/11/08 09:05 Prepared: 01/23/08 08:02 Analyzed: 01/25/08 01:53

Solids: 37.36 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	450	450	26	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	540	450	3.5	
206-44-0	Fluoranthene	1	12	45	10	J
86-73-7	Fluorene	1	45	45	0.75	U
118-74-1	Hexachlorobenzene	1	450	450	2.1	U
87-68-3	Hexachlorobutadiene	1	450	450	1.8	U
77-47-4	Hexachlorocyclopentadiene	1	450	450	11	U
67-72-1	Hexachloroethane	1	450	450	2.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	2.7	180	1.9	J
78-59-1	Isophorone	1	450	450	1.1	U
91-57-6	2-Methylnaphthalene	1	2.7	450	1.3	J
95-48-7	2-Methylphenol	1	450	450	22	U
106-44-5	4-Methylphenol	1	450	450	24	U
91-20-3	Naphthalene	1	2.7	45	0.62	J
88-74-4	2-Nitroaniline	1	450	450	35	U
99-09-2	3-Nitroaniline	1	450	450	29	U
100-01-6	4-Nitroaniline	1	450	450	62	U
98-95-3	Nitrobenzene	1	450	450	4.0	U
100-02-7	4-Nitrophenol	1	880	880	30	U
88-75-5	2-Nitrophenol	1	450	450	33	U
86-30-6	N-Nitroso-diphenylamine	1	450	450	2.1	U
621-64-7	N-Nitroso-di-n-propylamine	1	450	450	1.9	U
87-86-5	Pentachlorophenol	1	880	880	9.8	U
85-01-8	Phenanthrene	1	45	45	9.7	U
108-95-2	Phenol	1	450	450	1.9	U
129-00-0	Pyrene	1	18	45	0.85	J
95-94-3	1,2,4,5-Tetrachlorobenzene	1	450	450	2.1	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	450	450	44	U
88-06-2	2,4,6-Trichlorophenol	1	450	450	12	U
95-95-4	2,4,5-Trichlorophenol	1	450	450	16	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	1800	1370	76	35 - 105	
Phenol-d6	1780	1380	77	40 - 100	
Nitrobenzene-d5	928	780	84	35 - 100	
2-Fluorobiphenyl	892	813	91	45 - 105	
2,4,6-Tribromophenol	1790	1400	78	35 - 125	
o-Terphenyl	892	833	93	30 - 125	

02573

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-02 File ID: 80123302.D

Sampled: 01/11/08 09:05 Prepared: 01/23/08 08:02 Analyzed: 01/25/08 01:53

Solids: 37.36 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	201994	8.09	196503	8.05	
Naphthalene-d8	631768	10.87	634629	10.86	
Acenaphthene-d10	329603	15.02	352151	15.01	
Phenanthrene-d10	415998	18.36	458536	18.34	
Chrysene-d12	276143	21.89	353190	21.87	
Perylene-d12	291714	23.78	340969	23.75	

* Values outside of QC limits

02574

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB7AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-03 File ID: 80123303.D

Sampled: 01/11/08 09:05 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 19:00

Solids: 71.69 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.93	24	0.56	J
208-96-8	Acenaphthylene	1	24	24	0.84	U
98-86-2	Acetophenone	1	240	240	9.4	U
120-12-7	Anthracene	1	24	24	0.59	U
1912-24-9	Atrazine	1	240	240	2.1	U
100-52-7	Benzaldehyde	1	240	240	37	U
56-55-3	Benzo(a)anthracene	1	24	24	0.75	U
50-32-8	Benzo(a)pyrene	1	24	24	1.4	U
205-99-2	Benzo(b)fluoranthene	1	24	24	1.2	U
207-08-9	Benzo(k)fluoranthene	1	24	24	1.0	U
191-24-2	Benzo(g,h,i)perylene	1	93	93	3.2	U
92-52-4	1,1'-Biphenyl	1	240	240	0.64	U
101-55-3	4-Bromophenyl Phenyl Ether	1	240	240	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	4.6	240	2.9	J
105-60-2	Caprolactam	1	460	460	32	U
86-74-8	Carbazole	1	240	240	0.69	U
59-50-7	4-Chloro-3-methylphenol	1	240	240	2.5	U
106-47-8	4-Chloroaniline	1	240	240	27	U
111-91-1	Bis(2-chloroethoxy)methane	1	240	240	1.1	U
111-44-4	Bis(2-chloroethyl) Ether	1	240	240	1.3	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	240	240	0.44	U
91-58-7	2-Chloronaphthalene	1	240	240	0.60	U
95-57-8	2-Chlorophenol	1	240	240	0.53	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	240	240	0.62	U
218-01-9	Chrysene	1	24	24	0.66	U
53-70-3	Dibenz(a,h)anthracene	1	93	93	0.75	U
132-64-9	Dibenzofuran	1	240	240	0.37	U
84-74-2	Di-n-butyl Phthalate	1	18	240	1.7	J
91-94-1	3,3'-Dichlorobenzidine	1	460	460	110	U
120-83-2	2,4-Dichlorophenol	1	240	240	9.2	U
84-66-2	Diethyl Phthalate	1	0.93	240	0.52	J
105-67-9	2,4-Dimethylphenol	1	240	240	8.0	U
131-11-3	Dimethyl Phthalate	1	240	240	0.47	U
534-52-1	4,6-Dinitro-2-methylphenol	1	240	240	51	U
51-28-5	2,4-Dinitrophenol	1	460	460	46	U
121-14-2	2,4-Dinitrotoluene	1	240	240	18	U
606-20-2	2,6-Dinitrotoluene	1	240	240	2.3	U

02598

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB7AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-03 File ID: 80123303.D

Sampled: 01/11/08 09:05 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 19:00

Solids: 71.69 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	240	240	14	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	31	240	1.8	J
206-44-0	Fluoranthene	1	24	24	5.2	U
86-73-7	Fluorene	1	24	24	0.39	U
118-74-1	Hexachlorobenzene	1	240	240	1.1	U
87-68-3	Hexachlorobutadiene	1	240	240	0.96	U
77-47-4	Hexachlorocyclopentadiene	1	240	240	5.5	U
67-72-1	Hexachloroethane	1	240	240	1.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	93	93	0.98	U
78-59-1	Isophorone	1	240	240	0.56	U
91-57-6	2-Methylnaphthalene	1	240	240	0.67	U
95-48-7	2-Methylphenol	1	240	240	11	U
106-44-5	4-Methylphenol	1	240	240	13	U
91-20-3	Naphthalene	1	0.46	24	0.32	J
88-74-4	2-Nitroaniline	1	240	240	18	U
99-09-2	3-Nitroaniline	1	240	240	15	U
100-01-6	4-Nitroaniline	1	240	240	32	U
98-95-3	Nitrobenzene	1	240	240	2.1	U
100-02-7	4-Nitrophenol	1	460	460	16	U
88-75-5	2-Nitrophenol	1	240	240	17	U
86-30-6	N-Nitroso-diphenylamine	1	240	240	1.1	U
621-64-7	N-Nitroso-di-n-propylamine	1	240	240	0.99	U
87-86-5	Pentachlorophenol	1	460	460	5.1	U
85-01-8	Phenanthrene	1	24	24	5.0	U
108-95-2	Phenol	1	240	240	0.98	U
129-00-0	Pyrene	1	24	24	0.44	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	240	240	1.1	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	240	240	23	U
88-06-2	2,4,6-Trichlorophenol	1	240	240	6.4	U
95-95-4	2,4,5-Trichlorophenol	1	240	240	8.4	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	939	703	75	35 - 105	
Phenol-d6	930	782	84	40 - 100	
Nitrobenzene-d5	484	426	88	35 - 100	
2-Fluorobiphenyl	465	447	96	45 - 105	
2,4,6-Tribromophenol	935	750	80	35 - 125	
o-Terphenyl	465	468	101	30 - 125	

02559

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB7AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-03 File ID: 80123303.D

Sampled: 01/11/08 09:05 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 19:00

Solids: 71.69 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	190267	8.1	196503	8.05	
Naphthalene-d8	592999	10.86	634629	10.86	
Acenaphthene-d10	336486	15	352151	15.01	
Phenanthrene-d10	435492	18.34	458536	18.34	
Chrysene-d12	337805	21.87	353190	21.87	
Perylene-d12	284115	23.74	340969	23.75	

* Values outside of QC limits

02606

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-04 File ID: 80123304.D

Sampled: 01/11/08 09:10 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 19:35

Solids: 80.43 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	21	21	0.50	U
208-96-8	Acenaphthylene	1	21	21	0.75	U
98-86-2	Acetophenone	1	210	210	8.4	U
120-12-7	Anthracene	1	21	21	0.53	U
1912-24-9	Atrazine	1	210	210	1.9	U
100-52-7	Benzaldehyde	1	210	210	33	U
56-55-3	Benzo(a)anthracene	1	21	21	0.67	U
50-32-8	Benzo(a)pyrene	1	21	21	1.3	U
205-99-2	Benzo(b)fluoranthene	1	21	21	1.1	U
207-08-9	Benzo(k)fluoranthene	1	21	21	0.89	U
191-24-2	Benzo(g,h,i)perylene	1	83	83	2.8	U
92-52-4	1,1'-Biphenyl	1	210	210	0.57	U
101-55-3	4-Bromophenyl Phenyl Ether	1	210	210	1.6	U
85-68-7	Butyl Benzyl Phthalate	1	210	210	2.6	U
105-60-2	Caprolactam	1	410	410	28	U
86-74-8	Carbazole	1	210	210	0.62	U
59-50-7	4-Chloro-3-methylphenol	1	210	210	2.2	U
106-47-8	4-Chloroaniline	1	210	210	24	U
111-91-1	Bis(2-chloroethoxy)methane	1	210	210	0.99	U
111-44-4	Bis(2-chloroethyl) Ether	1	210	210	1.1	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	210	210	0.39	U
91-58-7	2-Chloronaphthalene	1	210	210	0.54	U
95-57-8	2-Chlorophenol	1	210	210	0.48	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	210	210	0.56	U
218-01-9	Chrysene	1	21	21	0.59	U
53-70-3	Dibenz(a,h)anthracene	1	83	83	0.67	U
132-64-9	Dibenzofuran	1	210	210	0.33	U
84-74-2	Di-n-butyl Phthalate	1	9.1	210	1.5	J B) Z
91-94-1	3,3'-Dichlorobenzidine	1	410	410	97	U
120-83-2	2,4-Dichlorophenol	1	210	210	8.2	U
84-66-2	Diethyl Phthalate	1	210	210	0.46	U
105-67-9	2,4-Dimethylphenol	1	210	210	7.1	U
131-11-3	Dimethyl Phthalate	1	210	210	0.42	U
534-52-1	4,6-Dinitro-2-methylphenol	1	210	210	45	U
51-28-5	2,4-Dinitrophenol	1	410	410	41	U
121-14-2	2,4-Dinitrotoluene	1	210	210	16	U
606-20-2	2,6-Dinitrotoluene	1	210	210	2.0	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-04 File ID: 80123304.D

Sampled: 01/11/08 09:10 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 19:35

Solids: 80.43 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	210	210	12	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	17	210	1.6	J
206-44-0	Fluoranthene	1	21	21	4.7	U
86-73-7	Fluorene	1	21	21	0.35	U
118-74-1	Hexachlorobenzene	1	210	210	0.99	U
87-68-3	Hexachlorobutadiene	1	210	210	0.86	U
77-47-4	Hexachlorocyclopentadiene	1	210	210	4.9	U
67-72-1	Hexachloroethane	1	210	210	0.99	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	83	83	0.87	U
78-59-1	Isophorone	1	210	210	0.50	U
91-57-6	2-Methylnaphthalene	1	210	210	0.59	U
95-48-7	2-Methylphenol	1	210	210	10	U
106-44-5	4-Methylphenol	1	210	210	11	U
91-20-3	Naphthalene	1	0.41	21	0.29	J
88-74-4	2-Nitroaniline	1	210	210	16	U
99-09-2	3-Nitroaniline	1	210	210	14	U
100-01-6	4-Nitroaniline	1	210	210	29	U
98-95-3	Nitrobenzene	1	210	210	1.9	U
100-02-7	4-Nitrophenol	1	410	410	14	U
88-75-5	2-Nitrophenol	1	210	210	15	U
86-30-6	N-Nitroso-diphenylamine	1	210	210	0.99	U
621-64-7	N-Nitroso-di-n-propylamine	1	210	210	0.89	U
87-86-5	Pentachlorophenol	1	410	410	4.6	U
85-01-8	Phenanthrene	1	21	21	4.5	U
108-95-2	Phenol	1	210	210	0.87	U
129-00-0	Pyrene	1	21	21	0.39	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	210	210	0.99	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	210	210	20	U
88-06-2	2,4,6-Trichlorophenol	1	210	210	5.7	U
95-95-4	2,4,5-Trichlorophenol	1	210	210	7.5	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	837	625	75	35 - 105	
Phenol-d6	829	695	84	40 - 100	
Nitrobenzene-d5	431	371	86	35 - 100	
2-Fluorobiphenyl	414	381	92	45 - 105	
2,4,6-Tribromophenol	833	657	79	35 - 125	
o-Terphenyl	414	417	101	30 - 125	

02613

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-04 File ID: 80123304.D

Sampled: 01/11/08 09:10 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 19:35

Solids: 80.43 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	192057	8.09	196503	8.05	
Naphthalene-d8	609957	10.86	634629	10.86	
Acenaphthene-d10	343899	15	352151	15.01	
Phenanthrene-d10	450699	18.35	458536	18.34	
Chrysene-d12	342067	21.87	353190	21.87	
Perylene-d12	272871	23.74	340969	23.75	

* Values outside of QC limits

02614

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-05 File ID: 80123305.D

Sampled: 01/11/08 10:05 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 20:09

Solids: 69.25 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	25	25	0.58	U
208-96-8	Acenaphthylene	1	25	25	0.87	U
98-86-2	Acetophenone	1	250	250	9.7	U
120-12-7	Anthracene	1	25	25	0.62	U
1912-24-9	Atrazine	1	250	250	2.2	U
100-52-7	Benzaldehyde	1	250	250	38	U
56-55-3	Benzo(a)anthracene	1	25	25	0.78	U
50-32-8	Benzo(a)pyrene	1	25	25	1.5	U
205-99-2	Benzo(b)fluoranthene	1	25	25	1.2	U
207-08-9	Benzo(k)fluoranthene	1	25	25	1.0	U
191-24-2	Benzo(g,h,i)perylene	1	97	97	3.3	U
92-52-4	1,1'-Biphenyl	1	250	250	0.66	U
101-55-3	4-Bromophenyl Phenyl Ether	1	250	250	1.8	U
85-68-7	Butyl Benzyl Phthalate	1	5.3	250	3.0	J
105-60-2	Caprolactam	1	480	480	33	U
86-74-8	Carbazole	1	250	250	0.72	U
59-50-7	4-Chloro-3-methylphenol	1	250	250	2.6	U
106-47-8	4-Chloroaniline	1	250	250	28	U
111-91-1	Bis(2-chloroethoxy)methane	1	250	250	1.2	U
111-44-4	Bis(2-chloroethyl) Ether	1	250	250	1.3	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	250	250	0.45	U
91-58-7	2-Chloronaphthalene	1	250	250	0.62	U
95-57-8	2-Chlorophenol	1	250	250	0.55	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	250	250	0.65	U
218-01-9	Chrysene	1	25	25	0.69	U
53-70-3	Dibenz(a,h)anthracene	1	97	97	0.78	U
132-64-9	Dibenzofuran	1	250	250	0.38	U
84-74-2	Di-n-butyl Phthalate	1	17	250	1.7	J
91-94-1	3,3´-Dichlorobenzidine	1	480	480	110	U
120-83-2	2,4-Dichlorophenol	1	250	250	9.5	U
84-66-2	Diethyl Phthalate	1	250	250	0.54	U
105-67-9	2,4-Dimethylphenol	1	250	250	8.2	U
131-11-3	Dimethyl Phthalate	1	250	250	0.49	U
534-52-1	4,6-Dinitro-2-methylphenol	1	250	250	53	U
51-28-5	2,4-Dinitrophenol	1	480	480	48	U
121-14-2	2,4-Dinitrotoluene	1	250	250	19	U
606-20-2	2,6-Dinitrotoluene	1	250	250	2.3	U

02623

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-05 File ID: 80123305.D

Sampled: 01/11/08 10:05 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 20:09

Solids: 69.25 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	250	250	14	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	23	250	1.9	J
206-44-0	Fluoranthene	1	25	25	5.4	U
86-73-7	Fluorene	1	25	25	0.40	U
118-74-1	Hexachlorobenzene	1	250	250	1.1	U
87-68-3	Hexachlorobutadiene	1	250	250	0.99	U
77-47-4	Hexachlorocyclopentadiene	1	250	250	5.7	U
67-72-1	Hexachloroethane	1	250	250	1.2	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	97	97	1.0	U
78-59-1	Isophorone	1	250	250	0.58	U
91-57-6	2-Methylnaphthalene	1	0.96	250	0.69	J
95-48-7	2-Methylphenol	1	250	250	12	U
106-44-5	4-Methylphenol	1	250	250	13	U
91-20-3	Naphthalene	1	0.48	25	0.34	J
88-74-4	2-Nitroaniline	1	250	250	19	U
99-09-2	3-Nitroaniline	1	250	250	16	U
100-01-6	4-Nitroaniline	1	250	250	33	U
98-95-3	Nitrobenzene	1	250	250	2.2	U
100-02-7	4-Nitrophenol	1	480	480	16	U
88-75-5	2-Nitrophenol	1	250	250	18	U
86-30-6	N-Nitroso-diphenylamine	1	250	250	1.2	U
621-64-7	N-Nitroso-di-n-propylamine	1	250	250	1.0	U
87-86-5	Pentachlorophenol	1	480	480	5.3	U
85-01-8	Phenanthrene	1	25	25	5.2	U
108-95-2	Phenol	1	250	250	1.0	U
129-00-0	Pyrene	1	25	25	0.46	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	250	250	1.2	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	250	250	24	U
88-06-2	2,4,6-Trichlorophenol	1	250	250	6.6	U
95-95-4	2,4,5-Trichlorophenol	1	250	250	8.7	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	972	683	70	35 - 105	
Phenol-d6	963	800	83	40 - 100	
Nitrobenzene-d5	501	454	91	35 - 100	
2-Fluorobiphenyl	481	472	98	45 - 105	
2,4,6-Tribromophenol	968	590	61	35 - 125	
o-Terphenyl	481	495	103	30 - 125	

02624

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-05 File ID: 80123305.D

Sampled: 01/11/08 10:05 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 20:09

Solids: 69.25 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	184886	8.09	196503	8.05	
Naphthalene-d8	584767	10.86	634629	10.86	
Acenaphthene-d10	330999	15	352151	15.01	
Phenanthrene-d10	429950	18.35	458536	18.34	
Chrysene-d12	335245	21.87	353190	21.87	
Perylene-d12	254680	23.74	340969	23.75	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB4AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-06 File ID: 80123306.D

Sampled: 01/11/08 12:05 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 20:43

Solids: 76.38 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.87	22	0.52	J
208-96-8	Acenaphthylene	1	22	22	0.79	U
98-86-2	Acetophenone	1	220	220	8.8	U
120-12-7	Anthracene	1	22	22	0.56	U
1912-24-9	Atrazine	1	220	220	2.0	U
100-52-7	Benzaldehyde	1	220	220	34	U
56-55-3	Benzo(a)anthracene	1	22	22	0.70	U
50-32-8	Benzo(a)pyrene	1	22	22	1.3	U
205-99-2	Benzo(b)fluoranthene	1	22	22	1.1	U
207-08-9	Benzo(k)fluoranthene	1	22	22	0.94	U
191-24-2	Benzo(g,h,i)perylene	1	88	88	3.0	U
92-52-4	1,1'-Biphenyl	1	220	220	0.60	U
101-55-3	4-Bromophenyl Phenyl Ether	1	220	220	1.6	U
85-68-7	Butyl Benzyl Phthalate	1	6.1	220	2.7	J
105-60-2	Caprolactam	1	430	430	30	U
86-74-8	Carbazole	1	220	220	0.65	U
59-50-7	4-Chloro-3-methylphenol	1	220	220	2.3	U
106-47-8	4-Chloroaniline	1	220	220	26	U
111-91-1	Bis(2-chloroethoxy)methane	1	220	220	1.0	U
111-44-4	Bis(2-chloroethyl) Ether	1	220	220	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	220	220	0.41	U
91-58-7	2-Chloronaphthalene	1	220	220	0.57	U
95-57-8	2-Chlorophenol	1	220	220	0.50	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	220	220	0.59	U
218-01-9	Chrysene	1	22	22	0.62	U
53-70-3	Dibenz(a,h)anthracene	1	88	88	0.70	U
132-64-9	Dibenzofuran	1	220	220	0.34	U
84-74-2	Di-n-butyl Phthalate	1	20	220	1.6	J
91-94-1	3,3'-Dichlorobenzidine	1	430	430	100	U
120-83-2	2,4-Dichlorophenol	1	220	220	8.6	U
84-66-2	Diethyl Phthalate	1	0.87	220	0.49	J
105-67-9	2,4-Dimethylphenol	1	220	220	7.5	U
131-11-3	Dimethyl Phthalate	1	220	220	0.44	U
534-52-1	4,6-Dinitro-2-methylphenol	1	220	220	48	U
51-28-5	2,4-Dinitrophenol	1	430	430	43	U
121-14-2	2,4-Dinitrotoluene	1	220	220	17	U
606-20-2	2,6-Dinitrotoluene	1	220	220	2.1	U

02636

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB4AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-06 File ID: 80123306.D

Sampled: 01/11/08 12:05 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 20:43

Solids: 76.38 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	220	220	13	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	82	220	1.7	J
206-44-0	Fluoranthene	1	22	22	4.9	U
86-73-7	Fluorene	1	22	22	0.37	U
118-74-1	Hexachlorobenzene	1	220	220	1.0	U
87-68-3	Hexachlorobutadiene	1	220	220	0.90	U
77-47-4	Hexachlorocyclopentadiene	1	220	220	5.1	U
67-72-1	Hexachloroethane	1	220	220	1.0	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	88	88	0.92	U
78-59-1	Isophorone	1	220	220	0.52	U
91-57-6	2-Methylnaphthalene	1	220	220	0.63	U
95-48-7	2-Methylphenol	1	220	220	11	U
106-44-5	4-Methylphenol	1	220	220	12	U
91-20-3	Naphthalene	1	0.44	22	0.31	J
88-74-4	2-Nitroaniline	1	220	220	17	U
99-09-2	3-Nitroaniline	1	220	220	14	U
100-01-6	4-Nitroaniline	1	220	220	30	U
98-95-3	Nitrobenzene	1	220	220	2.0	U
100-02-7	4-Nitrophenol	1	430	430	15	U
88-75-5	2-Nitrophenol	1	220	220	16	U
86-30-6	N-Nitroso-diphenylamine	1	220	220	1.0	U
621-64-7	N-Nitroso-di-n-propylamine	1	220	220	0.93	U
87-86-5	Pentachlorophenol	1	430	430	4.8	U
85-01-8	Phenanthrene	1	22	22	4.7	U
108-95-2	Phenol	1	220	220	0.92	U
129-00-0	Pyrene	1	22	22	0.42	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	220	220	1.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	220	220	21	U
88-06-2	2,4,6-Trichlorophenol	1	220	220	6.0	U
95-95-4	2,4,5-Trichlorophenol	1	220	220	7.9	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	882	655	74	35 - 105	
Phenol-d6	873	726	83	40 - 100	
Nitrobenzene-d5	454	398	88	35 - 100	
2-Fluorobiphenyl	436	400	92	45 - 105	
2,4,6-Tribromophenol	877	716	82	35 - 125	
o-Terphenyl	436	428	98	30 - 125	

02637

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB4AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-06 File ID: 80123306.D

Sampled: 01/11/08 12:05 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 20:43

Solids: 76.38 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	194712	8.09	196503	8.05	
Naphthalene-d8	627374	10.86	634629	10.86	
Acenaphthene-d10	357331	15	352151	15.01	
Phenanthrene-d10	473337	18.34	458536	18.34	
Chrysene-d12	355962	21.87	353190	21.87	
Perylene-d12	304884	23.74	340969	23.75	

* Values outside of QC limits

02538

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-07 File ID: 80123307.D

Sampled: 01/11/08 12:40 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 21:18

Solids: 78.19 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.85	22	0.51	J
208-96-8	Acenaphthylene	1	22	22	0.77	U
98-86-2	Acetophenone	1	220	220	8.6	U
120-12-7	Anthracene	1	22	22	0.54	U
1912-24-9	Atrazine	1	220	220	1.9	U
100-52-7	Benzaldehyde	1	220	220	34	U
56-55-3	Benzo(a)anthracene	1	22	22	0.69	U
50-32-8	Benzo(a)pyrene	1	22	22	1.3	U
205-99-2	Benzo(b)fluoranthene	1	22	22	1.1	U
207-08-9	Benzo(k)fluoranthene	1	22	22	0.92	U
191-24-2	Benzo(g,h,i)perylene	1	86	86	2.9	U
92-52-4	1,1'-Biphenyl	1	220	220	0.59	U
101-55-3	4-Bromophenyl Phenyl Ether	1	220	220	1.6	U
85-68-7	Butyl Benzyl Phthalate	1	4.7	220	2.7	J
105-60-2	Caprolactam	1	420	420	29	U
86-74-8	Carbazole	1	220	220	0.64	U
59-50-7	4-Chloro-3-methylphenol	1	220	220	2.3	U
106-47-8	4-Chloroaniline	1	220	220	25	U
111-91-1	Bis(2-chloroethoxy)methane	1	220	220	1.0	U
111-44-4	Bis(2-chloroethyl) Ether	1	220	220	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	220	220	0.40	U
91-58-7	2-Chloronaphthalene	1	220	220	0.55	U
95-57-8	2-Chlorophenol	1	220	220	0.49	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	220	220	0.57	U
218-01-9	Chrysene	1	22	22	0.61	U
53-70-3	Dibenz(a,h)anthracene	1	86	86	0.69	U
132-64-9	Dibenzofuran	1	220	220	0.34	U
84-74-2	Di-n-butyl Phthalate	1	9.8	220	1.5	J B7E
91-94-1	3,3'-Dichlorobenzidine	1	420	420	100	U
120-83-2	2,4-Dichlorophenol	1	220	220	8.4	U
84-66-2	Diethyl Phthalate	1	220	220	0.48	U
105-67-9	2,4-Dimethylphenol	1	220	220	7.3	U
131-11-3	Dimethyl Phthalate	1	220	220	0.43	U
534-52-1	4,6-Dinitro-2-methylphenol	1	220	220	47	U
51-28-5	2,4-Dinitrophenol	1	420	420	42	U
121-14-2	2,4-Dinitrotoluene	1	220	220	17	U
606-20-2	2,6-Dinitrotoluene	1	220	220	2.1	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-07 File ID: 80123307.D

Sampled: 01/11/08 12:40 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 21:18

Solids: 78.19 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	220	220	13	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	29	220	1.7	J
206-44-0	Fluoranthene	1	22	22	4.8	U
86-73-7	Fluorene	1	22	22	0.36	U
118-74-1	Hexachlorobenzene	1	220	220	1.0	U
87-68-3	Hexachlorobutadiene	1	220	220	0.88	U
77-47-4	Hexachlorocyclopentadiene	1	220	220	5.0	U
67-72-1	Hexachloroethane	1	220	220	1.0	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	86	86	0.90	U
78-59-1	Isophorone	1	220	220	0.51	U
91-57-6	2-Methylnaphthalene	1	220	220	0.61	U
95-48-7	2-Methylphenol	1	220	220	10	U
106-44-5	4-Methylphenol	1	220	220	12	U
91-20-3	Naphthalene	1	0.43	22	0.30	J
88-74-4	2-Nitroaniline	1	220	220	17	U
99-09-2	3-Nitroaniline	1	220	220	14	U
100-01-6	4-Nitroaniline	1	220	220	29	U
98-95-3	Nitrobenzene	1	220	220	1.9	U
100-02-7	4-Nitrophenol	1	420	420	14	U
88-75-5	2-Nitrophenol	1	220	220	16	U
86-30-6	N-Nitroso-diphenylamine	1	220	220	1.0	U
621-64-7	N-Nitroso-di-n-propylamine	1	220	220	0.91	U
87-86-5	Pentachlorophenol	1	420	420	4.7	U
85-01-8	Phenanthrene	1	22	22	4.6	U
108-95-2	Phenol	1	220	220	0.90	U
129-00-0	Pyrene	1	22	22	0.41	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	220	220	1.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	220	220	21	U
88-06-2	2,4,6-Trichlorophenol	1	220	220	5.9	U
95-95-4	2,4,5-Trichlorophenol	1	220	220	7.7	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	861	651	76	35 - 105	
Phenol-d6	853	725	85	40 - 100	
Nitrobenzene-d5	443	397	90	35 - 100	
2-Fluorobiphenyl	426	417	98	45 - 105	
2,4,6-Tribromophenol	857	645	75	35 - 125	
o-Terphenyl	426	428	100	30 - 125	

02651

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-07 File ID: 80123307.D

Sampled: 01/11/08 12:40 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 21:18

Solids: 78.19 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	203837	8.1	196503	8.05	
Naphthalene-d8	650958	10.86	634629	10.86	
Acenaphthene-d10	366097	15	352151	15.01	
Phenanthrene-d10	476983	18.35	458536	18.34	
Chrysene-d12	377747	21.87	353190	21.87	
Perylene-d12	293007	23.74	340969	23.75	

* Values outside of QC limits

02652

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB4C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-08 File ID: 80123308.D

Sampled: 01/11/08 13:00 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 21:52

Solids: 78.10 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	22	22	0.51	U
208-96-8	Acenaphthylene	1	22	22	0.77	U
98-86-2	Acetophenone	1	220	220	8.6	U
120-12-7	Anthracene	1	22	22	0.55	U
1912-24-9	Atrazine	1	220	220	1.9	U
100-52-7	Benzaldehyde	1	220	220	34	U
56-55-3	Benzo(a)anthracene	1	22	22	0.69	U
50-32-8	Benzo(a)pyrene	1	22	22	1.3	U
205-99-2	Benzo(b)fluoranthene	1	22	22	1.1	U
207-08-9	Benzo(k)fluoranthene	1	22	22	0.92	U
191-24-2	Benzo(g,h,i)perylene	1	86	86	2.9	U
92-52-4	1,1'-Biphenyl	1	220	220	0.59	U
101-55-3	4-Bromophenyl Phenyl Ether	1	220	220	1.6	U
85-68-7	Butyl Benzyl Phthalate	1	14	220	2.7	J
105-60-2	Caprolactam	1	420	420	29	U
86-74-8	Carbazole	1	220	220	0.64	U
59-50-7	4-Chloro-3-methylphenol	1	220	220	2.3	U
106-47-8	4-Chloroaniline	1	220	220	25	U
111-91-1	Bis(2-chloroethoxy)methane	1	220	220	1.0	U
111-44-4	Bis(2-chloroethyl) Ether	1	220	220	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	220	220	0.40	U
91-58-7	2-Chloronaphthalene	1	220	220	0.55	U
95-57-8	2-Chlorophenol	1	220	220	0.49	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	220	220	0.57	U
218-01-9	Chrysene	1	22	22	0.61	U
53-70-3	Dibenz(a,h)anthracene	1	86	86	0.69	U
132-64-9	Dibenzofuran	1	220	220	0.34	U
84-74-2	Di-n-butyl Phthalate	1	13	220	1.5	J B
91-94-1	3,3´-Dichlorobenzidine	1	420	420	100	U
120-83-2	2,4-Dichlorophenol	1	220	220	8.4	U
84-66-2	Diethyl Phthalate	1	220	220	0.48	U
105-67-9	2,4-Dimethylphenol	1	220	220	7.3	U
131-11-3	Dimethyl Phthalate	1	220	220	0.43	U
534-52-1	4,6-Dinitro-2-methylphenol	1	220	220	47	U
51-28-5	2,4-Dinitrophenol	1	420	420	42	U
121-14-2	2,4-Dinitrotoluene	1	220	220	17	U
606-20-2	2,6-Dinitrotoluene	1	220	220	2.1	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB4C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-08 File ID: 80123308.D

Sampled: 01/11/08 13:00 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 21:52

Solids: 78.10 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	220	220	13	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	59	220	1.7	J
206-44-0	Fluoranthene	1	22	22	4.8	U
86-73-7	Fluorene	1	22	22	0.36	U
118-74-1	Hexachlorobenzene	1	220	220	1.0	U
87-68-3	Hexachlorobutadiene	1	220	220	0.88	U
77-47-4	Hexachlorocyclopentadiene	1	220	220	5.0	U
67-72-1	Hexachloroethane	1	220	220	1.0	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	86	86	0.90	U
78-59-1	Isophorone	1	220	220	0.51	U
91-57-6	2-Methylnaphthalene	1	220	220	0.61	U
95-48-7	2-Methylphenol	1	220	220	10	U
106-44-5	4-Methylphenol	1	220	220	12	U
91-20-3	Naphthalene	1	0.43	22	0.30	J
88-74-4	2-Nitroaniline	1	220	220	17	U
99-09-2	3-Nitroaniline	1	220	220	14	U
100-01-6	4-Nitroaniline	1	220	220	29	U
98-95-3	Nitrobenzene	1	220	220	1.9	U
100-02-7	4-Nitrophenol	1	420	420	14	U
88-75-5	2-Nitrophenol	1	220	220	16	U
86-30-6	N-Nitroso-diphenylamine	1	220	220	1.0	U
621-64-7	N-Nitroso-di-n-propylamine	1	220	220	0.91	U
87-86-5	Pentachlorophenol	1	420	420	4.7	U
85-01-8	Phenanthrene	1	22	22	4.6	U
108-95-2	Phenol	1	220	220	0.90	U
129-00-0	Pyrene	1	22	22	0.41	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	220	220	1.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	220	220	21	U
88-06-2	2,4,6-Trichlorophenol	1	220	220	5.9	U
95-95-4	2,4,5-Trichlorophenol	1	220	220	7.7	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	862	680	79	35 - 105	
Phenol-d6	854	726	85	40 - 100	
Nitrobenzene-d5	444	392	88	35 - 100	
2-Fluorobiphenyl	427	413	97	45 - 105	
2,4,6-Tribromophenol	858	610	71	35 - 125	
o-Terphenyl	427	430	101	30 - 125	

02654

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB4C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-08 File ID: 80123308.D

Sampled: 01/11/08 13:00 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 21:52

Solids: 78.10 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	193114	8.09	196503	8.05	
Naphthalene-d8	605249	10.86	634629	10.86	
Acenaphthene-d10	343322	15	352151	15.01	
Phenanthrene-d10	443429	18.35	458536	18.34	
Chrysene-d12	338219	21.87	353190	21.87	
Perylene-d12	308231	23.75	340969	23.75	

* Values outside of QC limits

02665

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-09 File ID: 80123309.D

Sampled: 01/11/08 00:00 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 22:26

Solids: 80.32 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	21	21	0.50	U
208-96-8	Acenaphthylene	1	21	21	0.75	U
98-86-2	Acetophenone	1	210	210	8.4	U
120-12-7	Anthracene	1	21	21	0.53	U
1912-24-9	Atrazine	1	210	210	1.9	U
100-52-7	Benzaldehyde	1	210	210	33	U
56-55-3	Benzo(a)anthracene	1	21	21	0.67	U
50-32-8	Benzo(a)pyrene	1	21	21	1.3	U
205-99-2	Benzo(b)fluoranthene	1	21	21	1.1	U
207-08-9	Benzo(k)fluoranthene	1	21	21	0.89	U
191-24-2	Benzo(g,h,i)perylene	1	83	83	2.9	U
92-52-4	1,1'-Biphenyl	1	210	210	0.57	U
101-55-3	4-Bromophenyl Phenyl Ether	1	210	210	1.6	U
85-68-7	Butyl Benzyl Phthalate	1	210	210	2.6	U
105-60-2	Caprolactam	1	410	410	29	U
86-74-8	Carbazole	1	210	210	0.62	U
59-50-7	4-Chloro-3-methylphenol	1	210	210	2.2	U
106-47-8	4-Chloroaniline	1	210	210	24	U
111-91-1	Bis(2-chloroethoxy)methane	1	210	210	1.0	U
111-44-4	Bis(2-chloroethyl) Ether	1	210	210	1.1	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	210	210	0.39	U
91-58-7	2-Chloronaphthalene	1	210	210	0.54	U
95-57-8	2-Chlorophenol	1	210	210	0.48	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	210	210	0.56	U
218-01-9	Chrysene	1	21	21	0.59	U
53-70-3	Dibenz(a,h)anthracene	1	83	83	0.67	U
132-64-9	Dibenzofuran	1	210	210	0.33	U
84-74-2	Di-n-butyl Phthalate	1	9.5	210	1.5	J B
91-94-1	3,3´-Dichlorobenzidine	1	410	410	98	U
120-83-2	2,4-Dichlorophenol	1	210	210	8.2	U
84-66-2	Diethyl Phthalate	1	210	210	0.46	U
105-67-9	2,4-Dimethylphenol	1	210	210	7.1	U
131-11-3	Dimethyl Phthalate	1	210	210	0.42	U
534-52-1	4,6-Dinitro-2-methylphenol	1	210	210	45	U
51-28-5	2,4-Dinitrophenol	1	410	410	41	U
121-14-2	2,4-Dinitrotoluene	1	210	210	16	U
606-20-2	2,6-Dinitrotoluene	1	210	210	2.0	U

02675

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-09 File ID: 80123309.D

Sampled: 01/11/08 00:00 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 22:26

Solids: 80.32 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	210	210	12	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	74	210	1.6	J
206-44-0	Fluoranthene	1	21	21	4.7	U
86-73-7	Fluorene	1	21	21	0.35	U
118-74-1	Hexachlorobenzene	1	210	210	0.99	U
87-68-3	Hexachlorobutadiene	1	210	210	0.86	U
77-47-4	Hexachlorocyclopentadiene	1	210	210	4.9	U
67-72-1	Hexachloroethane	1	210	210	1.0	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	83	83	0.87	U
78-59-1	Isophorone	1	210	210	0.50	U
91-57-6	2-Methylnaphthalene	1	210	210	0.60	U
95-48-7	2-Methylphenol	1	210	210	10	U
106-44-5	4-Methylphenol	1	210	210	11	U
91-20-3	Naphthalene	1	21	21	0.29	U
88-74-4	2-Nitroaniline	1	210	210	16	U
99-09-2	3-Nitroaniline	1	210	210	14	U
100-01-6	4-Nitroaniline	1	210	210	29	U
98-95-3	Nitrobenzene	1	210	210	1.9	U
100-02-7	4-Nitrophenol	1	410	410	14	U
88-75-5	2-Nitrophenol	1	210	210	15	U
86-30-6	N-Nitroso-diphenylamine	1	210	210	1.0	U
621-64-7	N-Nitroso-di-n-propylamine	1	210	210	0.89	U
87-86-5	Pentachlorophenol	1	410	410	4.6	U
85-01-8	Phenanthrene	1	21	21	4.5	U
108-95-2	Phenol	1	210	210	0.87	U
129-00-0	Pyrene	1	21	21	0.39	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	210	210	1.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	210	210	20	U
88-06-2	2,4,6-Trichlorophenol	1	210	210	5.7	U
95-95-4	2,4,5-Trichlorophenol	1	210	210	7.5	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	838	629	75	35 - 105	
Phenol-d6	830	686	83	40 - 100	
Nitrobenzene-d5	432	316	73	35 - 100	
2-Fluorobiphenyl	415	314	76	45 - 105	
2,4,6-Tribromophenol	834	531	64	35 - 125	
o-Terphenyl	415	400	96	30 - 125	

62576

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-09 File ID: 80123309.D

Sampled: 01/11/08 00:00 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 22:26

Solids: 80.32 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	197664	8.08	196503	8.05	
Naphthalene-d8	625447	10.86	634629	10.86	
Acenaphthene-d10	353101	15.01	352151	15.01	
Phenanthrene-d10	450668	18.35	458536	18.34	
Chrysene-d12	361515	21.88	353190	21.87	
Perylene-d12	339585	23.74	340969	23.75	

* Values outside of QC limits

02677

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801250-01 File ID: 80125001.D

Sampled: 01/14/08 14:30 Prepared: 01/18/08 08:05 Analyzed: 01/22/08 22:06

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0800629 Sequence: 8012344 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	5.0	5.0	0.043	U
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	5.0	5.0	0.051	U
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	0.085	5.0	0.029	J B7E
105-60-2	Caprolactam	1	5.0	5.0	0.14	U
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	1.1	5.0	0.38	J B7E
91-94-1	3,3´-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	0.038	5.0	0.034	J
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

02685

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801250-01 File ID: 80125001.D

Sampled: 01/14/08 14:30 Prepared: 01/18/08 08:05 Analyzed: 01/22/08 22:06

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0800629 Sequence: 8012344 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	5.0	5.0	0.41	U
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	5.0	5.0	0.031	U
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.066	0.50	0.023	J
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.019	0.50	0.015	J
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.1	8.60	45	20 - 110	
Phenol-d6	18.9	6.33	34	10 - 115	
Nitrobenzene-d5	9.81	8.29	85	40 - 110	
2-Fluorobiphenyl	9.43	6.98	74	50 - 110	
2,4,6-Tribromophenol	19.0	16.2	85	40 - 125	
o-Terphenyl	9.43	9.21	98	50 - 135	

02686

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-5

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47 4MD
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0801250-01
File ID: 80125001.D
Sampled: 01/14/08 14:30
Prepared: 01/18/08 08:05
Analyzed: 01/22/08 22:06
Solids:
Preparation: 3510C Liquid-Liquid Extr
Initial/Final: 1060 mL / 1 mL
QC Batch: 0800629
Sequence: 8012344
Calibration: 8A23018
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	208785	8.13	202723	8.13	
Naphthalene-d8	676771	10.93	632326	10.94	
Acenaphthene-d10	370571	15.08	351133	15.09	
Phenanthrene-d10	470901	18.4	465609	18.4	
Chrysene-d12	381146	21.91	314206	21.92	
Perylene-d12	358070	23.8	312328	23.81	

* Values outside of QC limits

02687

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-01 File ID: 80125301.D

Sampled: 01/14/08 12:55 Prepared: 01/23/08 08:02 Analyzed: 01/25/08 00:44

Solids: 73.68 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.90	23	0.54	J
208-96-8	Acenaphthylene	1	23	23	0.81	U
98-86-2	Acetophenone	1	230	230	9.1	U
120-12-7	Anthracene	1	23	23	0.58	U
1912-24-9	Atrazine	1	230	230	2.0	U
100-52-7	Benzaldehyde	1	230	230	36	U
56-55-3	Benzo(a)anthracene	1	0.90	23	0.73	J
50-32-8	Benzo(a)pyrene	1	23	23	1.4	U
205-99-2	Benzo(b)fluoranthene	1	23	23	1.2	U
207-08-9	Benzo(k)fluoranthene	1	23	23	0.97	U
191-24-2	Benzo(g,h,i)perylene	1	91	91	3.1	U
92-52-4	1,1'-Biphenyl	1	230	230	0.62	U
101-55-3	4-Bromophenyl Phenyl Ether	1	230	230	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	230	230	2.9	U
105-60-2	Caprolactam	1	450	450	31	U
86-74-8	Carbazole	1	230	230	0.68	U
59-50-7	4-Chloro-3-methylphenol	1	230	230	2.4	U
106-47-8	4-Chloroaniline	1	230	230	27	U
111-91-1	Bis(2-chloroethoxy)methane	1	230	230	1.1	U
111-44-4	Bis(2-chloroethyl) Ether	1	230	230	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	230	230	0.42	U
91-58-7	2-Chloronaphthalene	1	230	230	0.59	U
95-57-8	2-Chlorophenol	1	230	230	0.52	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	230	230	0.61	U
218-01-9	Chrysene	1	0.90	23	0.65	J
53-70-3	Dibenz(a,h)anthracene	1	91	91	0.73	U
132-64-9	Dibenzofuran	1	230	230	0.36	U
84-74-2	Di-n-butyl Phthalate	1	21	230	1.6	J
91-94-1	3,3'-Dichlorobenzidine	1	450	450	110	U
120-83-2	2,4-Dichlorophenol	1	230	230	8.9	U
84-66-2	Diethyl Phthalate	1	1.8	230	0.50	J
105-67-9	2,4-Dimethylphenol	1	230	230	7.7	U
131-11-3	Dimethyl Phthalate	1	230	230	0.46	U
534-52-1	4,6-Dinitro-2-methylphenol	1	230	230	49	U
51-28-5	2,4-Dinitrophenol	1	450	450	45	U
121-14-2	2,4-Dinitrotoluene	1	230	230	18	U
606-20-2	2,6-Dinitrotoluene	1	230	230	2.2	U

02698

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-01 File ID: 80125301.D

Sampled: 01/14/08 12:55 Prepared: 01/23/08 08:02 Analyzed: 01/25/08 00:44

Solids: 73.68 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	230	230	13	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	78	230	1.8	J
206-44-0	Fluoranthene	1	23	23	5.1	U
86-73-7	Fluorene	1	23	23	0.38	U
118-74-1	Hexachlorobenzene	1	230	230	1.1	U
87-68-3	Hexachlorobutadiene	1	230	230	0.94	U
77-47-4	Hexachlorocyclopentadiene	1	230	230	5.3	U
67-72-1	Hexachloroethane	1	230	230	1.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	91	91	0.95	U
78-59-1	Isophorone	1	230	230	0.54	U
91-57-6	2-Methylnaphthalene	1	0.90	230	0.65	J
95-48-7	2-Methylphenol	1	230	230	11	U
106-44-5	4-Methylphenol	1	230	230	12	U
91-20-3	Naphthalene	1	0.45	23	0.32	J
88-74-4	2-Nitroaniline	1	230	230	18	U
99-09-2	3-Nitroaniline	1	230	230	15	U
100-01-6	4-Nitroaniline	1	230	230	31	U
98-95-3	Nitrobenzene	1	230	230	2.0	U
100-02-7	4-Nitrophenol	1	450	450	15	U
88-75-5	2-Nitrophenol	1	230	230	17	U
86-30-6	N-Nitroso-diphenylamine	1	230	230	1.1	U
621-64-7	N-Nitroso-di-n-propylamine	1	230	230	0.97	U
87-86-5	Pentachlorophenol	1	450	450	5.0	U
85-01-8	Phenanthrene	1	23	23	4.9	U
108-95-2	Phenol	1	230	230	0.95	U
129-00-0	Pyrene	1	1.8	23	0.43	J
95-94-3	1,2,4,5-Tetrachlorobenzene	1	230	230	1.1	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	230	230	22	U
88-06-2	2,4,6-Trichlorophenol	1	230	230	6.2	U
95-95-4	2,4,5-Trichlorophenol	1	230	230	8.1	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	914	753	82	35 - 105	
Phenol-d6	905	802	89	40 - 100	
Nitrobenzene-d5	470	403	86	35 - 100	
2-Fluorobiphenyl	452	412	91	45 - 105	
2,4,6-Tribromophenol	909	827	91	35 - 125	
o-Terphenyl	452	425	94	30 - 125	

02699

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-01 File ID: 80125301.D

Sampled: 01/14/08 12:55 Prepared: 01/23/08 08:02 Analyzed: 01/25/08 00:44

Solids: 73.68 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	202133	8.09	196503	8.05	
Naphthalene-d8	629871	10.86	634629	10.86	
Acenaphthene-d10	342616	15	352151	15.01	
Phenanthrene-d10	447353	18.34	458536	18.34	
Chrysene-d12	320798	21.87	353190	21.87	
Perylene-d12	319797	23.75	340969	23.75	

* Values outside of QC limits

02706

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB5AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-02 File ID: 80125302.D

Sampled: 01/14/08 12:55 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 23:01

Solids: 75.19 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.89	23	0.53	J
208-96-8	Acenaphthylene	1	23	23	0.80	U
98-86-2	Acetophenone	1	230	230	8.9	U
120-12-7	Anthracene	1	23	23	0.57	U
1912-24-9	Atrazine	1	230	230	2.0	U
100-52-7	Benzaldehyde	1	230	230	35	U
56-55-3	Benzo(a)anthracene	1	0.89	23	0.71	J
50-32-8	Benzo(a)pyrene	1	23	23	1.4	U
205-99-2	Benzo(b)fluoranthene	1	23	23	1.1	U
207-08-9	Benzo(k)fluoranthene	1	23	23	0.95	U
191-24-2	Benzo(g,h,i)perylene	1	89	89	3.0	U
92-52-4	1,1'-Biphenyl	1	230	230	0.61	U
101-55-3	4-Bromophenyl Phenyl Ether	1	230	230	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	230	230	2.8	U
105-60-2	Caprolactam	1	440	440	30	U
86-74-8	Carbazole	1	230	230	0.66	U
59-50-7	4-Chloro-3-methylphenol	1	230	230	2.4	U
106-47-8	4-Chloroaniline	1	230	230	26	U
111-91-1	Bis(2-chloroethoxy)methane	1	230	230	1.1	U
111-44-4	Bis(2-chloroethyl) Ether	1	230	230	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	230	230	0.42	U
91-58-7	2-Chloronaphthalene	1	230	230	0.57	U
95-57-8	2-Chlorophenol	1	230	230	0.51	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	230	230	0.60	U
218-01-9	Chrysene	1	1.3	23	0.63	J
53-70-3	Dibenz(a,h)anthracene	1	89	89	0.71	U
132-64-9	Dibenzofuran	1	230	230	0.35	U
84-74-2	Di-n-butyl Phthalate	1	18	230	1.6	J
91-94-1	3,3'-Dichlorobenzidine	1	440	440	100	U
120-83-2	2,4-Dichlorophenol	1	230	230	8.8	U
84-66-2	Diethyl Phthalate	1	230	230	0.49	U
105-67-9	2,4-Dimethylphenol	1	230	230	7.6	U
131-11-3	Dimethyl Phthalate	1	230	230	0.45	U
534-52-1	4,6-Dinitro-2-methylphenol	1	230	230	48	U
51-28-5	2,4-Dinitrophenol	1	440	440	44	U
121-14-2	2,4-Dinitrotoluene	1	230	230	18	U
606-20-2	2,6-Dinitrotoluene	1	230	230	2.2	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB5AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-02 File ID: 80125302.D

Sampled: 01/14/08 12:55 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 23:01

Solids: 75.19 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	230	230	13	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	34	230	1.7	J
206-44-0	Fluoranthene	1	23	23	5.0	U
86-73-7	Fluorene	1	23	23	0.37	U
118-74-1	Hexachlorobenzene	1	230	230	1.1	U
87-68-3	Hexachlorobutadiene	1	230	230	0.92	U
77-47-4	Hexachlorocyclopentadiene	1	230	230	5.2	U
67-72-1	Hexachloroethane	1	230	230	1.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	89	89	0.93	U
78-59-1	Isophorone	1	230	230	0.53	U
91-57-6	2-Methylnaphthalene	1	230	230	0.64	U
95-48-7	2-Methylphenol	1	230	230	11	U
106-44-5	4-Methylphenol	1	230	230	12	U
91-20-3	Naphthalene	1	23	23	0.31	U
88-74-4	2-Nitroaniline	1	230	230	18	U
99-09-2	3-Nitroaniline	1	230	230	15	U
100-01-6	4-Nitroaniline	1	230	230	31	U
98-95-3	Nitrobenzene	1	230	230	2.0	U
100-02-7	4-Nitrophenol	1	440	440	15	U
88-75-5	2-Nitrophenol	1	230	230	16	U
86-30-6	N-Nitroso-diphenylamine	1	230	230	1.1	U
621-64-7	N-Nitroso-di-n-propylamine	1	230	230	0.95	U
87-86-5	Pentachlorophenol	1	440	440	4.9	U
85-01-8	Phenanthrene	1	23	23	4.8	U
108-95-2	Phenol	1	230	230	0.93	U
129-00-0	Pyrene	1	0.89	23	0.42	J
95-94-3	1,2,4,5-Tetrachlorobenzene	1	230	230	1.1	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	230	230	22	U
88-06-2	2,4,6-Trichlorophenol	1	230	230	6.1	U
95-95-4	2,4,5-Trichlorophenol	1	230	230	8.0	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	895	773	86	35 - 105	
Phenol-d6	887	808	91	40 - 100	
Nitrobenzene-d5	461	436	95	35 - 100	
2-Fluorobiphenyl	443	434	98	45 - 105	
2,4,6-Tribromophenol	891	750	84	35 - 125	
o-Terphenyl	443	457	103	30 - 125	

02715

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB5AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-02 File ID: 80125302.D

Sampled: 01/14/08 12:55 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 23:01

Solids: 75.19 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	181945	8.09	196503	8.05	
Naphthalene-d8	571910	10.86	634629	10.86	
Acenaphthene-d10	326221	15.01	352151	15.01	
Phenanthrene-d10	419795	18.35	458536	18.34	
Chrysene-d12	322457	21.87	353190	21.87	
Perylene-d12	317166	23.75	340969	23.75	

* Values outside of QC limits

82717

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-03 File ID: 80125303.D

Sampled: 01/14/08 14:00 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 23:35

Solids: 71.94 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.93	24	0.56	J
208-96-8	Acenaphthylene	1	24	24	0.83	U
98-86-2	Acetophenone	1	240	240	9.3	U
120-12-7	Anthracene	1	24	24	0.59	U
1912-24-9	Atrazine	1	240	240	2.1	U
100-52-7	Benzaldehyde	1	240	240	36	U
56-55-3	Benzo(a)anthracene	1	24	24	0.75	U
50-32-8	Benzo(a)pyrene	1	24	24	1.4	U
205-99-2	Benzo(b)fluoranthene	1	24	24	1.2	U
207-08-9	Benzo(k)fluoranthene	1	24	24	1.0	U
191-24-2	Benzo(g,h,i)perylene	1	93	93	3.2	U
92-52-4	1,1'-Biphenyl	1	240	240	0.64	U
101-55-3	4-Bromophenyl Phenyl Ether	1	240	240	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	240	240	2.9	U
105-60-2	Caprolactam	1	460	460	32	U
86-74-8	Carbazole	1	240	240	0.69	U
59-50-7	4-Chloro-3-methylphenol	1	240	240	2.5	U
106-47-8	4-Chloroaniline	1	240	240	27	U
111-91-1	Bis(2-chloroethoxy)methane	1	240	240	1.1	U
111-44-4	Bis(2-chloroethyl) Ether	1	240	240	1.3	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	240	240	0.44	U
91-58-7	2-Chloronaphthalene	1	240	240	0.60	U
95-57-8	2-Chlorophenol	1	240	240	0.53	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	240	240	0.62	U
218-01-9	Chrysene	1	24	24	0.66	U
53-70-3	Dibenz(a,h)anthracene	1	93	93	0.75	U
132-64-9	Dibenzofuran	1	240	240	0.37	U
84-74-2	Di-n-butyl Phthalate	1	16	240	1.7	J
91-94-1	3,3'-Dichlorobenzidine	1	460	460	110	U
120-83-2	2,4-Dichlorophenol	1	240	240	9.1	U
84-66-2	Diethyl Phthalate	1	240	240	0.52	U
105-67-9	2,4-Dimethylphenol	1	240	240	7.9	U
131-11-3	Dimethyl Phthalate	1	240	240	0.47	U
534-52-1	4,6-Dinitro-2-methylphenol	1	240	240	51	U
51-28-5	2,4-Dinitrophenol	1	460	460	46	U
121-14-2	2,4-Dinitrotoluene	1	240	240	18	U
606-20-2	2,6-Dinitrotoluene	1	240	240	2.3	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-03 File ID: 80125303.D

Sampled: 01/14/08 14:00 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 23:35

Solids: 71.94 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	240	240	14	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	67	240	1.8	J
206-44-0	Fluoranthene	1	24	24	5.2	U
86-73-7	Fluorene	1	24	24	0.39	U
118-74-1	Hexachlorobenzene	1	240	240	1.1	U
87-68-3	Hexachlorobutadiene	1	240	240	0.96	U
77-47-4	Hexachlorocyclopentadiene	1	240	240	5.5	U
67-72-1	Hexachloroethane	1	240	240	1.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	93	93	0.97	U
78-59-1	Isophorone	1	240	240	0.56	U
91-57-6	2-Methylnaphthalene	1	240	240	0.66	U
95-48-7	2-Methylphenol	1	240	240	11	U
106-44-5	4-Methylphenol	1	240	240	13	U
91-20-3	Naphthalene	1	0.46	24	0.32	J
88-74-4	2-Nitroaniline	1	240	240	18	U
99-09-2	3-Nitroaniline	1	240	240	15	U
100-01-6	4-Nitroaniline	1	240	240	32	U
98-95-3	Nitrobenzene	1	240	240	2.1	U
100-02-7	4-Nitrophenol	1	460	460	16	U
88-75-5	2-Nitrophenol	1	240	240	17	U
86-30-6	N-Nitroso-diphenylamine	1	240	240	1.1	U
621-64-7	N-Nitroso-di-n-propylamine	1	240	240	0.99	U
87-86-5	Pentachlorophenol	1	460	460	5.1	U
85-01-8	Phenanthrene	1	24	24	5.0	U
108-95-2	Phenol	1	240	240	0.97	U
129-00-0	Pyrene	1	24	24	0.44	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	240	240	1.1	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	240	240	23	U
88-06-2	2,4,6-Trichlorophenol	1	240	240	6.4	U
95-95-4	2,4,5-Trichlorophenol	1	240	240	8.3	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	936	684	73	35 - 105	
Phenol-d6	927	759	82	40 - 100	
Nitrobenzene-d5	482	402	83	35 - 100	
2-Fluorobiphenyl	463	417	90	45 - 105	
2,4,6-Tribromophenol	931	666	71	35 - 125	
o-Terphenyl	463	437	94	30 - 125	

02730

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-03 File ID: 80125303.D

Sampled: 01/14/08 14:00 Prepared: 01/23/08 08:02 Analyzed: 01/24/08 23:35

Solids: 71.94 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	200844	8.08	196503	8.05	
Naphthalene-d8	628313	10.86	634629	10.86	
Acenaphthene-d10	352256	15	352151	15.01	
Phenanthrene-d10	458723	18.35	458536	18.34	
Chrysene-d12	351506	21.87	353190	21.87	
Perylene-d12	344090	23.75	340969	23.75	

* Values outside of QC limits

02731

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-04 File ID: 80125304.D

Sampled: 01/14/08 14:10 Prepared: 01/23/08 08:02 Analyzed: 01/25/08 00:09

Solids: 77.24 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	22	22	0.52	U
208-96-8	Acenaphthylene	1	22	22	0.78	U
98-86-2	Acetophenone	1	220	220	8.7	U
120-12-7	Anthracene	1	22	22	0.55	U
1912-24-9	Atrazine	1	220	220	1.9	U
100-52-7	Benzaldehyde	1	220	220	34	U
56-55-3	Benzo(a)anthracene	1	22	22	0.70	U
50-32-8	Benzo(a)pyrene	1	22	22	1.3	U
205-99-2	Benzo(b)fluoranthene	1	22	22	1.1	U
207-08-9	Benzo(k)fluoranthene	1	22	22	0.93	U
191-24-2	Benzo(g,h,i)perylene	1	87	87	3.0	U
92-52-4	1,1'-Biphenyl	1	220	220	0.59	U
101-55-3	4-Bromophenyl Phenyl Ether	1	220	220	1.6	U
85-68-7	Butyl Benzyl Phthalate	1	220	220	2.7	U
105-60-2	Caprolactam	1	430	430	30	U
86-74-8	Carbazole	1	220	220	0.64	U
59-50-7	4-Chloro-3-methylphenol	1	220	220	2.3	U
106-47-8	4-Chloroaniline	1	220	220	25	U
111-91-1	Bis(2-chloroethoxy)methane	1	220	220	1.0	U
111-44-4	Bis(2-chloroethyl) Ether	1	220	220	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	220	220	0.41	U
91-58-7	2-Chloronaphthalene	1	220	220	0.56	U
95-57-8	2-Chlorophenol	1	220	220	0.50	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	220	220	0.58	U
218-01-9	Chrysene	1	22	22	0.62	U
53-70-3	Dibenz(a,h)anthracene	1	87	87	0.70	U
132-64-9	Dibenzofuran	1	220	220	0.34	U
84-74-2	Di-n-butyl Phthalate	1	16	220	1.6	J
91-94-1	3,3'-Dichlorobenzidine	1	430	430	100	U
120-83-2	2,4-Dichlorophenol	1	220	220	8.5	U
84-66-2	Diethyl Phthalate	1	220	220	0.48	U
105-67-9	2,4-Dimethylphenol	1	220	220	7.4	U
131-11-3	Dimethyl Phthalate	1	220	220	0.44	U
534-52-1	4,6-Dinitro-2-methylphenol	1	220	220	47	U
51-28-5	2,4-Dinitrophenol	1	430	430	43	U
121-14-2	2,4-Dinitrotoluene	1	220	220	17	U
606-20-2	2,6-Dinitrotoluene	1	220	220	2.1	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-04 File ID: 80125304.D

Sampled: 01/14/08 14:10 Prepared: 01/23/08 08:02 Analyzed: 01/25/08 00:09

Solids: 77.24 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	220	220	13	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	110	220	1.7	J
206-44-0	Fluoranthene	1	22	22	4.9	U
86-73-7	Fluorene	1	22	22	0.36	U
118-74-1	Hexachlorobenzene	1	220	220	1.0	U
87-68-3	Hexachlorobutadiene	1	220	220	0.89	U
77-47-4	Hexachlorocyclopentadiene	1	220	220	5.1	U
67-72-1	Hexachloroethane	1	220	220	1.0	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	87	87	0.91	U
78-59-1	Isophorone	1	220	220	0.52	U
91-57-6	2-Methylnaphthalene	1	220	220	0.62	U
95-48-7	2-Methylphenol	1	220	220	11	U
106-44-5	4-Methylphenol	1	220	220	12	U
91-20-3	Naphthalene	1	22	22	0.30	U
88-74-4	2-Nitroaniline	1	220	220	17	U
99-09-2	3-Nitroaniline	1	220	220	14	U
100-01-6	4-Nitroaniline	1	220	220	30	U
98-95-3	Nitrobenzene	1	220	220	1.9	U
100-02-7	4-Nitrophenol	1	430	430	15	U
88-75-5	2-Nitrophenol	1	220	220	16	U
86-30-6	N-Nitroso-diphenylamine	1	220	220	1.0	U
621-64-7	N-Nitroso-di-n-propylamine	1	220	220	0.92	U
87-86-5	Pentachlorophenol	1	430	430	4.8	U
85-01-8	Phenanthrene	1	22	22	4.7	U
108-95-2	Phenol	1	220	220	0.91	U
129-00-0	Pyrene	1	22	22	0.41	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	220	220	1.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	220	220	21	U
88-06-2	2,4,6-Trichlorophenol	1	220	220	6.0	U
95-95-4	2,4,5-Trichlorophenol	1	220	220	7.8	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	872	655	75	35 - 105	
Phenol-d6	863	714	83	40 - 100	
Nitrobenzene-d5	449	394	88	35 - 100	
2-Fluorobiphenyl	432	398	92	45 - 105	
2,4,6-Tribromophenol	867	530	61	35 - 125	
o-Terphenyl	432	447	104	30 - 125	

02742

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-04 File ID: 80125304.D

Sampled: 01/14/08 14:10 Prepared: 01/23/08 08:02 Analyzed: 01/25/08 00:09

Solids: 77.24 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012605 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	202436	8.08	196503	8.05	
Naphthalene-d8	634367	10.87	634629	10.86	
Acenaphthene-d10	359316	15.01	352151	15.01	
Phenanthrene-d10	450460	18.35	458536	18.34	
Chrysene-d12	358316	21.88	353190	21.87	
Perylene-d12	334840	23.75	340969	23.75	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-06 File ID: 80125306.D

Sampled: 01/14/08 00:00 Prepared: 01/23/08 08:02 Analyzed: 01/26/08 15:45

Solids: 74.13 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	23	23	0.54	U
208-96-8	Acenaphthylene	1	23	23	0.81	U
98-86-2	Acetophenone	1	230	230	9.1	U
120-12-7	Anthracene	1	23	23	0.57	U
1912-24-9	Atrazine	1	230	230	2.0	U
100-52-7	Benzaldehyde	1	230	230	35	U
56-55-3	Benzo(a)anthracene	1	0.90	23	0.72	J
50-32-8	Benzo(a)pyrene	1	23	23	1.4	U
205-99-2	Benzo(b)fluoranthene	1	23	23	1.1	U
207-08-9	Benzo(k)fluoranthene	1	23	23	0.97	U
191-24-2	Benzo(g,h,i)perylene	1	90	90	3.1	U
92-52-4	1,1'-Biphenyl	1	0.90	230	0.62	J
101-55-3	4-Bromophenyl Phenyl Ether	1	230	230	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	4.5	230	2.8	J
105-60-2	Caprolactam	1	450	450	31	U
86-74-8	Carbazole	1	230	230	0.67	U
59-50-7	4-Chloro-3-methylphenol	1	230	230	2.4	U
106-47-8	4-Chloroaniline	1	230	230	26	U
111-91-1	Bis(2-chloroethoxy)methane	1	230	230	1.1	U
111-44-4	Bis(2-chloroethyl) Ether	1	230	230	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	230	230	0.42	U
91-58-7	2-Chloronaphthalene	1	230	230	0.58	U
95-57-8	2-Chlorophenol	1	230	230	0.52	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	230	230	0.60	U
218-01-9	Chrysene	1	23	23	0.64	U
53-70-3	Dibenz(a,h)anthracene	1	90	90	0.72	U
132-64-9	Dibenzofuran	1	230	230	0.35	U
84-74-2	Di-n-butyl Phthalate	1	12	230	1.6	J B?
91-94-1	3,3'-Dichlorobenzidine	1	450	450	110	U
120-83-2	2,4-Dichlorophenol	1	230	230	8.9	U
84-66-2	Diethyl Phthalate	1	16	230	0.50	J
105-67-9	2,4-Dimethylphenol	1	230	230	7.7	U
131-11-3	Dimethyl Phthalate	1	230	230	0.46	U
534-52-1	4,6-Dinitro-2-methylphenol	1	230	230	49	U
51-28-5	2,4-Dinitrophenol	1	450	450	45	U
121-14-2	2,4-Dinitrotoluene	1	230	230	18	U
606-20-2	2,6-Dinitrotoluene	1	230	230	2.2	U

02751

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-06 File ID: 80125306.D

Sampled: 01/14/08 00:00 Prepared: 01/23/08 08:02 Analyzed: 01/26/08 15:45

Solids: 74.13 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	230	230	13	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	74	230	1.8	J
206-44-0	Fluoranthene	1	23	23	5.1	U
86-73-7	Fluorene	1	4.5	23	0.38	J
118-74-1	Hexachlorobenzene	1	230	230	1.1	U
87-68-3	Hexachlorobutadiene	1	230	230	0.93	U
77-47-4	Hexachlorocyclopentadiene	1	230	230	5.3	U
67-72-1	Hexachloroethane	1	230	230	1.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	90	90	0.94	U
78-59-1	Isophorone	1	230	230	0.54	U
91-57-6	2-Methylnaphthalene	1	1.3	230	0.64	J
95-48-7	2-Methylphenol	1	230	230	11	U
106-44-5	4-Methylphenol	1	230	230	12	U
91-20-3	Naphthalene	1	0.45	23	0.31	J
88-74-4	2-Nitroaniline	1	230	230	18	U
99-09-2	3-Nitroaniline	1	230	230	15	U
100-01-6	4-Nitroaniline	1	230	230	31	U
98-95-3	Nitrobenzene	1	230	230	2.0	U
100-02-7	4-Nitrophenol	1	450	450	15	U
88-75-5	2-Nitrophenol	1	230	230	16	U
86-30-6	N-Nitroso-diphenylamine	1	230	230	1.1	U
621-64-7	N-Nitroso-di-n-propylamine	1	230	230	0.96	U
87-86-5	Pentachlorophenol	1	450	450	5.0	U
85-01-8	Phenanthrene	1	23	23	4.9	U
108-95-2	Phenol	1	1.3	230	0.94	J
129-00-0	Pyrene	1	0.90	23	0.43	J
95-94-3	1,2,4,5-Tetrachlorobenzene	1	230	230	1.1	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	230	230	22	U
88-06-2	2,4,6-Trichlorophenol	1	230	230	6.2	U
95-95-4	2,4,5-Trichlorophenol	1	230	230	8.1	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	908	712	78	35 - 105	
Phenol-d6	899	769	86	40 - 100	
Nitrobenzene-d5	468	398	85	35 - 100	
2-Fluorobiphenyl	450	397	88	45 - 105	
2,4,6-Tribromophenol	904	725	80	35 - 125	
o-Terphenyl	450	438	98	30 - 125	

62752

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-6

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47 4MD
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0801253-06
File ID: 80125306.D
Sampled: 01/14/08 00:00
Prepared: 01/23/08 08:02
Analyzed: 01/26/08 15:45
Solids: 74.13
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 1 mL
QC Batch: 0800817
Sequence: 8012606
Calibration: 8A23018
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	231426	8.01	223700	7.98	
Naphthalene-d8	720513	10.8	730236	10.8	
Acenaphthene-d10	410400	14.95	399629	14.95	
Phenanthrene-d10	512261	18.3	512498	18.3	
Chrysene-d12	399604	21.83	436562	21.83	
Perylene-d12	383536	23.69	411514	23.69	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-07 File ID: 80125307.D

Sampled: 01/14/08 15:10 Prepared: 01/23/08 08:02 Analyzed: 01/26/08 16:20

Solids: 71.41 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	24	24	0.56	U
208-96-8	Acenaphthylene	1	24	24	0.84	U
98-86-2	Acetophenone	1	240	240	9.4	U
120-12-7	Anthracene	1	24	24	0.60	U
1912-24-9	Atrazine	1	240	240	2.1	U
100-52-7	Benzaldehyde	1	240	240	37	U
56-55-3	Benzo(a)anthracene	1	2.3	24	0.75	J
50-32-8	Benzo(a)pyrene	1	24	24	1.4	U
205-99-2	Benzo(b)fluoranthene	1	1.9	24	1.2	J
207-08-9	Benzo(k)fluoranthene	1	24	24	1.0	U
191-24-2	Benzo(g,h,i)perylene	1	94	94	3.2	U
92-52-4	1,1'-Biphenyl	1	0.93	240	0.64	J
101-55-3	4-Bromophenyl Phenyl Ether	1	240	240	1.8	U
85-68-7	Butyl Benzyl Phthalate	1	240	240	2.9	U
105-60-2	Caprolactam	1	460	460	32	U
86-74-8	Carbazole	1	240	240	0.70	U
59-50-7	4-Chloro-3-methylphenol	1	240	240	2.5	U
106-47-8	4-Chloroaniline	1	240	240	27	U
111-91-1	Bis(2-chloroethoxy)methane	1	240	240	1.1	U
111-44-4	Bis(2-chloroethyl) Ether	1	240	240	1.3	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	240	240	0.44	U
91-58-7	2-Chloronaphthalene	1	240	240	0.60	U
95-57-8	2-Chlorophenol	1	240	240	0.54	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	240	240	0.63	U
218-01-9	Chrysene	1	24	24	0.67	U
53-70-3	Dibenz(a,h)anthracene	1	94	94	0.75	U
132-64-9	Dibenzofuran	1	240	240	0.37	U
84-74-2	Di-n-butyl Phthalate	1	20	240	1.7	J
91-94-1	3,3'-Dichlorobenzidine	1	460	460	110	U
120-83-2	2,4-Dichlorophenol	1	240	240	9.2	U
84-66-2	Diethyl Phthalate	1	7.9	240	0.52	J
105-67-9	2,4-Dimethylphenol	1	240	240	8.0	U
131-11-3	Dimethyl Phthalate	1	240	240	0.47	U
534-52-1	4,6-Dinitro-2-methylphenol	1	240	240	51	U
51-28-5	2,4-Dinitrophenol	1	460	460	46	U
121-14-2	2,4-Dinitrotoluene	1	240	240	18	U
606-20-2	2,6-Dinitrotoluene	1	240	240	2.3	U

0274

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-07 File ID: 80125307.D

Sampled: 01/14/08 15:10 Prepared: 01/23/08 08:02 Analyzed: 01/26/08 16:20

Solids: 71.41 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	240	240	14	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	130	240	1.8	J
206-44-0	Fluoranthene	1	24	24	5.3	U
86-73-7	Fluorene	1	4.7	24	0.39	J
118-74-1	Hexachlorobenzene	1	240	240	1.1	U
87-68-3	Hexachlorobutadiene	1	240	240	0.96	U
77-47-4	Hexachlorocyclopentadiene	1	240	240	5.5	U
67-72-1	Hexachloroethane	1	240	240	1.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	94	94	0.98	U
78-59-1	Isophorone	1	240	240	0.56	U
91-57-6	2-Methylnaphthalene	1	0.93	240	0.67	J
95-48-7	2-Methylphenol	1	240	240	11	U
106-44-5	4-Methylphenol	1	240	240	13	U
91-20-3	Naphthalene	1	0.47	24	0.33	J
88-74-4	2-Nitroaniline	1	240	240	18	U
99-09-2	3-Nitroaniline	1	240	240	15	U
100-01-6	4-Nitroaniline	1	240	240	32	U
98-95-3	Nitrobenzene	1	240	240	2.1	U
100-02-7	4-Nitrophenol	1	460	460	16	U
88-75-5	2-Nitrophenol	1	240	240	17	U
86-30-6	N-Nitroso-diphenylamine	1	240	240	1.1	U
621-64-7	N-Nitroso-di-n-propylamine	1	240	240	1.0	U
87-86-5	Pentachlorophenol	1	460	460	5.2	U
85-01-8	Phenanthrene	1	24	24	5.1	U
108-95-2	Phenol	1	1.4	240	0.98	J
129-00-0	Pyrene	1	2.3	24	0.44	J
95-94-3	1,2,4,5-Tetrachlorobenzene	1	240	240	1.1	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	240	240	23	U
88-06-2	2,4,6-Trichlorophenol	1	240	240	6.4	U
95-95-4	2,4,5-Trichlorophenol	1	240	240	8.4	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	943	756	80	35 - 105	
Phenol-d6	934	798	86	40 - 100	
Nitrobenzene-d5	485	429	88	35 - 100	
2-Fluorobiphenyl	467	434	93	45 - 105	
2,4,6-Tribromophenol	938	771	82	35 - 125	
o-Terphenyl	467	440	94	30 - 125	

02775

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-07 File ID: 80125307.D

Sampled: 01/14/08 15:10 Prepared: 01/23/08 08:02 Analyzed: 01/26/08 16:20

Solids: 71.41 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	220115	8.01	223700	7.98	
Naphthalene-d8	701126	10.8	730236	10.8	
Acenaphthene-d10	383097	14.95	399629	14.95	
Phenanthrene-d10	494031	18.3	512498	18.3	
Chrysene-d12	345587	21.84	436562	21.83	
Perylene-d12	338953	23.69	411514	23.69	

* Values outside of QC limits

02776

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB8AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-08 File ID: 80125308.D

Sampled: 01/14/08 15:10 Prepared: 01/23/08 08:02 Analyzed: 01/26/08 16:54

Solids: 77.53 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	22	22	0.52	U
208-96-8	Acenaphthylene	1	22	22	0.77	U
98-86-2	Acetophenone	1	220	220	8.7	U
120-12-7	Anthracene	1	22	22	0.55	U
1912-24-9	Atrazine	1	220	220	1.9	U
100-52-7	Benzaldehyde	1	220	220	34	U
56-55-3	Benzo(a)anthracene	1	22	22	0.69	U
50-32-8	Benzo(a)pyrene	1	2.6	22	1.3	J
205-99-2	Benzo(b)fluoranthene	1	2.1	22	1.1	J
207-08-9	Benzo(k)fluoranthene	1	22	22	0.92	U
191-24-2	Benzo(g,h,i)perylene	1	86	86	3.0	U
92-52-4	1,1'-Biphenyl	1	1.3	220	0.59	J
101-55-3	4-Bromophenyl Phenyl Ether	1	220	220	1.6	U
85-68-7	Butyl Benzyl Phthalate	1	220	220	2.7	U
105-60-2	Caprolactam	1	430	430	30	U
86-74-8	Carbazole	1	220	220	0.64	U
59-50-7	4-Chloro-3-methylphenol	1	220	220	2.3	U
106-47-8	4-Chloroaniline	1	220	220	25	U
111-91-1	Bis(2-chloroethoxy)methane	1	220	220	1.0	U
111-44-4	Bis(2-chloroethyl) Ether	1	220	220	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	220	220	0.40	U
91-58-7	2-Chloronaphthalene	1	220	220	0.56	U
95-57-8	2-Chlorophenol	1	220	220	0.49	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	220	220	0.58	U
218-01-9	Chrysene	1	22	22	0.61	U
53-70-3	Dibenz(a,h)anthracene	1	86	86	0.69	U
132-64-9	Dibenzofuran	1	220	220	0.34	U
84-74-2	Di-n-butyl Phthalate	1	16	220	1.5	J
91-94-1	3,3'-Dichlorobenzidine	1	430	430	100	U
120-83-2	2,4-Dichlorophenol	1	220	220	8.5	U
84-66-2	Diethyl Phthalate	1	4.7	220	0.48	J
105-67-9	2,4-Dimethylphenol	1	220	220	7.4	U
131-11-3	Dimethyl Phthalate	1	220	220	0.44	U
534-52-1	4,6-Dinitro-2-methylphenol	1	220	220	47	U UJ, M
51-28-5	2,4-Dinitrophenol	1	430	430	43	U UJ, M
121-14-2	2,4-Dinitrotoluene	1	220	220	17	U
606-20-2	2,6-Dinitrotoluene	1	220	220	2.1	U

02795

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB8AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-08 File ID: 80125308.D

Sampled: 01/14/08 15:10 Prepared: 01/23/08 08:02 Analyzed: 01/26/08 16:54

Solids: 77.53 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	220	220	13	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	35	220	1.7	J
206-44-0	Fluoranthene	1	22	22	4.8	U
86-73-7	Fluorene	1	3.9	22	0.36	J
118-74-1	Hexachlorobenzene	1	220	220	1.0	U
87-68-3	Hexachlorobutadiene	1	220	220	0.89	U
77-47-4	Hexachlorocyclopentadiene	1	220	220	5.1	U
67-72-1	Hexachloroethane	1	220	220	1.0	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	86	86	0.90	U
78-59-1	Isophorone	1	220	220	0.52	U
91-57-6	2-Methylnaphthalene	1	2.6	220	0.62	J
95-48-7	2-Methylphenol	1	220	220	10	U
106-44-5	4-Methylphenol	1	220	220	12	U
91-20-3	Naphthalene	1	0.43	22	0.30	J
88-74-4	2-Nitroaniline	1	220	220	17	U
99-09-2	3-Nitroaniline	1	220	220	14	U
100-01-6	4-Nitroaniline	1	220	220	30	U
98-95-3	Nitrobenzene	1	220	220	1.9	U
100-02-7	4-Nitrophenol	1	430	430	14	U
88-75-5	2-Nitrophenol	1	220	220	16	U
86-30-6	N-Nitroso-diphenylamine	1	220	220	1.0	U
621-64-7	N-Nitroso-di-n-propylamine	1	220	220	0.92	U
87-86-5	Pentachlorophenol	1	430	430	4.7	U
85-01-8	Phenanthrene	1	22	22	4.7	U
108-95-2	Phenol	1	2.1	220	0.90	J
129-00-0	Pyrene	1	22	22	0.41	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	220	220	1.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	220	220	21	U
88-06-2	2,4,6-Trichlorophenol	1	220	220	5.9	U
95-95-4	2,4,5-Trichlorophenol	1	220	220	7.7	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	869	711	82	35 - 105	
Phenol-d6	860	758	88	40 - 100	
Nitrobenzene-d5	447	398	89	35 - 100	
2-Fluorobiphenyl	430	404	94	45 - 105	
2,4,6-Tribromophenol	864	696	80	35 - 125	
o-Terphenyl	430	420	98	30 - 125	

02796

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB8AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-08 File ID: 80125308.D

Sampled: 01/14/08 15:10 Prepared: 01/23/08 08:02 Analyzed: 01/26/08 16:54

Solids: 77.53 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	213675	8.01	223700	7.98	
Naphthalene-d8	694019	10.8	730236	10.8	
Acenaphthene-d10	394096	14.95	399629	14.95	
Phenanthrene-d10	502236	18.3	512498	18.3	
Chrysene-d12	371586	21.84	436562	21.83	
Perylene-d12	362930	23.69	411514	23.69	

* Values outside of QC limits

02797

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-09 File ID: 80125309.D

Sampled: 01/14/08 15:30 Prepared: 01/23/08 08:02 Analyzed: 01/26/08 17:29

Solids: 74.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	23	23	0.54	U
208-96-8	Acenaphthylene	1	23	23	0.81	U
98-86-2	Acetophenone	1	230	230	9.1	U
120-12-7	Anthracene	1	23	23	0.58	U
1912-24-9	Atrazine	1	230	230	2.0	U
100-52-7	Benzaldehyde	1	230	230	35	U
56-55-3	Benzo(a)anthracene	1	0.90	23	0.73	J
50-32-8	Benzo(a)pyrene	1	23	23	1.4	U
205-99-2	Benzo(b)fluoranthene	1	23	23	1.1	U
207-08-9	Benzo(k)fluoranthene	1	23	23	0.97	U
191-24-2	Benzo(g,h,i)perylene	1	91	91	3.1	U
92-52-4	1,1'-Biphenyl	1	1.4	230	0.62	J
101-55-3	4-Bromophenyl Phenyl Ether	1	230	230	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	230	230	2.8	U
105-60-2	Caprolactam	1	450	450	31	U
86-74-8	Carbazole	1	230	230	0.67	U
59-50-7	4-Chloro-3-methylphenol	1	230	230	2.4	U
106-47-8	4-Chloroaniline	1	230	230	26	U
111-91-1	Bis(2-chloroethoxy)methane	1	230	230	1.1	U
111-44-4	Bis(2-chloroethyl) Ether	1	230	230	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	230	230	0.42	U
91-58-7	2-Chloronaphthalene	1	230	230	0.58	U
95-57-8	2-Chlorophenol	1	230	230	0.52	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	230	230	0.61	U
218-01-9	Chrysene	1	0.90	23	0.64	J
53-70-3	Dibenz(a,h)anthracene	1	91	91	0.73	U
132-64-9	Dibenzofuran	1	230	230	0.36	U
84-74-2	Di-n-butyl Phthalate	1	9.0	230	1.6	J B7E
91-94-1	3,3'-Dichlorobenzidine	1	450	450	110	U
120-83-2	2,4-Dichlorophenol	1	230	230	8.9	U
84-66-2	Diethyl Phthalate	1	3.6	230	0.50	J
105-67-9	2,4-Dimethylphenol	1	230	230	7.7	U
131-11-3	Dimethyl Phthalate	1	230	230	0.46	U
534-52-1	4,6-Dinitro-2-methylphenol	1	230	230	49	U
51-28-5	2,4-Dinitrophenol	1	450	450	45	U
121-14-2	2,4-Dinitrotoluene	1	230	230	18	U
606-20-2	2,6-Dinitrotoluene	1	230	230	2.2	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-09 File ID: 80125309.D

Sampled: 01/14/08 15:30 Prepared: 01/23/08 08:02 Analyzed: 01/26/08 17:29

Solids: 74.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800817 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	230	230	13	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	560	230	1.8	
206-44-0	Fluoranthene	1	23	23	5.1	U
86-73-7	Fluorene	1	5.0	23	0.38	J
118-74-1	Hexachlorobenzene	1	230	230	1.1	U
87-68-3	Hexachlorobutadiene	1	230	230	0.93	U
77-47-4	Hexachlorocyclopentadiene	1	230	230	5.3	U
67-72-1	Hexachloroethane	1	230	230	1.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	91	91	0.95	U
78-59-1	Isophorone	1	230	230	0.54	U
91-57-6	2-Methylnaphthalene	1	5.9	230	0.65	J
95-48-7	2-Methylphenol	1	230	230	11	U
106-44-5	4-Methylphenol	1	230	230	12	U
91-20-3	Naphthalene	1	0.90	23	0.31	J
88-74-4	2-Nitroaniline	1	230	230	18	U
99-09-2	3-Nitroaniline	1	230	230	15	U
100-01-6	4-Nitroaniline	1	230	230	31	U
98-95-3	Nitrobenzene	1	230	230	2.0	U
100-02-7	4-Nitrophenol	1	450	450	15	U
88-75-5	2-Nitrophenol	1	230	230	16	U
86-30-6	N-Nitroso-diphenylamine	1	230	230	1.1	U
621-64-7	N-Nitroso-di-n-propylamine	1	230	230	0.96	U
87-86-5	Pentachlorophenol	1	450	450	5.0	U
85-01-8	Phenanthrene	1	23	23	4.9	U
108-95-2	Phenol	1	230	230	0.95	U
129-00-0	Pyrene	1	0.90	23	0.43	J
95-94-3	1,2,4,5-Tetrachlorobenzene	1	230	230	1.1	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	230	230	22	U
88-06-2	2,4,6-Trichlorophenol	1	230	230	6.2	U
95-95-4	2,4,5-Trichlorophenol	1	230	230	8.1	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	910	745	82	35 - 105	
Phenol-d6	901	812	90	40 - 100	
Nitrobenzene-d5	468	412	88	35 - 100	
2-Fluorobiphenyl	450	420	93	45 - 105	
2,4,6-Tribromophenol	905	818	90	35 - 125	
o-Terphenyl	450	432	96	30 - 125	

02818

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB8B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47 4MD
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0801253-09
File ID: 80125309.D
Sampled: 01/14/08 15:30
Prepared: 01/23/08 08:02
Analyzed: 01/26/08 17:29
Solids: 74.00
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 1 mL
QC Batch: 0800817
Sequence: 8012606
Calibration: 8A23018
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	218013	8.01	223700	7.98	
Naphthalene-d8	718660	10.8	730236	10.8	
Acenaphthene-d10	393598	14.95	399629	14.95	
Phenanthrene-d10	521950	18.3	512498	18.3	
Chrysene-d12	373962	21.84	436562	21.83	
Perylene-d12	377685	23.69	411514	23.69	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-10 File ID: 80125310.D

Sampled: 01/14/08 15:35 Prepared: 01/25/08 10:34 Analyzed: 01/26/08 18:03

Solids: 73.53 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800940 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	23	23	0.54	U
208-96-8	Acenaphthylene	1	23	23	0.82	U
98-86-2	Acetophenone	1	230	230	9.1	U
120-12-7	Anthracene	1	23	23	0.58	U
1912-24-9	Atrazine	1	230	230	2.0	U
100-52-7	Benzaldehyde	1	230	230	36	U
56-55-3	Benzo(a)anthracene	1	23	23	0.73	U
50-32-8	Benzo(a)pyrene	1	1.8	23	1.4	J
205-99-2	Benzo(b)fluoranthene	1	23	23	1.2	U
207-08-9	Benzo(k)fluoranthene	1	23	23	0.97	U
191-24-2	Benzo(g,h,i)perylene	1	91	91	3.1	U
92-52-4	1,1'-Biphenyl	1	0.91	230	0.62	J
101-55-3	4-Bromophenyl Phenyl Ether	1	230	230	1.7	U
85-68-7	Butyl Benzyl Phthalate	1	230	230	2.9	U
105-60-2	Caprolactam	1	450	450	31	U
86-74-8	Carbazole	1	230	230	0.68	U
59-50-7	4-Chloro-3-methylphenol	1	230	230	2.4	U
106-47-8	4-Chloroaniline	1	230	230	27	U
111-91-1	Bis(2-chloroethoxy)methane	1	230	230	1.1	U
111-44-4	Bis(2-chloroethyl) Ether	1	230	230	1.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	230	230	0.43	U
91-58-7	2-Chloronaphthalene	1	230	230	0.59	U
95-57-8	2-Chlorophenol	1	230	230	0.52	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	230	230	0.61	U
218-01-9	Chrysene	1	23	23	0.65	U
53-70-3	Dibenz(a,h)anthracene	1	91	91	0.73	U
132-64-9	Dibenzofuran	1	230	230	0.36	U
84-74-2	Di-n-butyl Phthalate	1	19	230	1.6	J
91-94-1	3,3'-Dichlorobenzidine	1	450	450	110	U
120-83-2	2,4-Dichlorophenol	1	230	230	8.9	U
84-66-2	Diethyl Phthalate	1	7.3	230	0.51	J
105-67-9	2,4-Dimethylphenol	1	230	230	7.8	U
131-11-3	Dimethyl Phthalate	1	230	230	0.46	U
534-52-1	4,6-Dinitro-2-methylphenol	1	230	230	50	U
51-28-5	2,4-Dinitrophenol	1	450	450	45	U
121-14-2	2,4-Dinitrotoluene	1	230	230	18	U
606-20-2	2,6-Dinitrotoluene	1	230	230	2.2	U

02846

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-10 File ID: 80125310.D

Sampled: 01/14/08 15:35 Prepared: 01/25/08 10:34 Analyzed: 01/26/08 18:03

Solids: 73.53 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800940 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	230	230	13	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	170	230	1.8	J
206-44-0	Fluoranthene	1	23	23	5.1	U
86-73-7	Fluorene	1	4.1	23	0.38	J
118-74-1	Hexachlorobenzene	1	230	230	1.1	U
87-68-3	Hexachlorobutadiene	1	230	230	0.94	U
77-47-4	Hexachlorocyclopentadiene	1	230	230	5.3	U
67-72-1	Hexachloroethane	1	230	230	1.1	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	91	91	0.95	U
78-59-1	Isophorone	1	230	230	0.55	U
91-57-6	2-Methylnaphthalene	1	2.7	230	0.65	J
95-48-7	2-Methylphenol	1	230	230	11	U
106-44-5	4-Methylphenol	1	230	230	12	U
91-20-3	Naphthalene	1	0.45	23	0.32	J
88-74-4	2-Nitroaniline	1	230	230	18	U
99-09-2	3-Nitroaniline	1	230	230	15	U
100-01-6	4-Nitroaniline	1	230	230	31	U
98-95-3	Nitrobenzene	1	230	230	2.0	U
100-02-7	4-Nitrophenol	1	450	450	15	U
88-75-5	2-Nitrophenol	1	230	230	17	U
86-30-6	N-Nitroso-diphenylamine	1	230	230	1.1	U
621-64-7	N-Nitroso-di-n-propylamine	1	230	230	0.97	U
87-86-5	Pentachlorophenol	1	450	450	5.0	U
85-01-8	Phenanthrene	1	23	23	4.9	U
108-95-2	Phenol	1	2.3	230	0.95	J
129-00-0	Pyrene	1	23	23	0.43	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	230	230	1.1	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	230	230	22	U
88-06-2	2,4,6-Trichlorophenol	1	230	230	6.3	U
95-95-4	2,4,5-Trichlorophenol	1	230	230	8.2	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	916	705	77	35 - 105	
Phenol-d6	907	756	83	40 - 100	
Nitrobenzene-d5	471	394	84	35 - 100	
2-Fluorobiphenyl	453	396	87	45 - 105	
2,4,6-Tribromophenol	911	756	83	35 - 125	
o-Terphenyl	453	438	97	30 - 125	

02841

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-10 File ID: 80125310.D

Sampled: 01/14/08 15:35 Prepared: 01/25/08 10:34 Analyzed: 01/26/08 18:03

Solids: 73.53 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0800940 Sequence: 8012606 Calibration: 8A23018 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	228006	8.01	223700	7.98	
Naphthalene-d8	726867	10.8	730236	10.8	
Acenaphthene-d10	417092	14.95	399629	14.95	
Phenanthrene-d10	509636	18.3	512498	18.3	
Chrysene-d12	392494	21.84	436562	21.83	
Perylene-d12	393009	23.69	411514	23.69	

* Values outside of QC limits

028442

SAMPLE ID SUMMARY

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB6A	0801213-10
57SB6AB	0801213-11
57SB6B	0801213-12
EQBK-4	0801230-01
57SB6C	0801233-01
57SB7A	0801233-02
57SB7AB	0801233-03
57SB7B	0801233-04
57SB7C	0801233-05
57SB4AB	0801233-06
57SB4B	0801233-07
57SB4C	0801233-08
DUP-5	0801233-09
EQBK-5	0801250-01
57SB5A	0801253-01
57SB5AB	0801253-02
57SB5B	0801253-03
57SB5C	0801253-04
DUP-6	0801253-06
57SB8A	0801253-07
57SB8AB	0801253-08
57SB8B	0801253-09
57SB8C	0801253-10

ANALYSIS DATA SHEET

57SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801213-10 File ID: A150057-0

Sampled: 01/10/08 15:40 Prepared: 01/23/08 07:58 Analyzed: 02/01/08 16:24

Solids: 28.65 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020314 Calibration: 8B03011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	5.9	5.9	1.2	U
319-85-7	beta-BHC	1	12	12	2.3	U
58-89-9	gamma-BHC (Lindane)	1	12	12	2.2	U
319-86-8	delta-BHC	1	12	12	3.3	U
5103-71-9	alpha-Chlordane	1	12	12	2.4	U
5103-74-2	gamma-Chlordane	1	12	12	1.6	U
72-54-8	4,4'-DDD	1	12	12	3.9	U
72-55-9	4,4'-DDE	1	12	12	3.1	U
50-29-3	4,4'-DDT	1	12	12	3.6	U
309-00-2	Aldrin	1	5.9	5.9	1.9	U
60-57-1	Dieldrin	1	12	12	1.6	U
959-98-8	Endosulfan I	1	12	12	3.1	U
33213-65-9	Endosulfan II	1	140	12	3.0	J/8
1031-07-8	Endosulfan Sulfate	1	12	12	3.5	U
72-20-8	Endrin	1	12	12	1.9	U
7421-93-4	Endrin Aldehyde	1	12	12	3.6	U
53494-70-5	Endrin Ketone	1	12	12	3.6	U
76-44-8	Heptachlor	1	23	23	4.2	U
1024-57-3	Heptachlor Epoxide	1	5.9	5.9	1.4	U
72-43-5	Methoxychlor	1	59	59	4.5	U
8001-35-2	Toxaphene	1	590	590	78	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	116	81.7	70	70 - 125	
Decachlorobiphenyl	116	94.0	81	55 - 130	

* Values outside of QC limits

01030

ANALYSIS DATA SHEET

57SB6AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801213-11 File ID: A150059-0

Sampled: 01/10/08 15:40 Prepared: 01/23/08 07:58 Analyzed: 02/01/08 17:34

Solids: 77.38 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020314 Calibration: 8B03011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.2	2.2	0.45	U
319-85-7	beta-BHC	1	4.3	4.3	0.87	U
58-89-9	gamma-BHC (Lindane)	1	4.3	4.3	0.83	U
319-86-8	delta-BHC	1	4.3	4.3	1.2	U
5103-71-9	alpha-Chlordane	1	4.3	4.3	0.88	U
5103-74-2	gamma-Chlordane	1	4.3	4.3	0.61	U
72-54-8	4,4'-DDD	1	4.3	4.3	1.4	U
72-55-9	4,4'-DDE	1	4.3	4.3	1.2	U
50-29-3	4,4'-DDT	1	4.3	4.3	1.3	U
309-00-2	Aldrin	1	2.2	2.2	0.70	U
60-57-1	Dieldrin	1	4.3	4.3	0.60	U
959-98-8	Endosulfan I	1	4.3	4.3	1.2	U
33213-65-9	Endosulfan II	1	4.3	4.3	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.3	4.3	1.3	U
72-20-8	Endrin	1	4.3	4.3	0.69	U
7421-93-4	Endrin Aldehyde	1	4.3	4.3	1.3	U
53494-70-5	Endrin Ketone	1	4.3	4.3	1.3	U
76-44-8	Heptachlor	1	8.7	8.7	1.6	U
1024-57-3	Heptachlor Epoxide	1	2.2	2.2	0.54	U
72-43-5	Methoxychlor	1	22	22	1.7	U
8001-35-2	Toxaphene	1	220	220	29	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	43.1	31.6	73	70 - 125	
Decachlorobiphenyl	43.1	34.1	79	55 - 130	

* Values outside of QC limits

01039

ANALYSIS DATA SHEET

57SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801213-12 File ID: data011-0

Sampled: 01/10/08 17:00 Prepared: 01/23/08 07:58 Analyzed: 02/06/08 14:15

Solids: 69.91 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020735 Calibration: 8B07005 Instrument: 222

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.4	2.4	0.50	U
319-85-7	beta-BHC	1	4.7	4.7	0.96	U
58-89-9	gamma-BHC (Lindane)	1	4.7	4.7	0.92	U
319-86-8	delta-BHC	1	4.7	4.7	1.3	U
5103-71-9	alpha-Chlordane	1	4.7	4.7	0.97	U
5103-74-2	gamma-Chlordane	1	4.7	4.7	0.67	U
72-54-8	4,4'-DDD	1	4.7	4.7	1.6	U
72-55-9	4,4'-DDE	1	4.7	4.7	1.3	U
50-29-3	4,4'-DDT	1	4.7	4.7	1.5	U
309-00-2	Aldrin	1	2.4	2.4	0.78	U
60-57-1	Dieldrin	1	13	4.7	0.66	J,P
959-98-8	Endosulfan I	1	4.7	4.7	1.3	U
33213-65-9	Endosulfan II	1	4.7	4.7	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.7	4.7	1.4	U
72-20-8	Endrin	1	6.2	4.7	0.77	
7421-93-4	Endrin Aldehyde	1	4.7	4.7	1.5	U
53494-70-5	Endrin Ketone	1	4.7	4.7	1.5	U
76-44-8	Heptachlor	1	9.6	9.6	1.7	U
1024-57-3	Heptachlor Epoxide	1	2.4	2.4	0.59	U
72-43-5	Methoxychlor	1	24	24	1.8	U
8001-35-2	Toxaphene	1	240	240	32	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	47.7	40.7	85	70 - 125	
Decachlorobiphenyl	47.7	41.9	88	55 - 130	

* Values outside of QC limits

01050

ANALYSIS DATA SHEET

EQBK-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Water Laboratory ID: 0801230-01 File ID: data010-0

Sampled: 01/11/08 13:40 Prepared: 01/17/08 07:52 Analyzed: 02/06/08 13:40

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0800579 Sequence: 8020735 Calibration: 8B07005 Instrument: 222

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.181	96	25 - 140	
Decachlorobiphenyl	0.189	0.226	120	30 - 135	

* Values outside of QC limits

01059

ANALYSIS DATA SHEET

57SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-01 File ID: A150068-0

Sampled: 01/11/08 08:15 Prepared: 01/23/08 07:58 Analyzed: 02/01/08 22:47

Solids: 73.67 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020314 Calibration: 8B03011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.3	2.3	0.48	U
319-85-7	beta-BHC	1	4.5	4.5	0.91	U
58-89-9	gamma-BHC (Lindane)	1	4.5	4.5	0.87	U
319-86-8	delta-BHC	1	4.5	4.5	1.3	U
5103-71-9	alpha-Chlordane	1	4.5	4.5	0.92	U
5103-74-2	gamma-Chlordane	1	4.5	4.5	0.64	U
72-54-8	4,4'-DDD	1	4.5	4.5	1.5	U
72-55-9	4,4'-DDE	1	4.5	4.5	1.2	U
50-29-3	4,4'-DDT	1	4.5	4.5	1.4	U
309-00-2	Aldrin	1	2.3	2.3	0.74	U
60-57-1	Dieldrin	1	4.5	4.5	0.63	U
959-98-8	Endosulfan I	1	4.5	4.5	1.2	U
33213-65-9	Endosulfan II	1	4.5	4.5	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.5	4.5	1.4	U
72-20-8	Endrin	1	4.5	4.5	0.73	U
7421-93-4	Endrin Aldehyde	1	4.5	4.5	1.4	U
53494-70-5	Endrin Ketone	1	4.5	4.5	1.4	U
76-44-8	Heptachlor	1	9.1	9.1	1.6	U
1024-57-3	Heptachlor Epoxide	1	2.3	2.3	0.56	U
72-43-5	Methoxychlor	1	23	23	1.8	U
8001-35-2	Toxaphene	1	230	230	30	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	45.2	34.9	77	70 - 125	
Decachlorobiphenyl	45.2	38.8	86	55 - 130	

* Values outside of QC limits

21058

ANALYSIS DATA SHEET

57SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-02 File ID: A150069-0

Sampled: 01/11/08 09:05 Prepared: 01/23/08 07:58 Analyzed: 02/01/08 23:22

Solids: 37.36 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020314 Calibration: 8B03011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	4.5	4.5	0.94	U
319-85-7	beta-BHC	1	8.8	8.8	1.8	U
58-89-9	gamma-BHC (Lindane)	1	8.8	8.8	1.7	U
319-86-8	delta-BHC	1	8.8	8.8	2.5	U
5103-71-9	alpha-Chlordane	1	8.8	8.8	1.8	U
5103-74-2	gamma-Chlordane	1	8.8	8.8	1.3	U
72-54-8	4,4'-DDD	1	8.8	8.8	3.0	U
72-55-9	4,4'-DDE	1	8.8	8.8	2.4	U
50-29-3	4,4'-DDT	1	8.8	8.8	2.8	U
309-00-2	Aldrin	1	4.5	4.5	1.5	U
60-57-1	Dieldrin	1	8.8	8.8	1.2	U
959-98-8	Endosulfan I	1	8.8	8.8	2.4	U
33213-65-9	Endosulfan II	1	8.8	8.8	2.3	U
1031-07-8	Endosulfan Sulfate	1	8.8	8.8	2.7	U
72-20-8	Endrin	1	8.8	8.8	1.4	U
7421-93-4	Endrin Aldehyde	1	8.8	8.8	2.8	U
53494-70-5	Endrin Ketone	1	8.8	8.8	2.7	U
76-44-8	Heptachlor	1	18	18	3.2	U
1024-57-3	Heptachlor Epoxide	1	4.5	4.5	1.1	U
72-43-5	Methoxychlor	1	45	45	3.5	U
8001-35-2	Toxaphene	1	450	450	60	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	89.2	72.0	81	70 - 125	
Decachlorobiphenyl	89.2	76.1	85	55 - 130	

* Values outside of QC limits

01077

ANALYSIS DATA SHEET

57SB7AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-03 File ID: data012-0

Sampled: 01/11/08 09:05 Prepared: 01/23/08 07:58 Analyzed: 02/06/08 14:50

Solids: 71.69 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020735 Calibration: 8B07005 Instrument: 222

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.4	2.4	0.49	U
319-85-7	beta-BHC	1	4.6	4.6	0.94	U
58-89-9	gamma-BHC (Lindane)	1	4.6	4.6	0.90	U
319-86-8	delta-BHC	1	4.6	4.6	1.3	U
5103-71-9	alpha-Chlordane	1	4.6	4.6	0.95	U
5103-74-2	gamma-Chlordane	1	4.6	4.6	0.66	U
72-54-8	4,4'-DDD	1	4.6	4.6	1.6	U
72-55-9	4,4'-DDE	1	4.6	4.6	1.3	U
50-29-3	4,4'-DDT	1	4.6	4.6	1.4	U
309-00-2	Aldrin	1	2.4	2.4	0.76	U
60-57-1	Dieldrin	1	4.6	4.6	0.64	U
959-98-8	Endosulfan I	1	4.6	4.6	1.2	U
33213-65-9	Endosulfan II	1	4.6	4.6	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.6	4.6	1.4	U
72-20-8	Endrin	1	4.6	4.6	0.75	U
7421-93-4	Endrin Aldehyde	1	4.6	4.6	1.5	U
53494-70-5	Endrin Ketone	1	4.6	4.6	1.4	U
76-44-8	Heptachlor	1	9.3	9.3	1.7	U
1024-57-3	Heptachlor Epoxide	1	2.4	2.4	0.58	U
72-43-5	Methoxychlor	1	24	24	1.8	U
8001-35-2	Toxaphene	1	240	240	31	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	46.5	38.2	82	70 - 125	
Decachlorobiphenyl	46.5	38.5	83	55 - 130	

* Values outside of QC limits

01086

ANALYSIS DATA SHEET

57SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-04 File ID: data013-0

Sampled: 01/11/08 09:10 Prepared: 01/23/08 07:58 Analyzed: 02/06/08 15:25

Solids: 80.43 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020735 Calibration: 8B07005 Instrument: 222

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.44	U
319-85-7	beta-BHC	1	4.1	4.1	0.84	U
58-89-9	gamma-BHC (Lindane)	1	4.1	4.1	0.80	U
319-86-8	delta-BHC	1	4.1	4.1	1.2	U
5103-71-9	alpha-Chlordane	1	4.1	4.1	0.84	U
5103-74-2	gamma-Chlordane	1	4.1	4.1	0.58	U
72-54-8	4,4'-DDD	1	4.1	4.1	1.4	U
72-55-9	4,4'-DDE	1	4.1	4.1	1.1	U
50-29-3	4,4'-DDT	1	4.1	4.1	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.68	U
60-57-1	Dieldrin	1	4.1	4.1	0.57	U
959-98-8	Endosulfan I	1	4.1	4.1	1.1	U
33213-65-9	Endosulfan II	1	4.1	4.1	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.1	4.1	1.2	U
72-20-8	Endrin	1	4.1	4.1	0.67	U
7421-93-4	Endrin Aldehyde	1	4.1	4.1	1.3	U
53494-70-5	Endrin Ketone	1	4.1	4.1	1.3	U
76-44-8	Heptachlor	1	8.3	8.3	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.51	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	28	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	41.4	30.9	75	70 - 125	
Decachlorobiphenyl	41.4	32.0	77	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

57SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-05 File ID: A150076-0

Sampled: 01/11/08 10:05 Prepared: 01/23/08 07:58 Analyzed: 02/02/08 03:26

Solids: 69.25 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020314 Calibration: 8B03011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.5	2.5	0.51	U
319-85-7	beta-BHC	1	4.8	4.8	0.97	U
58-89-9	gamma-BHC (Lindane)	1	4.8	4.8	0.93	U
319-86-8	delta-BHC	1	4.8	4.8	1.4	U
5103-71-9	alpha-Chlordane	1	4.8	4.8	0.98	U
5103-74-2	gamma-Chlordane	1	4.8	4.8	0.68	U
72-54-8	4,4'-DDD	1	4.8	4.8	1.6	U
72-55-9	4,4'-DDE	1	4.8	4.8	1.3	U
50-29-3	4,4'-DDT	1	4.8	4.8	1.5	U
309-00-2	Aldrin	1	2.5	2.5	0.78	U
60-57-1	Dieldrin	1	4.8	4.8	0.67	U
959-98-8	Endosulfan I	1	4.8	4.8	1.3	U
33213-65-9	Endosulfan II	1	4.8	4.8	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.8	4.8	1.4	U
72-20-8	Endrin	1	4.8	4.8	0.77	U
7421-93-4	Endrin Aldehyde	1	4.8	4.8	1.5	U
53494-70-5	Endrin Ketone	1	4.8	4.8	1.5	U
76-44-8	Heptachlor	1	9.7	9.7	1.7	U
1024-57-3	Heptachlor Epoxide	1	2.5	2.5	0.60	U
72-43-5	Methoxychlor	1	25	25	1.9	U
8001-35-2	Toxaphene	1	250	250	32	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	48.1	39.5	82	70 - 125	
Decachlorobiphenyl	48.1	40.5	84	55 - 130	

* Values outside of QC limits

021894

ANALYSIS DATA SHEET

57SB4AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-06 File ID: A150082-0

Sampled: 01/11/08 12:05 Prepared: 01/23/08 07:58 Analyzed: 02/02/08 07:17

Solids: 76.38 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020314 Calibration: 8B03011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.2	2.2	0.46	U
319-85-7	beta-BHC	1	4.3	4.3	0.88	U
58-89-9	gamma-BHC (Lindane)	1	4.3	4.3	0.84	U
319-86-8	delta-BHC	1	4.3	4.3	1.2	U
5103-71-9	alpha-Chlordane	1	4.3	4.3	0.89	U
5103-74-2	gamma-Chlordane	1	4.3	4.3	0.62	U
72-54-8	4,4'-DDD	1	4.3	4.3	1.5	U
72-55-9	4,4'-DDE	1	4.3	4.3	1.2	U
50-29-3	4,4'-DDT	1	4.3	4.3	1.3	U
309-00-2	Aldrin	1	2.2	2.2	0.71	U
60-57-1	Dieldrin	1	4.3	4.3	0.60	U
959-98-8	Endosulfan I	1	4.3	4.3	1.2	U
33213-65-9	Endosulfan II	1	4.3	4.3	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.3	4.3	1.3	U
72-20-8	Endrin	1	4.3	4.3	0.70	U
7421-93-4	Endrin Aldehyde	1	4.3	4.3	1.4	U
53494-70-5	Endrin Ketone	1	4.3	4.3	1.3	U
76-44-8	Heptachlor	1	8.8	8.8	1.6	U
1024-57-3	Heptachlor Epoxide	1	2.2	2.2	0.54	U
72-43-5	Methoxychlor	1	22	22	1.7	U
8001-35-2	Toxaphene	1	220	220	29	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	43.6	34.1	78	70 - 125	
Decachlorobiphenyl	43.6	32.9	75	55 - 130	

* Values outside of QC limits

01113

ANALYSIS DATA SHEET

57SB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-07 File ID: A150083-0

Sampled: 01/11/08 12:40 Prepared: 01/23/08 07:58 Analyzed: 02/02/08 07:52

Solids: 78.19 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020314 Calibration: 8B03011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.2	2.2	0.45	U
319-85-7	beta-BHC	1	4.2	4.2	0.86	U
58-89-9	gamma-BHC (Lindane)	1	4.2	4.2	0.82	U
319-86-8	delta-BHC	1	4.2	4.2	1.2	U
5103-71-9	alpha-Chlordane	1	4.2	4.2	0.87	U
5103-74-2	gamma-Chlordane	1	4.2	4.2	0.60	U
72-54-8	4,4'-DDD	1	4.2	4.2	1.4	U
72-55-9	4,4'-DDE	1	4.2	4.2	1.1	U
50-29-3	4,4'-DDT	1	4.2	4.2	1.3	U
309-00-2	Aldrin	1	2.2	2.2	0.69	U
60-57-1	Dieldrin	1	4.2	4.2	0.59	U
959-98-8	Endosulfan I	1	4.2	4.2	1.1	U
33213-65-9	Endosulfan II	1	4.2	4.2	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.2	4.2	1.3	U
72-20-8	Endrin	1	4.2	4.2	0.69	U
7421-93-4	Endrin Aldehyde	1	4.2	4.2	1.3	U
53494-70-5	Endrin Ketone	1	4.2	4.2	1.3	U
76-44-8	Heptachlor	1	8.6	8.6	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.2	2.2	0.53	U
72-43-5	Methoxychlor	1	22	22	1.6	U
8001-35-2	Toxaphene	1	220	220	29	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	42.6	35.0	82	70 - 125	
Decachlorobiphenyl	42.6	36.6	86	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

57SB4C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-08 File ID: A150084-0

Sampled: 01/11/08 13:00 Prepared: 01/23/08 07:58 Analyzed: 02/02/08 08:26

Solids: 78.10 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020314 Calibration: 8B03011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.2	2.2	0.45	U
319-85-7	beta-BHC	1	4.2	4.2	0.86	U
58-89-9	gamma-BHC (Lindane)	1	4.2	4.2	0.82	U
319-86-8	delta-BHC	1	4.2	4.2	1.2	U
5103-71-9	alpha-Chlordane	1	4.2	4.2	0.87	U
5103-74-2	gamma-Chlordane	1	4.2	4.2	0.60	U
72-54-8	4,4'-DDD	1	4.2	4.2	1.4	U
72-55-9	4,4'-DDE	1	4.2	4.2	1.2	U
50-29-3	4,4'-DDT	1	4.2	4.2	1.3	U
309-00-2	Aldrin	1	2.2	2.2	0.70	U
60-57-1	Dieldrin	1	4.2	4.2	0.59	U
959-98-8	Endosulfan I	1	4.2	4.2	1.1	U
33213-65-9	Endosulfan II	1	4.2	4.2	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.2	4.2	1.3	U
72-20-8	Endrin	1	4.2	4.2	0.69	U
7421-93-4	Endrin Aldehyde	1	4.2	4.2	1.3	U
53494-70-5	Endrin Ketone	1	4.2	4.2	1.3	U
76-44-8	Heptachlor	1	8.6	8.6	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.2	2.2	0.53	U
72-43-5	Methoxychlor	1	22	22	1.7	U
8001-35-2	Toxaphene	1	220	220	29	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	42.7	33.5	78	70 - 125	
Decachlorobiphenyl	42.7	33.0	77	55 - 130	

* Values outside of QC limits

01131

ANALYSIS DATA SHEET

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-09 File ID: A150085-0

Sampled: 01/11/08 00:00 Prepared: 01/23/08 07:58 Analyzed: 02/02/08 09:01

Solids: 80.32 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020314 Calibration: 8B03011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.44	U
319-85-7	beta-BHC	1	4.1	4.1	0.84	U
58-89-9	gamma-BHC (Lindane)	1	4.1	4.1	0.80	U
319-86-8	delta-BHC	1	4.1	4.1	1.2	U
5103-71-9	alpha-Chlordane	1	4.1	4.1	0.84	U
5103-74-2	gamma-Chlordane	1	4.1	4.1	0.59	U
72-54-8	4,4'-DDD	1	4.1	4.1	1.4	U
72-55-9	4,4'-DDE	1	4.1	4.1	1.1	U
50-29-3	4,4'-DDT	1	4.1	4.1	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.68	U
60-57-1	Dieldrin	1	4.1	4.1	0.57	U
959-98-8	Endosulfan I	1	4.1	4.1	1.1	U
33213-65-9	Endosulfan II	1	4.1	4.1	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.1	4.1	1.2	U
72-20-8	Endrin	1	4.1	4.1	0.67	U
7421-93-4	Endrin Aldehyde	1	4.1	4.1	1.3	U
53494-70-5	Endrin Ketone	1	4.1	4.1	1.3	U
76-44-8	Heptachlor	1	8.3	8.3	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.52	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	28	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	41.5	33.0	79	70 - 125	
Decachlorobiphenyl	41.5	30.4	73	55 - 130	

* Values outside of QC limits

01140

ANALYSIS DATA SHEET

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Water Laboratory ID: 0801250-01 File ID: A150063-0

Sampled: 01/14/08 14:30 Prepared: 01/17/08 07:52 Analyzed: 02/01/08 19:53

Solids: Preparation: 3510C Liquid-Liquid Ex Initial/Final: 1050 mL / 2 mL

QC Batch: 0800579 Sequence: 8020314 Calibration: 8B03011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.190	0.0811	43	25 - 140	
Decachlorobiphenyl	0.190	0.167	88	30 - 135	

* Values outside of QC limits

21149

ANALYSIS DATA SHEET

57SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-01 File ID: A150086-0

Sampled: 01/14/08 12:55 Prepared: 01/23/08 07:58 Analyzed: 02/02/08 09:36

Solids: 73.68 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020314 Calibration: 8B03011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.3	2.3	0.48	U
319-85-7	beta-BHC	1	4.5	4.5	0.91	U
58-89-9	gamma-BHC (Lindane)	1	4.5	4.5	0.87	U
319-86-8	delta-BHC	1	4.5	4.5	1.3	U
5103-71-9	alpha-Chlordane	1	4.5	4.5	0.92	U
5103-74-2	gamma-Chlordane	1	4.5	4.5	0.64	U
72-54-8	4,4'-DDD	1	4.5	4.5	1.5	U
72-55-9	4,4'-DDE	1	4.5	4.5	1.2	U
50-29-3	4,4'-DDT	1	4.5	4.5	1.4	U
309-00-2	Aldrin	1	2.3	2.3	0.74	U
60-57-1	Dieldrin	1	4.5	4.5	0.63	U
959-98-8	Endosulfan I	1	4.5	4.5	1.2	U
33213-65-9	Endosulfan II	1	4.5	4.5	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.5	4.5	1.4	U
72-20-8	Endrin	1	4.5	4.5	0.73	U
7421-93-4	Endrin Aldehyde	1	4.5	4.5	1.4	U
53494-70-5	Endrin Ketone	1	4.5	4.5	1.4	U
76-44-8	Heptachlor	1	9.1	9.1	1.6	U
1024-57-3	Heptachlor Epoxide	1	9.6	2.3	0.56	J, g
72-43-5	Methoxychlor	1	23	23	1.8	U
8001-35-2	Toxaphene	1	230	230	30	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	45.2	36.7	81	70 - 125	
Decachlorobiphenyl	45.2	34.1	75	55 - 130	

* Values outside of QC limits

01158

ANALYSIS DATA SHEET

57SB5AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-02 File ID: A150088-0

Sampled: 01/14/08 12:55 Prepared: 01/23/08 07:58 Analyzed: 02/02/08 10:46

Solids: 75.19 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020314 Calibration: 8B03011 Instrument: 158

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.3	2.3	0.47	U
319-85-7	beta-BHC	1	4.4	4.4	0.90	U
58-89-9	gamma-BHC (Lindane)	1	4.4	4.4	0.85	U
319-86-8	delta-BHC	1	4.4	4.4	1.2	U
5103-71-9	alpha-Chlordane	1	4.4	4.4	0.90	U
5103-74-2	gamma-Chlordane	1	4.4	4.4	0.63	U
72-54-8	4,4'-DDD	1	4.4	4.4	1.5	U
72-55-9	4,4'-DDE	1	4.4	4.4	1.2	U
50-29-3	4,4'-DDT	1	4.4	4.4	1.4	U
309-00-2	Aldrin	1	2.3	2.3	0.72	U
60-57-1	Dieldrin	1	4.4	4.4	0.61	U
959-98-8	Endosulfan I	1	4.4	4.4	1.2	U
33213-65-9	Endosulfan II	1	4.4	4.4	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.4	4.4	1.3	U
72-20-8	Endrin	1	4.4	4.4	0.71	U
7421-93-4	Endrin Aldehyde	1	4.4	4.4	1.4	U
53494-70-5	Endrin Ketone	1	4.4	4.4	1.4	U
76-44-8	Heptachlor	1	8.9	8.9	1.6	U
1024-57-3	Heptachlor Epoxide	1	6.6	2.3	0.55	J g
72-43-5	Methoxychlor	1	23	23	1.7	U
8001-35-2	Toxaphene	1	230	230	30	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	44.3	36.2	82	70 - 125	
Decachlorobiphenyl	44.3	34.9	79	55 - 130	

* Values outside of QC limits

01167

ANALYSIS DATA SHEET

57SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-03 File ID: data014-0

Sampled: 01/14/08 14:00 Prepared: 01/23/08 07:58 Analyzed: 02/06/08 16:35

Solids: 71.94 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020735 Calibration: 8B07005 Instrument: 222

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.4	2.4	0.49	U
319-85-7	beta-BHC	1	4.6	4.6	0.94	U
58-89-9	gamma-BHC (Lindane)	1	4.6	4.6	0.89	U
319-86-8	delta-BHC	1	4.6	4.6	1.3	U
5103-71-9	alpha-Chlordane	1	4.6	4.6	0.94	U
5103-74-2	gamma-Chlordane	1	4.6	4.6	0.65	U
72-54-8	4,4'-DDD	1	4.6	4.6	1.6	U
72-55-9	4,4'-DDE	1	4.6	4.6	1.2	U
50-29-3	4,4'-DDT	1	4.6	4.6	1.4	U
309-00-2	Aldrin	1	2.4	2.4	0.75	U
60-57-1	Dieldrin	1	4.6	4.6	0.64	U
959-98-8	Endosulfan I	1	4.6	4.6	1.2	U
33213-65-9	Endosulfan II	1	4.6	4.6	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.6	4.6	1.4	U
72-20-8	Endrin	1	4.6	4.6	0.75	U
7421-93-4	Endrin Aldehyde	1	4.6	4.6	1.4	U
53494-70-5	Endrin Ketone	1	4.6	4.6	1.4	U
76-44-8	Heptachlor	1	9.3	9.3	1.7	U
1024-57-3	Heptachlor Epoxide	1	2.4	2.4	0.58	U
72-43-5	Methoxychlor	1	24	24	1.8	U
8001-35-2	Toxaphene	1	240	240	31	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	46.3	35.4	77	70 - 125	
Decachlorobiphenyl	46.3	36.3	78	55 - 130	

* Values outside of QC limits

01176

ANALYSIS DATA SHEET

57SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-04 File ID: data015-0

Sampled: 01/14/08 14:10 Prepared: 01/23/08 07:58 Analyzed: 02/06/08 17:10

Solids: 77.24 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020735 Calibration: 8B07005 Instrument: 222

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.2	2.2	0.45	U
319-85-7	beta-BHC	1	4.3	4.3	0.87	U
58-89-9	gamma-BHC (Lindane)	1	4.3	4.3	0.83	U
319-86-8	delta-BHC	1	4.3	4.3	1.2	U
5103-71-9	alpha-Chlordane	1	4.3	4.3	0.88	U
5103-74-2	gamma-Chlordane	1	4.3	4.3	0.61	U
72-54-8	4,4'-DDD	1	4.3	4.3	1.5	U
72-55-9	4,4'-DDE	1	4.3	4.3	1.2	U
50-29-3	4,4'-DDT	1	4.3	4.3	1.3	U
309-00-2	Aldrin	1	2.2	2.2	0.70	U
60-57-1	Dieldrin	1	4.3	4.3	0.60	U
959-98-8	Endosulfan I	1	4.3	4.3	1.2	U
33213-65-9	Endosulfan II	1	4.3	4.3	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.3	4.3	1.3	U
72-20-8	Endrin	1	4.3	4.3	0.69	U
7421-93-4	Endrin Aldehyde	1	4.3	4.3	1.3	U
53494-70-5	Endrin Ketone	1	4.3	4.3	1.3	U
76-44-8	Heptachlor	1	8.7	8.7	1.6	U
1024-57-3	Heptachlor Epoxide	1	2.2	2.2	0.54	U
72-43-5	Methoxychlor	1	22	22	1.7	U
8001-35-2	Toxaphene	1	220	220	29	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	43.2	37.9	88	70 - 125	
Decachlorobiphenyl	43.2	39.7	92	55 - 130	

* Values outside of QC limits

01185

ANALYSIS DATA SHEET

DUP-6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-06 File ID: data016-0

Sampled: 01/14/08 00:00 Prepared: 01/23/08 07:58 Analyzed: 02/06/08 17:45

Solids: 74.13 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020735 Calibration: 8B07005 Instrument: 222

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.3	2.3	0.47	U
319-85-7	beta-BHC	1	4.5	4.5	0.91	U
58-89-9	gamma-BHC (Lindane)	1	4.5	4.5	0.87	U
319-86-8	delta-BHC	1	4.5	4.5	1.3	U
5103-71-9	alpha-Chlordane	1	4.5	4.5	0.91	U
5103-74-2	gamma-Chlordane	1	4.5	4.5	0.63	U
72-54-8	4,4'-DDD	1	4.5	4.5	1.5	U
72-55-9	4,4'-DDE	1	4.5	4.5	1.2	U
50-29-3	4,4'-DDT	1	4.5	4.5	1.4	U
309-00-2	Aldrin	1	2.3	2.3	0.73	U
60-57-1	Dieldrin	1	3.4	4.5	0.62	J J/8
959-98-8	Endosulfan I	1	4.5	4.5	1.2	U
33213-65-9	Endosulfan II	1	4.5	4.5	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.5	4.5	1.3	U
72-20-8	Endrin	1	4.5	4.5	0.72	U
7421-93-4	Endrin Aldehyde	1	4.5	4.5	1.4	U
53494-70-5	Endrin Ketone	1	4.5	4.5	1.4	U
76-44-8	Heptachlor	1	9.0	9.0	1.6	U
1024-57-3	Heptachlor Epoxide	1	2.3	2.3	0.56	U
72-43-5	Methoxychlor	1	23	23	1.7	U
8001-35-2	Toxaphene	1	230	230	30	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	45.0	38.9	87	70 - 125	
Decachlorobiphenyl	45.0	43.5	97	55 - 130	

* Values outside of QC limits

01194

ANALYSIS DATA SHEET

57SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-07 File ID: data017-0

Sampled: 01/14/08 15:10 Prepared: 01/23/08 07:58 Analyzed: 02/06/08 18:20

Solids: 71.41 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020735 Calibration: 8B07005 Instrument: 222

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.4	2.4	0.49	U
319-85-7	beta-BHC	1	4.6	4.6	0.94	U
58-89-9	gamma-BHC (Lindane)	1	4.6	4.6	0.90	U
319-86-8	delta-BHC	1	4.6	4.6	1.3	U
5103-71-9	alpha-Chlordane	1	4.6	4.6	0.95	U
5103-74-2	gamma-Chlordane	1	4.6	4.6	0.66	U
72-54-8	4,4'-DDD	1	4.6	4.6	1.6	U
72-55-9	4,4'-DDE	1	4.6	4.6	1.3	U
50-29-3	4,4'-DDT	1	4.6	4.6	1.4	U
309-00-2	Aldrin	1	2.4	2.4	0.76	U
60-57-1	Dieldrin	1	5.4	4.6	0.65	J,P
959-98-8	Endosulfan I	1	4.6	4.6	1.3	U
33213-65-9	Endosulfan II	1	4.6	4.6	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.6	4.6	1.4	U
72-20-8	Endrin	1	2.7	4.6	0.75	J
7421-93-4	Endrin Aldehyde	1	4.6	4.6	1.5	U
53494-70-5	Endrin Ketone	1	4.6	4.6	1.4	U
76-44-8	Heptachlor	1	9.4	9.4	1.7	U
1024-57-3	Heptachlor Epoxide	1	2.4	2.4	0.58	U
72-43-5	Methoxychlor	1	24	24	1.8	U
8001-35-2	Toxaphene	1	240	240	31	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	46.7	37.1	79	70 - 125	
Decachlorobiphenyl	46.7	40.2	86	55 - 130	

* Values outside of QC limits

01203

ANALYSIS DATA SHEET

57SB8AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-08 File ID: data022-0

Sampled: 01/14/08 15:10 Prepared: 01/23/08 07:58 Analyzed: 02/06/08 21:15

Solids: 77.53 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020735 Calibration: 8B07005 Instrument: 222

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.2	2.2	0.45	U
319-85-7	beta-BHC	1	4.3	4.3	0.87	U
58-89-9	gamma-BHC (Lindane)	1	4.3	4.3	0.83	U
319-86-8	delta-BHC	1	4.3	4.3	1.2	U
5103-71-9	alpha-Chlordane	1	4.3	4.3	0.87	U
5103-74-2	gamma-Chlordane	1	4.3	4.3	0.61	U
72-54-8	4,4'-DDD	1	4.3	4.3	1.4	U
72-55-9	4,4'-DDE	1	4.3	4.3	1.2	U
50-29-3	4,4'-DDT	1	4.3	4.3	1.3	U
309-00-2	Aldrin	1	2.2	2.2	0.70	U
60-57-1	Dieldrin	1	2.7	4.3	0.59	J JIP
959-98-8	Endosulfan I	1	4.3	4.3	1.2	U
33213-65-9	Endosulfan II	1	4.3	4.3	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.3	4.3	1.3	U
72-20-8	Endrin	1	4.3	4.3	0.69	U
7421-93-4	Endrin Aldehyde	1	4.3	4.3	1.3	U
53494-70-5	Endrin Ketone	1	4.3	4.3	1.3	U
76-44-8	Heptachlor	1	8.6	8.6	1.6	U
1024-57-3	Heptachlor Epoxide	1	2.2	2.2	0.53	U
72-43-5	Methoxychlor	1	22	22	1.7	U
8001-35-2	Toxaphene	1	220	220	29	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	43.0	35.7	83	70 - 125	
Decachlorobiphenyl	43.0	37.1	86	55 - 130	

* Values outside of QC limits

01212

ANALYSIS DATA SHEET

57SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-09 File ID: data023-0

Sampled: 01/14/08 15:30 Prepared: 01/23/08 07:58 Analyzed: 02/06/08 21:50

Solids: 74.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800815 Sequence: 8020735 Calibration: 8B07005 Instrument: 222

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.3	2.3	0.47	U
319-85-7	beta-BHC	1	4.5	4.5	0.91	U
58-89-9	gamma-BHC (Lindane)	1	4.5	4.5	0.87	U
319-86-8	delta-BHC	1	4.5	4.5	1.3	U
5103-71-9	alpha-Chlordane	1	4.5	4.5	0.92	U
5103-74-2	gamma-Chlordane	1	4.5	4.5	0.64	U
72-54-8	4,4'-DDD	1	4.5	4.5	1.5	U
72-55-9	4,4'-DDE	1	4.5	4.5	1.2	U
50-29-3	4,4'-DDT	1	4.5	4.5	1.4	U
309-00-2	Aldrin	1	2.3	2.3	0.73	U
60-57-1	Dieldrin	1	1.6	4.5	0.62	J J/8
959-98-8	Endosulfan I	1	4.5	4.5	1.2	U
33213-65-9	Endosulfan II	1	4.5	4.5	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.5	4.5	1.4	U
72-20-8	Endrin	1	4.5	4.5	0.72	U
7421-93-4	Endrin Aldehyde	1	4.5	4.5	1.4	U
53494-70-5	Endrin Ketone	1	4.5	4.5	1.4	U
76-44-8	Heptachlor	1	9.1	9.1	1.6	U
1024-57-3	Heptachlor Epoxide	1	2.3	2.3	0.56	U
72-43-5	Methoxychlor	1	23	23	1.7	U
8001-35-2	Toxaphene	1	230	230	30	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	45.0	34.2	76	70 - 125	
Decachlorobiphenyl	45.0	35.8	80	55 - 130	

* Values outside of QC limits

01224

ANALYSIS DATA SHEET

57SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-10 File ID: data024-0

Sampled: 01/14/08 15:35 Prepared: 01/25/08 07:48 Analyzed: 02/06/08 22:25

Solids: 73.53 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800928 Sequence: 8020735 Calibration: 8B07005 Instrument: 222

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.3	2.3	0.48	U
319-85-7	beta-BHC	1	4.5	4.5	0.92	U
58-89-9	gamma-BHC (Lindane)	1	4.5	4.5	0.87	U
319-86-8	delta-BHC	1	4.5	4.5	1.3	U
5103-71-9	alpha-Chlordane	1	4.5	4.5	0.92	U
5103-74-2	gamma-Chlordane	1	4.5	4.5	0.64	U
72-54-8	4,4'-DDD	1	4.5	4.5	1.5	U
72-55-9	4,4'-DDE	1	4.5	4.5	1.2	U
50-29-3	4,4'-DDT	1	4.5	4.5	1.4	U
309-00-2	Aldrin	1	2.3	2.3	0.74	U
60-57-1	Dieldrin	1	4.5	4.5	0.63	U
959-98-8	Endosulfan I	1	4.5	4.5	1.2	U
33213-65-9	Endosulfan II	1	4.5	4.5	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.5	4.5	1.4	U
72-20-8	Endrin	1	4.5	4.5	0.73	U
7421-93-4	Endrin Aldehyde	1	4.5	4.5	1.4	U
53494-70-5	Endrin Ketone	1	4.5	4.5	1.4	U
76-44-8	Heptachlor	1	9.1	9.1	1.6	U
1024-57-3	Heptachlor Epoxide	1	2.3	2.3	0.56	U
72-43-5	Methoxychlor	1	23	23	1.8	U
8001-35-2	Toxaphene	1	230	230	30	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	45.3	43.4	96	70 - 125	
Decachlorobiphenyl	45.3	44.8	99	55 - 130	

* Values outside of QC limits

01230

SAMPLE ID SUMMARY

USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-47

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB6A	0801213-10
57SB6AB	0801213-11
57SB6B	0801213-12
EQBK-4	0801230-01
57SB6C	0801233-01
57SB7A	0801233-02
57SB7AB	0801233-03
57SB7B	0801233-04
57SB7C	0801233-05
57SB4AB	0801233-06
57SB4B	0801233-07
57SB4C	0801233-08
DUP-5	0801233-09
EQBK-5	0801250-01
57SB5A	0801253-01
57SB5AB	0801253-02
57SB5B	0801253-03
57SB5C	0801253-04
DUP-6	0801253-06
57SB8A	0801253-07
57SB8AB	0801253-08
57SB8B	0801253-09
57SB8C	0801253-10

00183

ANALYSIS DATA SHEET

57SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801213-10 File ID: A194009-0

Sampled: 01/10/08 15:40 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 17:50

Solids: 28.65 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	2	230	230	29	U
11104-28-2	PCB-1221	2	230	230	52	U
11141-16-5	PCB-1232	2	230	230	59	U
53469-21-9	PCB-1242	2	470	470	110	U
12672-29-6	PCB-1248	2	230	230	37	U
11097-69-1	PCB-1254	2	2000	230	31	
11096-82-5	PCB-1260	2	2000	470	110	
37324-23-5	PCB-1262	2	230	230	36	U
11100-14-4	PCB-1268	2	230	230	31	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		116	89.8	77	60 - 125	
Tetrachloro-m-xylene		116	97.2	84	32 - 129	

* Values outside of QC limits

00217

ANALYSIS DATA SHEET

57SB6AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801213-11 File ID: A193294-0

Sampled: 01/10/08 15:40 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 10:54

Solids: 77.38 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	43	43	5.4	U
11104-28-2	PCB-1221	1	43	43	9.6	U
11141-16-5	PCB-1232	1	43	43	11	U
53469-21-9	PCB-1242	1	87	87	21	U
12672-29-6	PCB-1248	1	43	43	6.8	U
11097-69-1	PCB-1254	1	43	43	5.7	U
11096-82-5	PCB-1260	1	87	87	21	U
37324-23-5	PCB-1262	1	43	43	6.7	U
11100-14-4	PCB-1268	1	43	43	5.7	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		43.1	40.1	93	60 - 125	
Tetrachloro-m-xylene		43.1	38.0	88	32 - 129	

* Values outside of QC limits

00226

ANALYSIS DATA SHEET

57SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801213-12 File ID: A193295-0

Sampled: 01/10/08 17:00 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 11:19

Solids: 69.91 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	47	47	6.0	U
11104-28-2	PCB-1221	1	47	47	11	U
11141-16-5	PCB-1232	1	47	47	12	U
53469-21-9	PCB-1242	1	96	96	23	U
12672-29-6	PCB-1248	1	47	47	7.6	U
11097-69-1	PCB-1254	1	550	47	6.3	
11096-82-5	PCB-1260	1	390	96	23	
37324-23-5	PCB-1262	1	47	47	7.4	U
11100-14-4	PCB-1268	1	47	47	6.3	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		47.7	46.0	96	60 - 125	
Tetrachloro-m-xylene		47.7	43.4	91	32 - 129	

* Values outside of QC limits

00235

ANALYSIS DATA SHEET

EQBK-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Water Laboratory ID: 0801230-01 File ID: A193289-0

Sampled: 01/11/08 13:40 Prepared: 01/17/08 07:55 Analyzed: 01/24/08 08:49

Solids: Preparation: 3510C Liquid-Liquid Ex(Initial/Final: 1060 mL / 2 mL

QC Batch: 0800352 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.189	0.169	89	40 - 135	
Tetrachloro-m-xylene		0.189	0.139	74	36 - 114	

* Values outside of QC limits

ANALYSIS DATA SHEET

57SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-01 File ID: A193296-0

Sampled: 01/11/08 08:15 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 11:44

Solids: 73.67 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	45	45	5.7	U
11104-28-2	PCB-1221	1	45	45	10	U
11141-16-5	PCB-1232	1	45	45	11	U
53469-21-9	PCB-1242	1	91	91	22	U
12672-29-6	PCB-1248	1	45	45	7.2	U
11097-69-1	PCB-1254	1	45	45	6.0	U
11096-82-5	PCB-1260	1	91	91	22	U
37324-23-5	PCB-1262	1	45	45	7.1	U
11100-14-4	PCB-1268	1	45	45	6.0	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		45.2	43.9	97	60 - 125	
Tetrachloro-m-xylene		45.2	42.1	93	32 - 129	

* Values outside of QC limits

00253

ANALYSIS DATA SHEET

57SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-02 File ID: A193298-0

Sampled: 01/11/08 09:05 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 12:34

Solids: 37.36 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	88	88	11	U
11104-28-2	PCB-1221	1	88	88	20	U
11141-16-5	PCB-1232	1	88	88	22	U
53469-21-9	PCB-1242	1	180	180	44	U
12672-29-6	PCB-1248	1	88	88	14	U
11097-69-1	PCB-1254	1	420	88	12	
11096-82-5	PCB-1260	1	210	180	43	
37324-23-5	PCB-1262	1	88	88	14	U
11100-14-4	PCB-1268	1	88	88	12	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		89.2	81.0	91	60 - 125	
Tetrachloro-m-xylene		89.2	79.9	90	32 - 129	

* Values outside of QC limits

00262

ANALYSIS DATA SHEET

57SB7AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-03 File ID: A193299-0

Sampled: 01/11/08 09:05 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 12:59

Solids: 71.69 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	46	46	5.9	U
11104-28-2	PCB-1221	1	46	46	10	U
11141-16-5	PCB-1232	1	46	46	12	U
53469-21-9	PCB-1242	1	93	93	23	U
12672-29-6	PCB-1248	1	46	46	7.4	U
11097-69-1	PCB-1254	1	46	46	6.1	U
11096-82-5	PCB-1260	1	93	93	22	U
37324-23-5	PCB-1262	1	46	46	7.3	U
11100-14-4	PCB-1268	1	46	46	6.1	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		46.5	46.8	101	60 - 125	
Tetrachloro-m-xylene		46.5	44.0	95	32 - 129	

* Values outside of QC limits

00275

ANALYSIS DATA SHEET

57SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-04 File ID: A193300-0

Sampled: 01/11/08 09:10 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 13:25

Solids: 80.43 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	41	41	5.2	U
11104-28-2	PCB-1221	1	41	41	9.2	U
11141-16-5	PCB-1232	1	41	41	10	U
53469-21-9	PCB-1242	1	83	83	20	U
12672-29-6	PCB-1248	1	41	41	6.6	U
11097-69-1	PCB-1254	1	41	41	5.5	U
11096-82-5	PCB-1260	1	83	83	20	U
37324-23-5	PCB-1262	1	41	41	6.5	U
11100-14-4	PCB-1268	1	41	41	5.5	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		41.4	40.7	98	60 - 125	
Tetrachloro-m-xylene		41.4	39.7	96	32 - 129	

* Values outside of QC limits

00284

ANALYSIS DATA SHEET

57SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-05 File ID: A193301-0

Sampled: 01/11/08 10:05 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 13:50

Solids: 69.25 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	48	48	6.1	U
11104-28-2	PCB-1221	1	48	48	11	U
11141-16-5	PCB-1232	1	48	48	12	U
53469-21-9	PCB-1242	1	97	97	24	U
12672-29-6	PCB-1248	1	48	48	7.7	U
11097-69-1	PCB-1254	1	48	48	6.4	U
11096-82-5	PCB-1260	1	97	97	23	U
37324-23-5	PCB-1262	1	48	48	7.5	U
11100-14-4	PCB-1268	1	48	48	6.4	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		48.1	48.5	101	60 - 125	
Tetrachloro-m-xylene		48.1	45.9	95	32 - 129	

* Values outside of QC limits

00293

ANALYSIS DATA SHEET

57SB4AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-06 File ID: A194063-0

Sampled: 01/11/08 12:05 Prepared: 01/23/08 08:00 Analyzed: 01/25/08 16:37

Solids: 76.38 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012603 Calibration: 8A26003 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	43	43	5.5	U
11104-28-2	PCB-1221	1	43	43	9.7	U
11141-16-5	PCB-1232	1	43	43	11	U
53469-21-9	PCB-1242	1	88	88	21	U
12672-29-6	PCB-1248	1	43	43	6.9	U
11097-69-1	PCB-1254	1	43	43	5.8	U
11096-82-5	PCB-1260	1	88	88	21	U
37324-23-5	PCB-1262	1	43	43	6.8	U
11100-14-4	PCB-1268	1	43	43	5.8	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		43.6	36.3	83	60 - 125	
Tetrachloro-m-xylene		43.6	40.5	93	32 - 129	

* Values outside of QC limits

00302

ANALYSIS DATA SHEET

57SB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-07 File ID: A194010-0

Sampled: 01/11/08 12:40 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 18:15

Solids: 78.19 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	42	42	5.4	U
11104-28-2	PCB-1221	1	42	42	9.5	U
11141-16-5	PCB-1232	1	42	42	11	U
53469-21-9	PCB-1242	1	86	86	21	U
12672-29-6	PCB-1248	1	42	42	6.8	U
11097-69-1	PCB-1254	1	42	42	5.6	U
11096-82-5	PCB-1260	1	86	86	20	U
37324-23-5	PCB-1262	1	42	42	6.7	U
11100-14-4	PCB-1268	1	42	42	5.6	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		42.6	30.1	71	60 - 125	
Tetrachloro-m-xylene		42.6	36.2	85	32 - 129	

* Values outside of QC limits

00314

ANALYSIS DATA SHEET

57SB4C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-08 File ID: A194011-0

Sampled: 01/11/08 13:00 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 18:40

Solids: 78.10 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	42	42	5.4	U
11104-28-2	PCB-1221	1	42	42	9.5	U
11141-16-5	PCB-1232	1	42	42	11	U
53469-21-9	PCB-1242	1	86	86	21	U
12672-29-6	PCB-1248	1	42	42	6.8	U
11097-69-1	PCB-1254	1	42	42	5.6	U
11096-82-5	PCB-1260	1	86	86	20	U
37324-23-5	PCB-1262	1	42	42	6.7	U
11100-14-4	PCB-1268	1	42	42	5.6	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		42.7	30.3	71	60 - 125	
Tetrachloro-m-xylene		42.7	37.0	87	32 - 129	

* Values outside of QC limits

00320

ANALYSIS DATA SHEET

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801233-09 File ID: A194012-0

Sampled: 01/11/08 00:00 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 19:05

Solids: 80.32 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	41	41	5.2	U
11104-28-2	PCB-1221	1	41	41	9.2	U
11141-16-5	PCB-1232	1	41	41	10	U
53469-21-9	PCB-1242	1	83	83	20	U
12672-29-6	PCB-1248	1	41	41	6.6	U
11097-69-1	PCB-1254	1	41	41	5.5	U
11096-82-5	PCB-1260	1	83	83	20	U
37324-23-5	PCB-1262	1	41	41	6.5	U
11100-14-4	PCB-1268	1	41	41	5.5	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		41.5	29.2	70	60 - 125	
Tetrachloro-m-xylene		41.5	36.1	87	32 - 129	

* Values outside of QC limits

00328

ANALYSIS DATA SHEET

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Water Laboratory ID: 0801250-01 File ID: A193290-0

Sampled: 01/14/08 14:30 Prepared: 01/17/08 07:55 Analyzed: 01/24/08 09:14

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1050 mL / 2 mL

QC Batch: 0800352 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.190	0.179	94	40 - 135	
Tetrachloro-m-xylene		0.190	0.139	73	36 - 114	

* Values outside of QC limits

00337

ANALYSIS DATA SHEET

57SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-01 File ID: A194013-0

Sampled: 01/14/08 12:55 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 19:30

Solids: 73.68 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	45	45	5.7	U
11104-28-2	PCB-1221	1	45	45	10	U
11141-16-5	PCB-1232	1	45	45	11	U
53469-21-9	PCB-1242	1	91	91	22	U
12672-29-6	PCB-1248	1	45	45	7.2	U
11097-69-1	PCB-1254	1	200	45	6.0	
11096-82-5	PCB-1260	1	73	91	22	J JJ
37324-23-5	PCB-1262	1	45	45	7.1	U
11100-14-4	PCB-1268	1	45	45	6.0	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		45.2	33.8	75	60 - 125	
Tetrachloro-m-xylene		45.2	39.9	88	32 - 129	

* Values outside of QC limits

00346

ANALYSIS DATA SHEET

57SB5AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-02 File ID: A194014-0

Sampled: 01/14/08 12:55 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 19:55

Solids: 75.19 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	44	44	5.6	U
11104-28-2	PCB-1221	1	44	44	9.8	U
11141-16-5	PCB-1232	1	44	44	11	U
53469-21-9	PCB-1242	1	89	89	22	U
12672-29-6	PCB-1248	1	44	44	7.0	U
11097-69-1	PCB-1254	1	130	44	5.9	JP
11096-82-5	PCB-1260	1	89	89	21	U
37324-23-5	PCB-1262	1	44	44	6.9	U
11100-14-4	PCB-1268	1	44	44	5.9	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	44.3	32.7	74	60 - 125	
Tetrachloro-m-xylene	44.3	40.2	91	32 - 129	

* Values outside of QC limits

20355

ANALYSIS DATA SHEET

57SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-03 File ID: A194015-0

Sampled: 01/14/08 14:00 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 20:20

Solids: 71.94 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	46	46	5.8	U
11104-28-2	PCB-1221	1	46	46	10	U
11141-16-5	PCB-1232	1	46	46	12	U
53469-21-9	PCB-1242	1	93	93	23	U
12672-29-6	PCB-1248	1	46	46	7.4	U
11097-69-1	PCB-1254	1	21	46	6.1	J
11096-82-5	PCB-1260	1	93	93	22	U
37324-23-5	PCB-1262	1	46	46	7.2	U
11100-14-4	PCB-1268	1	46	46	6.1	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		46.3	33.7	73	60 - 125	
Tetrachloro-m-xylene		46.3	40.0	86	32 - 129	

* Values outside of QC limits

0036

ANALYSIS DATA SHEET

57SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-04 File ID: A194019-0

Sampled: 01/14/08 14:10 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 22:01

Solids: 77.24 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	43	43	5.4	U
11104-28-2	PCB-1221	1	43	43	9.6	U
11141-16-5	PCB-1232	1	43	43	11	U
53469-21-9	PCB-1242	1	87	87	21	U
12672-29-6	PCB-1248	1	43	43	6.9	U
11097-69-1	PCB-1254	1	43	43	5.7	U
11096-82-5	PCB-1260	1	87	87	21	U
37324-23-5	PCB-1262	1	43	43	6.7	U
11100-14-4	PCB-1268	1	43	43	5.7	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		43.2	33.6	78	60 - 125	
Tetrachloro-m-xylene		43.2	37.7	87	32 - 129	

* Values outside of QC limits

00373

ANALYSIS DATA SHEET

DUP-6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-06 File ID: A194020-0

Sampled: 01/14/08 00:00 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 22:26

Solids: 74.13 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	45	45	5.7	U
11104-28-2	PCB-1221	1	45	45	10	U
11141-16-5	PCB-1232	1	45	45	11	U
53469-21-9	PCB-1242	1	90	90	22	U
12672-29-6	PCB-1248	1	45	45	7.1	U
11097-69-1	PCB-1254	1	250	45	5.9	J, F
11096-82-5	PCB-1260	1	90	90	21	U
37324-23-5	PCB-1262	1	45	45	7.0	U
11100-14-4	PCB-1268	1	45	45	5.9	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	45.0	33.7	75	60 - 125	
Tetrachloro-m-xylene	45.0	39.5	88	32 - 129	

* Values outside of QC limits

00382

ANALYSIS DATA SHEET

57SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-07 File ID: A194021-0

Sampled: 01/14/08 15:10 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 22:51

Solids: 71.41 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	46	46	5.9	U
11104-28-2	PCB-1221	1	46	46	10	U
11141-16-5	PCB-1232	1	46	46	12	U
53469-21-9	PCB-1242	1	94	94	23	U
12672-29-6	PCB-1248	1	46	46	7.4	U
11097-69-1	PCB-1254	1	290	46	6.2	
11096-82-5	PCB-1260	1	140	94	22	
37324-23-5	PCB-1262	1	46	46	7.3	U
11100-14-4	PCB-1268	1	46	46	6.2	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		46.7	34.6	74	60 - 125	
Tetrachloro-m-xylene		46.7	38.7	83	32 - 129	

* Values outside of QC limits

00351

ANALYSIS DATA SHEET

57SB8AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-08 File ID: A194022-0

Sampled: 01/14/08 15:10 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 23:16

Solids: 77.53 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	43	43	5.4	U
11104-28-2	PCB-1221	1	43	43	9.5	U
11141-16-5	PCB-1232	1	43	43	11	U
53469-21-9	PCB-1242	1	86	86	21	U
12672-29-6	PCB-1248	1	43	43	6.8	U
11097-69-1	PCB-1254	1	230	43	5.7	
11096-82-5	PCB-1260	1	86	86	21	U
37324-23-5	PCB-1262	1	43	43	6.7	U
11100-14-4	PCB-1268	1	43	43	5.7	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		43.0	35.3	82	60 - 125	
Tetrachloro-m-xylene		43.0	39.3	91	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

57SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-09 File ID: A194023-0

Sampled: 01/14/08 15:30 Prepared: 01/23/08 08:00 Analyzed: 01/24/08 23:41

Solids: 74.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800816 Sequence: 8012527 Calibration: 8A25009 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	45	45	5.7	U
11104-28-2	PCB-1221	1	45	45	10	U
11141-16-5	PCB-1232	1	45	45	11	U
53469-21-9	PCB-1242	1	91	91	22	U
12672-29-6	PCB-1248	1	45	45	7.2	U
11097-69-1	PCB-1254	1	79	45	5.9	J,Q
11096-82-5	PCB-1260	1	60	91	21	J
37324-23-5	PCB-1262	1	45	45	7.0	U
11100-14-4	PCB-1268	1	45	45	5.9	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		45.0	33.7	75	60 - 125	
Tetrachloro-m-xylene		45.0	37.0	82	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

57SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Soil Laboratory ID: 0801253-10 File ID: A194058-0

Sampled: 01/14/08 15:35 Prepared: 01/25/08 07:47 Analyzed: 01/25/08 14:32

Solids: 73.53 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0800927 Sequence: 8012603 Calibration: 8A26003 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	45	45	5.7	U
11104-28-2	PCB-1221	1	45	45	10	U
11141-16-5	PCB-1232	1	45	45	11	U
53469-21-9	PCB-1242	1	91	91	22	U
12672-29-6	PCB-1248	1	45	45	7.2	U
11097-69-1	PCB-1254	1	31	45	6.0	J
11096-82-5	PCB-1260	1	91	91	22	U
37324-23-5	PCB-1262	1	45	45	7.1	U
11100-14-4	PCB-1268	1	45	45	6.0	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		45.3	34.2	75	60 - 125	
Tetrachloro-m-xylene		45.3	38.9	86	32 - 129	

* Values outside of QC limits

aau18

SAMPLE ID SUMMARY

USEPA-8330

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-47

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB6A	0801213-10
57SB6AB	0801213-11
57SB6B	0801213-12
EQBK-4	0801230-01
57SB6C	0801233-01
57SB7A	0801233-02
57SB7AB	0801233-03
57SB7B	0801233-04
57SB7C	0801233-05
57SB4AB	0801233-06
57SB4B	0801233-07
57SB4C	0801233-08
DUP-5	0801233-09
EQBK-5	0801250-01
57SB5A	0801253-01
57SB5AB	0801253-02
57SB5B	0801253-03
57SB5C	0801253-04
DUP-6	0801253-06
57SB8A	0801253-07
57SB8AB	0801253-08
57SB8B	0801253-09
57SB8C	0801253-10

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-10 File ID: EXa005-0

Sampled: 01/10/08 15:40 Prepared: 01/22/08 07:37 Analyzed: 01/24/08 16:46

Solids: 28.65 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.63	105	57 - 139	

* Values outside of QC limits

0329

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB6AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-11 File ID: EXa006-0

Sampled: 01/10/08 15:40 Prepared: 01/22/08 07:37 Analyzed: 01/24/08 17:28

Solids: 77.38 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.56	102	57 - 139	

* Values outside of QC limits

03297

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-12 File ID: EXa007-0

Sampled: 01/10/08 17:00 Prepared: 01/22/08 07:37 Analyzed: 01/24/08 18:10

Solids: 69.91 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.51	101	57 - 139	

* Values outside of QC limits

03300

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

EQBK-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801230-01 File ID: expa006-0

Sampled: 01/11/08 13:40 Prepared: 01/16/08 07:45 Analyzed: 01/16/08 19:08

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0800520 Sequence: 8011728 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	6.49	5.80	89	29 - 138	

* Values outside of QC limits

03303

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-01 File ID: EXa008-0

Sampled: 01/11/08 08:15 Prepared: 01/22/08 07:37 Analyzed: 01/24/08 18:52

Solids: 73.67 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.57	103	57 - 139	

* Values outside of QC limits

03306

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-02 File ID: EXa009-0

Sampled: 01/11/08 09:05 Prepared: 01/22/08 07:37 Analyzed: 01/24/08 19:34

Solids: 37.36 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.63	105	57 - 139	

* Values outside of QC limits

03309

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB7AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-03 File ID: EXa010-0

Sampled: 01/11/08 09:05 Prepared: 01/22/08 07:37 Analyzed: 01/24/08 20:17

Solids: 71.69 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.60	104	57 - 139	

* Values outside of QC limits

033112

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-04 File ID: EXa011-0

Sampled: 01/11/08 09:10 Prepared: 01/22/08 07:37 Analyzed: 01/24/08 20:59

Solids: 80.43 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.36	94	57 - 139	

* Values outside of QC limits

03315

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-05 File ID: EXa012-0

Sampled: 01/11/08 10:05 Prepared: 01/22/08 07:37 Analyzed: 01/24/08 21:41

Solids: 69.25 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.45	98	57 - 139	

* Values outside of QC limits

03318

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB4AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-06 File ID: EXa014-0

Sampled: 01/11/08 12:05 Prepared: 01/22/08 07:37 Analyzed: 01/24/08 23:05

Solids: 76.38 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.54	102	57 - 139	

* Values outside of QC limits

83321

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-07 File ID: EXa015-0

Sampled: 01/11/08 12:40 Prepared: 01/22/08 07:37 Analyzed: 01/24/08 23:47

Solids: 78.19 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.31	92	57 - 139	

* Values outside of QC limits

03324

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB4C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-08 File ID: EXa016-0

Sampled: 01/11/08 13:00 Prepared: 01/22/08 07:37 Analyzed: 01/25/08 00:29

Solids: 78.10 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.45	98	57 - 139	

* Values outside of QC limits

03327

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-09 File ID: EXa017-0

Sampled: 01/11/08 00:00 Prepared: 01/22/08 07:37 Analyzed: 01/25/08 01:12

Solids: 80.32 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.41	96	57 - 139	

* Values outside of QC limits

03330

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801250-01 File ID: expa007-0

Sampled: 01/14/08 14:30 Prepared: 01/16/08 07:45 Analyzed: 01/16/08 19:45

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0800520 Sequence: 8011728 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	6.49	4.83	74	29 - 138	

* Values outside of QC limits

03333

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-01 File ID: EXa018-0

Sampled: 01/14/08 12:55 Prepared: 01/22/08 07:37 Analyzed: 01/25/08 01:54

Solids: 73.68 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.26	91	57 - 139	

* Values outside of QC limits

03336

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB5AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-02 File ID: EXa019-0

Sampled: 01/14/08 12:55 Prepared: 01/22/08 07:37 Analyzed: 01/25/08 02:36

Solids: 75.19 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.50	100	57 - 139	

* Values outside of QC limits

03339

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-03 File ID: EXa020-0

Sampled: 01/14/08 14:00 Prepared: 01/22/08 07:37 Analyzed: 01/25/08 03:18

Solids: 71.94 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.45	98	57 - 139	

* Values outside of QC limits

03342

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-04 File ID: EXa021-0

Sampled: 01/14/08 14:10 Prepared: 01/22/08 07:37 Analyzed: 01/25/08 04:00

Solids: 77.24 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.31	93	57 - 139	

* Values outside of QC limits

033345

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-06 File ID: EXa022-0

Sampled: 01/14/08 00:00 Prepared: 01/22/08 07:37 Analyzed: 01/25/08 04:42

Solids: 74.13 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.40	96	57 - 139	

* Values outside of QC limits

03348

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-07 File ID: EXa023-0

Sampled: 01/14/08 15:10 Prepared: 01/22/08 07:37 Analyzed: 01/25/08 05:24

Solids: 71.41 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.46	98	57 - 139	

* Values outside of QC limits

033351

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB8AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-08 File ID: EXa025-0

Sampled: 01/14/08 15:10 Prepared: 01/22/08 07:37 Analyzed: 01/25/08 06:49

Solids: 77.53 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.61	104	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-09 File ID: EXa026-0

Sampled: 01/14/08 15:30 Prepared: 01/22/08 07:37 Analyzed: 01/25/08 07:31

Solids: 74.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800457 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.32	93	57 - 139	

* Values outside of QC limits

03355

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-10 File ID: EXa032-0

Sampled: 01/14/08 15:35 Prepared: 01/22/08 15:21 Analyzed: 01/25/08 11:44

Solids: 73.53 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800502 Sequence: 8012531 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.33	93	57 - 139	

* Values outside of QC limits

03358

SAMPLE ID SUMMARY

USEPA-8332

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-47

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB6A	0801213-10
57SB6AB	0801213-11
57SB6B	0801213-12
EQBK-4	0801230-01
57SB6C	0801233-01
57SB7A	0801233-02
57SB7AB	0801233-03
57SB7B	0801233-04
57SB7C	0801233-05
57SB4AB	0801233-06
57SB4B	0801233-07
57SB4C	0801233-08
DUP-5	0801233-09
EQBK-5	0801250-01
57SB5A	0801253-01
57SB5AB	0801253-02
57SB5B	0801253-03
57SB5C	0801253-04
DUP-6	0801253-06
57SB8A	0801253-07
57SB8AB	0801253-08
57SB8B	0801253-09
57SB8C	0801253-10

63457

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-10 File ID: data005-0

Sampled: 01/10/08 15:40 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 09:14

Solids: 28.65 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.66	108	50 - 150	

* Values outside of QC limits

03480

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB6AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-11 File ID: data006-0

Sampled: 01/10/08 15:40 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 09:31

Solids: 77.38 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.72	110	50 - 150	

* Values outside of QC limits

69482

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801213-12 File ID: data007-0

Sampled: 01/10/08 17:00 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 09:48

Solids: 69.91 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.74	111	50 - 150	

* Values outside of QC limits

0S4S4

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

EQBK-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801230-01 File ID: expa032-0

Sampled: 01/11/08 13:40 Prepared: 01/16/08 07:46 Analyzed: 01/17/08 18:31

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0800521 Sequence: 8011841 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.44	107	50 - 150	

* Values outside of QC limits

03486

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-01 File ID: data008-0

Sampled: 01/11/08 08:15 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 10:05

Solids: 73.67 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.73	110	50 - 150	

* Values outside of QC limits

93489

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-02 File ID: data009-0

Sampled: 01/11/08 09:05 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 10:23

Solids: 37.36 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.70	109	50 - 150	

* Values outside of QC limits

03491

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB7AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-03 File ID: data010-0

Sampled: 01/11/08 09:05 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 10:40

Solids: 71.69 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.71	110	50 - 150	

* Values outside of QC limits

0453

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-04 File ID: data011-0

Sampled: 01/11/08 09:10 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 10:57

Solids: 80.43 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.74	111	50 - 150	

* Values outside of QC limits

0495

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-05 File ID: data012-0

Sampled: 01/11/08 10:05 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 11:15

Solids: 69.25 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.74	111	50 - 150	

* Values outside of QC limits

G3497

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB4AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-06 File ID: data014-0

Sampled: 01/11/08 12:05 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 11:49

Solids: 76.38 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.73	110	50 - 150	

* Values outside of QC limits

03499

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB4B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-07 File ID: data015-0

Sampled: 01/11/08 12:40 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 12:06

Solids: 78.19 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.73	110	50 - 150	

* Values outside of QC limits

6350i

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB4C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-08 File ID: data016-0

Sampled: 01/11/08 13:00 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 12:24

Solids: 78.10 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.71	109	50 - 150	

* Values outside of QC limits

03503

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801233-09 File ID: data017-0

Sampled: 01/11/08 00:00 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 12:41

Solids: 80.32 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.72	110	50 - 150	

* Values outside of QC limits

03505

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801250-01 File ID: expa033-0

Sampled: 01/14/08 14:30 Prepared: 01/16/08 07:46 Analyzed: 01/17/08 18:53

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0800521 Sequence: 8011841 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.44	107	50 - 150	

* Values outside of QC limits

03507

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-01 File ID: data018-0

Sampled: 01/14/08 12:55 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 12:58

Solids: 73.68 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.71	109	50 - 150	

* Values outside of QC limits

03516

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB5AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-02 File ID: data019-0

Sampled: 01/14/08 12:55 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 13:16

Solids: 75.19 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.72	110	50 - 150	

* Values outside of QC limits

03512

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-03 File ID: data020-0

Sampled: 01/14/08 14:00 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 13:33

Solids: 71.94 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.71	109	50 - 150	

* Values outside of QC limits

03514

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-04 File ID: data021-0

Sampled: 01/14/08 14:10 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 13:50

Solids: 77.24 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.73	110	50 - 150	

* Values outside of QC limits

03516

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

DUP-6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-06 File ID: data022-0

Sampled: 01/14/08 00:00 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 14:07

Solids: 74.13 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.74	111	50 - 150	

* Values outside of QC limits

03518

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-07 File ID: data023-0

Sampled: 01/14/08 15:10 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 14:25

Solids: 71.41 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.74	111	50 - 150	

* Values outside of QC limits

03520

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB8AB

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-08 File ID: data025-0

Sampled: 01/14/08 15:10 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 14:59

Solids: 77.53 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.73	110	50 - 150	

* Values outside of QC limits

03522

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-09 File ID: data026-0

Sampled: 01/14/08 15:30 Prepared: 01/22/08 07:36 Analyzed: 01/23/08 15:16

Solids: 74.00 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800456 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.70	109	50 - 150	

* Values outside of QC limits

03524

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0801253-10 File ID: data032-0

Sampled: 01/14/08 15:35 Prepared: 01/22/08 07:47 Analyzed: 01/23/08 17:00

Solids: 73.53 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0800522 Sequence: 8012435 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry wt	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry wt	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.73	110	50 - 150	

* Values outside of QC limits

03526

SAMPLE ID SUMMARY

USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-47

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB14A	0801213-01
57SB14B	0801213-02
57SB14C	0801213-03
57SB1AB	0801213-04
DUP-4	0801213-05
57SB9A	0801213-06
57SB9AB	0801213-07
EQBK-3	0801213-08
57SB6A	0801213-10
57SB6AB	0801213-11
57SB6B	0801213-12
EQBK-4	0801230-01
57SB6C	0801233-01
57SB7A	0801233-02
57SB7AB	0801233-03
57SB7B	0801233-04
57SB7C	0801233-05
57SB4AB	0801233-06
57SB4B	0801233-07
57SB4C	0801233-08
DUP-5	0801233-09
EQBK-5	0801250-01
57SB5A	0801253-01
57SB5AB	0801253-02
57SB5B	0801253-03
57SB5C	0801253-04
DUP-6	0801253-06
57SB8A	0801253-07
57SB8AB	0801253-08
57SB8B	0801253-09
57SB8C	0801253-10

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB14A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 08:10
Solids: 86.34
Laboratory ID: 0801213-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:15
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0800541

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	12000	mg/kg dry wt.	100	1000	210		01/22/08 15:34	J, S
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	1.0	0.17		01/18/08 10:35	
7440-41-7	Beryllium, Total	0.80	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 10:35	
7440-43-9	Cadmium, Total	0.25	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 10:35	B, P
7440-70-2	Calcium, Total	500	mg/kg dry wt.	1	50	4.2		01/18/08 10:35	
7440-47-3	Chromium, Total	19	mg/kg dry wt.	1	5.0	0.72		01/18/08 10:35	
7440-48-4	Cobalt, Total	5.1	mg/kg dry wt.	1	2.0	0.37		01/18/08 10:35	
7439-89-6	Iron, Total	14000	mg/kg dry wt.	200	2000	95		01/22/08 15:22	
7439-95-4	Magnesium, Total	650	mg/kg dry wt.	1	50	5.0		01/18/08 10:35	
7439-96-5	Manganese, Total	930	mg/kg dry wt.	10	10	1.6		01/23/08 11:07	
7440-09-7	Potassium, Total	550	mg/kg dry wt.	1	50	5.3		01/18/08 10:35	
7440-23-5	Sodium, Total	38	mg/kg dry wt.	1	100	13	J	01/18/08 10:35	B, P
7440-66-6	Zinc, Total	35	mg/kg dry wt.	1	5.0	1.0		01/18/08 10:35	

03625

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB14B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 08:25
Solids: 79.37
Laboratory ID: 0801213-02

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:15
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0800541

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	28000	mg/kg dry wt.	1	10	2.1		01/18/08 11:07	J, S
7440-39-3	Barium, Total	47	mg/kg dry wt.	1	1.0	0.17		01/18/08 11:07	
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.021		01/18/08 11:07	
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 11:07	
7440-70-2	Calcium, Total	69	mg/kg dry wt.	1	50	4.2		01/18/08 11:07	
7440-47-3	Chromium, Total	23	mg/kg dry wt.	1	5.0	0.72		01/18/08 11:07	
7440-48-4	Cobalt, Total	6.9	mg/kg dry wt.	1	2.0	0.37		01/18/08 11:07	
7439-89-6	Iron, Total	33000	mg/kg dry wt.	1	10	0.48		01/18/08 11:07	
7439-95-4	Magnesium, Total	1000	mg/kg dry wt.	1	50	5.0		01/18/08 11:07	
7439-96-5	Manganese, Total	260	mg/kg dry wt.	1	1.0	0.16		01/18/08 11:07	
7440-09-7	Potassium, Total	1100	mg/kg dry wt.	1	50	5.3		01/18/08 11:07	
7440-23-5	Sodium, Total	50	mg/kg dry wt.	1	100	13	J	01/18/08 11:07	B, P
7440-66-6	Zinc, Total	41	mg/kg dry wt.	1	5.0	1.0		01/18/08 11:07	

036326

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB14C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 09:07
Solids: 72.10
Laboratory ID: 0801213-03

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:15
Initial/Final: 0.5 g / 50 mL
QC Batch: 0800541

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	30000	mg/kg dry wt.	1	10	2.1		01/18/08 11:11	J,S
7440-39-3	Barium, Total	57	mg/kg dry wt.	1	1.0	0.17		01/18/08 11:11	
7440-41-7	Beryllium, Total	3.0	mg/kg dry wt.	1	1.0	0.021		01/18/08 11:11	
7440-43-9	Cadmium, Total	0.29	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 11:11	B,P
7440-70-2	Calcium, Total	190	mg/kg dry wt.	1	50	4.2		01/18/08 11:11	
7440-47-3	Chromium, Total	40	mg/kg dry wt.	1	5.0	0.72		01/18/08 11:11	
7440-48-4	Cobalt, Total	18	mg/kg dry wt.	1	2.0	0.37		01/18/08 11:11	
7439-89-6	Iron, Total	36000	mg/kg dry wt.	1	10	0.48		01/18/08 11:11	
7439-95-4	Magnesium, Total	8500	mg/kg dry wt.	1	50	5.0		01/18/08 11:11	
7439-96-5	Manganese, Total	550	mg/kg dry wt.	1	1.0	0.16		01/18/08 11:11	
7440-09-7	Potassium, Total	3000	mg/kg dry wt.	1	50	5.3		01/18/08 11:11	
7440-23-5	Sodium, Total	73	mg/kg dry wt.	1	100	13	J	01/18/08 11:11	B,P
7440-66-6	Zinc, Total	55	mg/kg dry wt.	1	5.0	1.0		01/18/08 11:11	

85627

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB1AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 10:55
Solids: 77.72
Laboratory ID: 0801213-04

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:15
Initial/Final: 0.4995 g / 50 mL
QC Batch: 0800541

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	26000	mg/kg dry wt.	1	10	2.1		01/18/08 11:16	J,S
7440-39-3	Barium, Total	49	mg/kg dry wt.	1	1.0	0.17		01/18/08 11:16	
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.021		01/18/08 11:16	
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 11:16	
7440-70-2	Calcium, Total	710	mg/kg dry wt.	1	50	4.2		01/18/08 11:16	
7440-47-3	Chromium, Total	24	mg/kg dry wt.	1	5.0	0.72		01/18/08 11:16	
7440-48-4	Cobalt, Total	4.1	mg/kg dry wt.	1	2.0	0.37		01/18/08 11:16	
7439-89-6	Iron, Total	34000	mg/kg dry wt.	1	10	0.48		01/18/08 11:16	
7439-95-4	Magnesium, Total	1200	mg/kg dry wt.	1	50	5.0		01/18/08 11:16	
7439-96-5	Manganese, Total	180	mg/kg dry wt.	1	1.0	0.16		01/18/08 11:16	
7440-09-7	Potassium, Total	950	mg/kg dry wt.	1	50	5.3		01/18/08 11:16	
7440-23-5	Sodium, Total	48	mg/kg dry wt.	1	100	13	J	01/18/08 11:16	B,P
7440-66-6	Zinc, Total	40	mg/kg dry wt.	1	5.0	1.0		01/18/08 11:16	

03628

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 12:00
Solids: 77.38
Laboratory ID: 0801213-05

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:15
Initial/Final: 0.4997 g / 50 mL
QC Batch: 0800541

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	28000	mg/kg dry wt.	1	10	2.1		01/18/08 11:20	J, S
7440-39-3	Barium, Total	45	mg/kg dry wt.	1	1.0	0.17		01/18/08 11:20	
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.021		01/18/08 11:20	
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 11:20	
7440-70-2	Calcium, Total	490	mg/kg dry wt.	1	50	4.2		01/18/08 11:20	
7440-47-3	Chromium, Total	25	mg/kg dry wt.	1	5.0	0.72		01/18/08 11:20	
7440-48-4	Cobalt, Total	3.5	mg/kg dry wt.	1	2.0	0.37		01/18/08 11:20	
7439-89-6	Iron, Total	37000	mg/kg dry wt.	1	10	0.48		01/18/08 11:20	
7439-95-4	Magnesium, Total	1100	mg/kg dry wt.	1	50	5.0		01/18/08 11:20	
7439-96-5	Manganese, Total	170	mg/kg dry wt.	1	1.0	0.16		01/18/08 11:20	
7440-09-7	Potassium, Total	1000	mg/kg dry wt.	1	50	5.3		01/18/08 11:20	
7440-23-5	Sodium, Total	52	mg/kg dry wt.	1	100	13	J	01/18/08 11:20	B, P
7440-66-6	Zinc, Total	43	mg/kg dry wt.	1	5.0	1.0		01/18/08 11:20	

03529

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 12:55
Solids: 85.84
Laboratory ID: 0801213-06

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:15
Initial/Final: 0.4998 g / 50 mL
QC Batch: 0800541

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	18000	mg/kg dry wt.	1	10	2.1		01/18/08 11:24	J,S
7440-39-3	Barium, Total	95	mg/kg dry wt.	1	1.0	0.17		01/18/08 11:24	
7440-41-7	Beryllium, Total	0.86	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 11:24	
7440-43-9	Cadmium, Total	0.16	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 11:24	B,P
7440-70-2	Calcium, Total	2300	mg/kg dry wt.	1	50	4.2		01/18/08 11:24	
7440-47-3	Chromium, Total	23	mg/kg dry wt.	1	5.0	0.72		01/18/08 11:24	
7440-48-4	Cobalt, Total	5.8	mg/kg dry wt.	1	2.0	0.37		01/18/08 11:24	
7439-89-6	Iron, Total	19000	mg/kg dry wt.	1	10	0.48		01/18/08 11:24	
7439-95-4	Magnesium, Total	1700	mg/kg dry wt.	1	50	5.0		01/18/08 11:24	
7439-96-5	Manganese, Total	630	mg/kg dry wt.	1	1.0	0.16		01/18/08 11:24	
7440-09-7	Potassium, Total	740	mg/kg dry wt.	1	50	5.3		01/18/08 11:24	
7440-23-5	Sodium, Total	50	mg/kg dry wt.	1	100	13	J	01/18/08 11:24	B,P
7440-66-6	Zinc, Total	38	mg/kg dry wt.	1	5.0	1.0		01/18/08 11:24	

03630

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB9AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 13:30
Solids: 79.97
Laboratory ID: 0801213-07

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:15
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0800541

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	26000	mg/kg dry wt.	1	10	2.1		01/18/08 11:29	J, S
7440-39-3	Barium, Total	48	mg/kg dry wt.	1	1.0	0.17		01/18/08 11:29	
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.021		01/18/08 11:29	
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/18/08 11:29	
7440-70-2	Calcium, Total	68	mg/kg dry wt.	1	50	4.2		01/18/08 11:29	
7440-47-3	Chromium, Total	26	mg/kg dry wt.	1	5.0	0.72		01/18/08 11:29	
7440-48-4	Cobalt, Total	3.3	mg/kg dry wt.	1	2.0	0.37		01/18/08 11:29	
7439-89-6	Iron, Total	36000	mg/kg dry wt.	1	10	0.48		01/18/08 11:29	
7439-95-4	Magnesium, Total	1100	mg/kg dry wt.	1	50	5.0		01/18/08 11:29	
7439-96-5	Manganese, Total	140	mg/kg dry wt.	1	1.0	0.16		01/18/08 11:29	
7440-09-7	Potassium, Total	1100	mg/kg dry wt.	1	50	5.3		01/18/08 11:29	
7440-23-5	Sodium, Total	59	mg/kg dry wt.	1	100	13	J	01/18/08 11:29	B, P
7440-66-6	Zinc, Total	38	mg/kg dry wt.	1	5.0	1.0		01/18/08 11:29	

03531

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

EQBK-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/10/08 14:10
Solids: 0.00
Laboratory ID: 0801213-08

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3010A Digestion
Prepared: 01/18/08 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0800636

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	01/22/08 11:00
7440-70-2	Calcium, Total	200	ug/L	1	500	40	J	01/22/08 11:00
7439-89-6	Iron, Total	18	ug/L	1	20	5.7	J	01/23/08 08:28
7439-95-4	Magnesium, Total	500	ug/L	1	500	38	U	01/22/08 11:00
7440-09-7	Potassium, Total	200	ug/L	1	200	54	U	01/22/08 11:00
7440-23-5	Sodium, Total	500	ug/L	1	500	84	U	01/22/08 11:00

03692

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 15:40
Solids: 28.65
Laboratory ID: 0801213-10

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:15
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0800541

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	23000	mg/kg dry wt.	1	10	2.1		01/18/08 11:42
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17		01/18/08 11:42
7440-41-7	Beryllium, Total	0.86	mg/kg dry wt.	1	1.0	0.021	J	01/18/08 11:42
7440-43-9	Cadmium, Total	51	mg/kg dry wt.	1	2.0	0.11		01/18/08 11:42
7440-70-2	Calcium, Total	3500	mg/kg dry wt.	1	50	4.2		01/18/08 11:42
7440-47-3	Chromium, Total	370	mg/kg dry wt.	1	5.0	0.72		01/18/08 11:42
7440-48-4	Cobalt, Total	6.1	mg/kg dry wt.	1	2.0	0.37		01/18/08 11:42
7439-89-6	Iron, Total	24000	mg/kg dry wt.	1	10	0.48		01/18/08 11:42
7439-95-4	Magnesium, Total	1400	mg/kg dry wt.	1	50	5.0		01/18/08 11:42
7439-96-5	Manganese, Total	670	mg/kg dry wt.	1	1.0	0.16		01/18/08 11:42
7440-09-7	Potassium, Total	1200	mg/kg dry wt.	1	50	5.3		01/18/08 11:42
7440-23-5	Sodium, Total	160	mg/kg dry wt.	1	100	13		01/18/08 11:42
7440-66-6	Zinc, Total	1700	mg/kg dry wt.	1	5.0	1.0		01/18/08 11:42

J, S

03633

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB6AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 15:40
Solids: 77.38
Laboratory ID: 0801213-11

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:15
Initial/Final: 0.4996 g / 50 mL
QC Batch: 0800541

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	28000	mg/kg dry wt.	1	10	2.1		01/18/08 11:47	I,S
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17		01/18/08 11:47	
7440-41-7	Beryllium, Total	1.5	mg/kg dry wt.	1	1.0	0.021		01/18/08 11:47	
7440-43-9	Cadmium, Total	0.12	mg/kg dry wt.	1	2.0	0.11	J	01/18/08 11:47	B,P
7440-70-2	Calcium, Total	730	mg/kg dry wt.	1	50	4.2		01/18/08 11:47	
7440-47-3	Chromium, Total	30	mg/kg dry wt.	1	5.0	0.72		01/18/08 11:47	
7440-48-4	Cobalt, Total	51	mg/kg dry wt.	1	2.0	0.37		01/18/08 11:47	
7439-89-6	Iron, Total	67000	mg/kg dry wt.	10	100	4.8		01/23/08 11:29	
7439-95-4	Magnesium, Total	920	mg/kg dry wt.	1	50	5.0		01/18/08 11:47	
7439-96-5	Manganese, Total	7700	mg/kg dry wt.	1	1.0	0.16		01/18/08 11:47	
7440-09-7	Potassium, Total	1100	mg/kg dry wt.	1	50	5.3		01/18/08 11:47	
7440-23-5	Sodium, Total	220	mg/kg dry wt.	1	100	13		01/18/08 11:47	
7440-66-6	Zinc, Total	50	mg/kg dry wt.	1	5.0	1.0		01/18/08 11:47	

0634

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB6B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 17:00
Solids: 69.91
Laboratory ID: 0801213-12

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:15
Initial/Final: 0.5 g / 50 mL
QC Batch: 0800541

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7429-90-5	Aluminum, Total	28000	mg/kg dry wt.	1	10	2.1		01/18/08 11:51	J,S
7440-39-3	Barium, Total	69	mg/kg dry wt.	1	1.0	0.17		01/18/08 11:51	
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.021		01/18/08 11:51	
7440-43-9	Cadmium, Total	2.5	mg/kg dry wt.	1	2.0	0.11		01/18/08 11:51	
7440-70-2	Calcium, Total	120	mg/kg dry wt.	1	50	4.2		01/18/08 11:51	
7440-47-3	Chromium, Total	39	mg/kg dry wt.	1	5.0	0.72		01/18/08 11:51	
7440-48-4	Cobalt, Total	16	mg/kg dry wt.	1	2.0	0.37		01/18/08 11:51	
7439-89-6	Iron, Total	38000	mg/kg dry wt.	1	10	0.48		01/18/08 11:51	
7439-95-4	Magnesium, Total	930	mg/kg dry wt.	1	50	5.0		01/18/08 11:51	
7439-96-5	Manganese, Total	1900	mg/kg dry wt.	1	1.0	0.16		01/18/08 11:51	
7440-09-7	Potassium, Total	920	mg/kg dry wt.	1	50	5.3		01/18/08 11:51	
7440-23-5	Sodium, Total	910	mg/kg dry wt.	1	100	13		01/18/08 11:51	
7440-66-6	Zinc, Total	130	mg/kg dry wt.	1	5.0	1.0		01/18/08 11:51	

03635

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

EQBK-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/11/08 13:40
Solids: 0.00
Laboratory ID: 0801230-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3010A Digestion
Prepared: 01/18/08 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0800636

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	01/22/08 11:04
7440-70-2	Calcium, Total	180	ug/L	1	500	40	J	01/22/08 11:04
7439-89-6	Iron, Total	20	ug/L	1	20	5.7	U	01/23/08 08:31
7439-95-4	Magnesium, Total	500	ug/L	1	500	38	U	01/22/08 11:04
7440-09-7	Potassium, Total	200	ug/L	1	200	54	U	01/22/08 11:04
7440-23-5	Sodium, Total	500	ug/L	1	500	84	U	01/22/08 11:04

03636

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB6C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 08:15
Solids: 73.67
Laboratory ID: 0801233-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	18000	mg/kg dry wt.	1	10	2.1		01/23/08 11:42 J,S
7440-39-3	Barium, Total	59	mg/kg dry wt.	1	1.0	0.17		01/23/08 11:42
7440-41-7	Beryllium, Total	1.8	mg/kg dry wt.	1	1.0	0.021		01/23/08 11:42
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/23/08 11:42
7440-70-2	Calcium, Total	110	mg/kg dry wt.	1	50	4.2		01/23/08 11:42
7440-47-3	Chromium, Total	33	mg/kg dry wt.	1	5.0	0.72		01/23/08 11:42
7440-48-4	Cobalt, Total	23	mg/kg dry wt.	1	2.0	0.37		01/23/08 11:42
7439-89-6	Iron, Total	35000	mg/kg dry wt.	1	10	0.48		01/23/08 11:42
7439-95-4	Magnesium, Total	1200	mg/kg dry wt.	1	50	5.0		01/23/08 11:42
7439-96-5	Manganese, Total	910	mg/kg dry wt.	1	1.0	0.16		01/23/08 11:42
7440-09-7	Potassium, Total	1300	mg/kg dry wt.	1	50	5.3		01/23/08 11:42
7440-23-5	Sodium, Total	870	mg/kg dry wt.	1	100	13		01/24/08 15:13
7440-66-6	Zinc, Total	27	mg/kg dry wt.	1	5.0	1.0		01/23/08 11:42

03657

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 09:05
Solids: 37.36
Laboratory ID: 0801233-02

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.4997 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	28000	mg/kg dry wt.	1	10	2.1		01/23/08 11:46
7440-39-3	Barium, Total	220	mg/kg dry wt.	1	1.0	0.17		01/23/08 11:46
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.021		01/23/08 11:46
7440-43-9	Cadmium, Total	120	mg/kg dry wt.	1	2.0	0.11		01/23/08 11:46
7440-70-2	Calcium, Total	2900	mg/kg dry wt.	1	50	4.2		01/23/08 11:46
7440-47-3	Chromium, Total	1500	mg/kg dry wt.	1	5.0	0.72		01/23/08 11:46
7440-48-4	Cobalt, Total	5.2	mg/kg dry wt.	1	2.0	0.37		01/23/08 11:46
7439-89-6	Iron, Total	29000	mg/kg dry wt.	1	10	0.48		01/23/08 11:46
7439-95-4	Magnesium, Total	1600	mg/kg dry wt.	1	50	5.0		01/23/08 11:46
7439-96-5	Manganese, Total	170	mg/kg dry wt.	1	1.0	0.16		01/23/08 11:46
7440-09-7	Potassium, Total	1000	mg/kg dry wt.	1	50	5.3		01/23/08 11:46
7440-23-5	Sodium, Total	250	mg/kg dry wt.	1	100	13		01/24/08 15:18
7440-66-6	Zinc, Total	3700	mg/kg dry wt.	1	5.0	1.0		01/23/08 11:46

J,S

03638

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB7AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 09:05
Solids: 71.69
Laboratory ID: 0801233-03

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	38000	mg/kg dry wt.	1	10	2.1		01/23/08 11:59
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	1.0	0.17		01/23/08 11:59
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.021		01/23/08 11:59
7440-43-9	Cadmium, Total	0.24	mg/kg dry wt.	1	2.0	0.11	J	01/23/08 11:59
7440-70-2	Calcium, Total	1500	mg/kg dry wt.	1	50	4.2		01/23/08 11:59
7440-47-3	Chromium, Total	46	mg/kg dry wt.	1	5.0	0.72		01/23/08 11:59
7440-48-4	Cobalt, Total	16	mg/kg dry wt.	1	2.0	0.37		01/23/08 11:59
7439-89-6	Iron, Total	51000	mg/kg dry wt.	10	100	4.8		01/23/08 15:10
7439-95-4	Magnesium, Total	880	mg/kg dry wt.	1	50	5.0		01/23/08 11:59
7439-96-5	Manganese, Total	2800	mg/kg dry wt.	1	1.0	0.16		01/23/08 11:59
7440-09-7	Potassium, Total	960	mg/kg dry wt.	1	50	5.3		01/23/08 11:59
7440-23-5	Sodium, Total	190	mg/kg dry wt.	1	100	13		01/24/08 10:54
7440-66-6	Zinc, Total	82	mg/kg dry wt.	1	5.0	1.0		01/23/08 11:59

J,S

03639

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 09:10
Solids: 80.43
Laboratory ID: 0801233-04

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	20000	mg/kg dry wt.	1	10	2.1		01/23/08 12:04
7440-39-3	Barium, Total	53	mg/kg dry wt.	1	1.0	0.17		01/23/08 12:04
7440-41-7	Beryllium, Total	1.2	mg/kg dry wt.	1	1.0	0.021		01/23/08 12:04
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/23/08 12:04
7440-70-2	Calcium, Total	350	mg/kg dry wt.	1	50	4.2		01/23/08 12:04
7440-47-3	Chromium, Total	23	mg/kg dry wt.	1	5.0	0.72		01/23/08 12:04
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	2.0	0.37		01/23/08 12:04
7439-89-6	Iron, Total	68000	mg/kg dry wt.	10	100	4.8		01/23/08 15:15
7439-95-4	Magnesium, Total	510	mg/kg dry wt.	1	50	5.0		01/23/08 12:04
7439-96-5	Manganese, Total	1200	mg/kg dry wt.	1	1.0	0.16		01/23/08 12:04
7440-09-7	Potassium, Total	730	mg/kg dry wt.	1	50	5.3		01/23/08 12:04
7440-23-5	Sodium, Total	310	mg/kg dry wt.	1	100	13		01/24/08 10:58
7440-66-6	Zinc, Total	26	mg/kg dry wt.	1	5.0	1.0		01/23/08 12:04

J/S

03648

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 10:05
Solids: 69.25
Laboratory ID: 0801233-05

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5002 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	28000	mg/kg dry wt.	1	10	2.1		01/23/08 12:09
7440-39-3	Barium, Total	52	mg/kg dry wt.	1	1.0	0.17		01/23/08 12:09
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.021		01/23/08 12:09
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/23/08 12:09
7440-70-2	Calcium, Total	190	mg/kg dry wt.	1	50	4.2		01/23/08 12:09
7440-47-3	Chromium, Total	50	mg/kg dry wt.	1	5.0	0.72		01/23/08 12:09
7440-48-4	Cobalt, Total	11	mg/kg dry wt.	1	2.0	0.37		01/23/08 12:09
7439-89-6	Iron, Total	35000	mg/kg dry wt.	1	10	0.48		01/23/08 12:09
7439-95-4	Magnesium, Total	2900	mg/kg dry wt.	1	50	5.0		01/23/08 12:09
7439-96-5	Manganese, Total	280	mg/kg dry wt.	1	1.0	0.16		01/23/08 12:09
7440-09-7	Potassium, Total	1900	mg/kg dry wt.	1	50	5.3		01/23/08 12:09
7440-23-5	Sodium, Total	190	mg/kg dry wt.	1	100	13		01/24/08 11:03
7440-66-6	Zinc, Total	25	mg/kg dry wt.	1	5.0	1.0		01/23/08 12:09

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056141

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB4AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 12:05
Solids: 76.38
Laboratory ID: 0801233-06

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.4996 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	26000	mg/kg dry wt.	1	10	2.1		01/23/08 12:13
7440-39-3	Barium, Total	54	mg/kg dry wt.	1	1.0	0.17		01/23/08 12:13
7440-41-7	Beryllium, Total	0.80	mg/kg dry wt.	1	1.0	0.021	J	01/23/08 12:13
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/23/08 12:13
7440-70-2	Calcium, Total	730	mg/kg dry wt.	1	50	4.2		01/23/08 12:13
7440-47-3	Chromium, Total	23	mg/kg dry wt.	1	5.0	0.72		01/23/08 12:13
7440-48-4	Cobalt, Total	4.0	mg/kg dry wt.	1	2.0	0.37		01/23/08 12:13
7439-89-6	Iron, Total	29000	mg/kg dry wt.	1	10	0.48		01/23/08 12:13
7439-95-4	Magnesium, Total	830	mg/kg dry wt.	1	50	5.0		01/23/08 12:13
7439-96-5	Manganese, Total	300	mg/kg dry wt.	1	1.0	0.16		01/23/08 12:13
7440-09-7	Potassium, Total	840	mg/kg dry wt.	1	50	5.3		01/23/08 12:13
7440-23-5	Sodium, Total	120	mg/kg dry wt.	1	100	13		01/24/08 11:08
7440-66-6	Zinc, Total	35	mg/kg dry wt.	1	5.0	1.0		01/23/08 12:13

J/S

83642

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB4B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 12:40
Solids: 78.19
Laboratory ID: 0801233-07

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	18000	mg/kg dry wt.	1	10	2.1		01/23/08 12:18
7440-39-3	Barium, Total	48	mg/kg dry wt.	1	1.0	0.17		01/23/08 12:18
7440-41-7	Beryllium, Total	1.8	mg/kg dry wt.	1	1.0	0.021		01/23/08 12:18
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/23/08 12:18
7440-70-2	Calcium, Total	480	mg/kg dry wt.	1	50	4.2		01/23/08 12:18
7440-47-3	Chromium, Total	33	mg/kg dry wt.	1	5.0	0.72		01/23/08 12:18
7440-48-4	Cobalt, Total	14	mg/kg dry wt.	1	2.0	0.37		01/23/08 12:18
7439-89-6	Iron, Total	87000	mg/kg dry wt.	10	100	4.8		01/23/08 15:19
7439-95-4	Magnesium, Total	520	mg/kg dry wt.	1	50	5.0		01/23/08 12:18
7439-96-5	Manganese, Total	990	mg/kg dry wt.	1	1.0	0.16		01/23/08 12:18
7440-09-7	Potassium, Total	720	mg/kg dry wt.	1	50	5.3		01/23/08 12:18
7440-23-5	Sodium, Total	180	mg/kg dry wt.	1	100	13		01/24/08 11:12
7440-66-6	Zinc, Total	24	mg/kg dry wt.	1	5.0	1.0		01/23/08 12:18

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03643

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB4C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 13:00
Solids: 78.10
Laboratory ID: 0801233-08

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5002 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	12000	mg/kg dry wt.	1	10	2.1		01/23/08 12:22
7440-39-3	Barium, Total	25	mg/kg dry wt.	1	1.0	0.17		01/23/08 12:22
7440-41-7	Beryllium, Total	1.6	mg/kg dry wt.	1	1.0	0.021		01/23/08 12:22
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/23/08 12:22
7440-70-2	Calcium, Total	220	mg/kg dry wt.	1	50	4.2		01/23/08 12:22
7440-47-3	Chromium, Total	18	mg/kg dry wt.	1	5.0	0.72		01/23/08 12:22
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	2.0	0.37		01/23/08 12:22
7439-89-6	Iron, Total	31000	mg/kg dry wt.	1	10	0.48		01/23/08 12:22
7439-95-4	Magnesium, Total	550	mg/kg dry wt.	1	50	5.0		01/23/08 12:22
7439-96-5	Manganese, Total	500	mg/kg dry wt.	1	1.0	0.16		01/23/08 12:22
7440-09-7	Potassium, Total	1200	mg/kg dry wt.	1	50	5.3		01/23/08 12:22
7440-23-5	Sodium, Total	980	mg/kg dry wt.	1	100	13		01/24/08 11:17
7440-66-6	Zinc, Total	12	mg/kg dry wt.	1	5.0	1.0		01/23/08 12:22

J, S

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 00:00
Solids: 80.32
Laboratory ID: 0801233-09

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	24000	mg/kg dry wt.	1	10	2.1		01/23/08 12:27 J,S
7440-39-3	Barium, Total	52	mg/kg dry wt.	1	1.0	0.17		01/23/08 12:27
7440-41-7	Beryllium, Total	0.76	mg/kg dry wt.	1	1.0	0.021	J	01/23/08 12:27
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/23/08 12:27
7440-70-2	Calcium, Total	640	mg/kg dry wt.	1	50	4.2		01/23/08 12:27
7440-47-3	Chromium, Total	23	mg/kg dry wt.	1	5.0	0.72		01/23/08 12:27
7440-48-4	Cobalt, Total	4.1	mg/kg dry wt.	1	2.0	0.37		01/23/08 12:27
7439-89-6	Iron, Total	33000	mg/kg dry wt.	1	10	0.48		01/23/08 12:27
7439-95-4	Magnesium, Total	780	mg/kg dry wt.	1	50	5.0		01/23/08 12:27
7439-96-5	Manganese, Total	320	mg/kg dry wt.	1	1.0	0.16		01/23/08 12:27
7440-09-7	Potassium, Total	810	mg/kg dry wt.	1	50	5.3		01/23/08 12:27
7440-23-5	Sodium, Total	110	mg/kg dry wt.	1	100	13		01/24/08 11:21
7440-66-6	Zinc, Total	37	mg/kg dry wt.	1	5.0	1.0		01/23/08 12:27

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

EQBK-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/14/08 14:30
Solids: 0.00
Laboratory ID: 0801250-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3010A Digestion
Prepared: 01/18/08 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0800636

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	01/22/08 11:08
7440-70-2	Calcium, Total	59	ug/L	1	500	40	J	01/22/08 11:08
7439-89-6	Iron, Total	20	ug/L	1	20	5.7	U	01/23/08 08:35
7439-95-4	Magnesium, Total	500	ug/L	1	500	38	U	01/22/08 11:08
7440-09-7	Potassium, Total	200	ug/L	1	200	54	U	01/22/08 11:08
7440-23-5	Sodium, Total	500	ug/L	1	500	84	U	01/22/08 11:08

03645

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 12:55
Solids: 73.68
Laboratory ID: 0801253-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.4996 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	26000	mg/kg dry wt.	1	10	2.1		01/23/08 12:31
7440-39-3	Barium, Total	100	mg/kg dry wt.	1	1.0	0.17		01/23/08 12:31
7440-41-7	Beryllium, Total	1.2	mg/kg dry wt.	1	1.0	0.021		01/23/08 12:31
7440-43-9	Cadmium, Total	6.5	mg/kg dry wt.	1	2.0	0.11		01/23/08 12:31
7440-70-2	Calcium, Total	640	mg/kg dry wt.	1	50	4.2		01/23/08 12:31
7440-47-3	Chromium, Total	47	mg/kg dry wt.	1	5.0	0.72		01/23/08 12:31
7440-48-4	Cobalt, Total	41	mg/kg dry wt.	1	2.0	0.37		01/23/08 12:31
7439-89-6	Iron, Total	36000	mg/kg dry wt.	1	10	0.48		01/23/08 12:31
7439-95-4	Magnesium, Total	1600	mg/kg dry wt.	1	50	5.0		01/23/08 12:31
7439-96-5	Manganese, Total	1600	mg/kg dry wt.	1	1.0	0.16		01/23/08 12:31
7440-09-7	Potassium, Total	1700	mg/kg dry wt.	1	50	5.3		01/23/08 12:31
7440-23-5	Sodium, Total	130	mg/kg dry wt.	1	100	13		01/24/08 11:26
7440-66-6	Zinc, Total	1100	mg/kg dry wt.	1	5.0	1.0		01/23/08 12:31

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INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB5AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 12:55
Solids: 75.19
Laboratory ID: 0801253-02

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	19000	mg/kg dry wt.	1	10	2.1		01/23/08 12:37
7440-39-3	Barium, Total	100	mg/kg dry wt.	1	1.0	0.17		01/23/08 12:37
7440-41-7	Beryllium, Total	0.83	mg/kg dry wt.	1	1.0	0.021	J	01/23/08 12:37
7440-43-9	Cadmium, Total	2.5	mg/kg dry wt.	1	2.0	0.11		01/23/08 12:37
7440-70-2	Calcium, Total	410	mg/kg dry wt.	1	50	4.2		01/23/08 12:37
7440-47-3	Chromium, Total	48	mg/kg dry wt.	1	5.0	0.72		01/23/08 12:37
7440-48-4	Cobalt, Total	18	mg/kg dry wt.	1	2.0	0.37		01/23/08 12:37
7439-89-6	Iron, Total	30000	mg/kg dry wt.	1	10	0.48		01/23/08 12:37
7439-95-4	Magnesium, Total	760	mg/kg dry wt.	1	50	5.0		01/23/08 12:37
7439-96-5	Manganese, Total	2100	mg/kg dry wt.	1	1.0	0.16		01/23/08 12:37
7440-09-7	Potassium, Total	850	mg/kg dry wt.	1	50	5.3		01/23/08 12:37
7440-23-5	Sodium, Total	100	mg/kg dry wt.	1	100	13		01/24/08 11:31
7440-66-6	Zinc, Total	35	mg/kg dry wt.	1	5.0	1.0		01/23/08 12:37

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03648

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB5B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 14:00
Solids: 71.94
Laboratory ID: 0801253-03

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	27000	mg/kg dry wt.	1	10	2.1		01/23/08 12:41
7440-39-3	Barium, Total	45	mg/kg dry wt.	1	1.0	0.17		01/23/08 12:41
7440-41-7	Beryllium, Total	1.5	mg/kg dry wt.	1	1.0	0.021		01/23/08 12:41
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/23/08 12:41
7440-70-2	Calcium, Total	1200	mg/kg dry wt.	1	50	4.2		01/23/08 12:41
7440-47-3	Chromium, Total	33	mg/kg dry wt.	1	5.0	0.72		01/23/08 12:41
7440-48-4	Cobalt, Total	8.2	mg/kg dry wt.	1	2.0	0.37		01/23/08 12:41
7439-89-6	Iron, Total	36000	mg/kg dry wt.	1	10	0.48		01/23/08 12:41
7439-95-4	Magnesium, Total	2100	mg/kg dry wt.	1	50	5.0		01/23/08 12:41
7439-96-5	Manganese, Total	590	mg/kg dry wt.	1	1.0	0.16		01/23/08 12:41
7440-09-7	Potassium, Total	1700	mg/kg dry wt.	1	50	5.3		01/23/08 12:41
7440-23-5	Sodium, Total	97	mg/kg dry wt.	1	100	13	J	01/24/08 11:35
7440-66-6	Zinc, Total	40	mg/kg dry wt.	1	5.0	1.0		01/23/08 12:41

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03649

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB5C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 14:10
Solids: 77.24
Laboratory ID: 0801253-04

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.4998 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	13000	mg/kg dry wt.	1	10	2.1		01/23/08 13:02
7440-39-3	Barium, Total	48	mg/kg dry wt.	1	1.0	0.17		01/23/08 13:02
7440-41-7	Beryllium, Total	1.9	mg/kg dry wt.	1	1.0	0.021		01/24/08 11:48
7440-43-9	Cadmium, Total	0.35	mg/kg dry wt.	1	2.0	0.11	J	01/23/08 13:02
7440-70-2	Calcium, Total	260	mg/kg dry wt.	1	50	4.2		01/23/08 13:02
7440-47-3	Chromium, Total	23	mg/kg dry wt.	1	5.0	0.72		01/23/08 13:02
7440-48-4	Cobalt, Total	28	mg/kg dry wt.	1	2.0	0.37		01/23/08 13:02
7439-89-6	Iron, Total	27000	mg/kg dry wt.	1	10	0.48		01/23/08 13:02
7439-95-4	Magnesium, Total	710	mg/kg dry wt.	1	50	5.0		01/23/08 13:02
7439-96-5	Manganese, Total	390	mg/kg dry wt.	1	1.0	0.16		01/23/08 13:02
7440-09-7	Potassium, Total	1100	mg/kg dry wt.	1	50	5.3		01/24/08 11:48
7440-23-5	Sodium, Total	510	mg/kg dry wt.	1	100	13		01/24/08 15:22
7440-66-6	Zinc, Total	20	mg/kg dry wt.	1	5.0	1.0		01/23/08 13:02

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03550

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-6

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 00:00
Solids: 74.13
Laboratory ID: 0801253-06

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	18000	mg/kg dry wt.	1	10	2.1		01/23/08 13:07
7440-39-3	Barium, Total	95	mg/kg dry wt.	1	1.0	0.17		01/23/08 13:07
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.021		01/24/08 11:53
7440-43-9	Cadmium, Total	2.6	mg/kg dry wt.	1	2.0	0.11		01/23/08 13:07
7440-70-2	Calcium, Total	390	mg/kg dry wt.	1	50	4.2		01/23/08 13:07
7440-47-3	Chromium, Total	35	mg/kg dry wt.	1	5.0	0.72		01/23/08 13:07
7440-48-4	Cobalt, Total	20	mg/kg dry wt.	1	2.0	0.37		01/23/08 13:07
7439-89-6	Iron, Total	28000	mg/kg dry wt.	1	10	0.48		01/23/08 13:07
7439-95-4	Magnesium, Total	820	mg/kg dry wt.	1	50	5.0		01/23/08 13:07
7439-96-5	Manganese, Total	2100	mg/kg dry wt.	1	1.0	0.16		01/23/08 13:07
7440-09-7	Potassium, Total	910	mg/kg dry wt.	1	50	5.3		01/24/08 11:53
7440-23-5	Sodium, Total	89	mg/kg dry wt.	1	100	13	J	01/24/08 15:27
7440-66-6	Zinc, Total	29	mg/kg dry wt.	1	5.0	1.0		01/23/08 13:07

J/S

03651

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:10
Solids: 71.41
Laboratory ID: 0801253-07

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	26000	mg/kg dry wt.	1	10	2.1		01/23/08 13:12
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17		01/23/08 13:12
7440-41-7	Beryllium, Total	2.2	mg/kg dry wt.	1	1.0	0.021		01/24/08 11:57
7440-43-9	Cadmium, Total	1.8	mg/kg dry wt.	1	2.0	0.11	J	01/23/08 13:12
7440-70-2	Calcium, Total	760	mg/kg dry wt.	1	50	4.2		01/23/08 13:12
7440-47-3	Chromium, Total	37	mg/kg dry wt.	1	5.0	0.72		01/23/08 13:12
7440-48-4	Cobalt, Total	18	mg/kg dry wt.	1	2.0	0.37		01/23/08 13:12
7439-89-6	Iron, Total	65000	mg/kg dry wt.	10	100	4.8		01/23/08 15:23
7439-95-4	Magnesium, Total	710	mg/kg dry wt.	1	50	5.0		01/23/08 13:12
7439-96-5	Manganese, Total	4400	mg/kg dry wt.	1	1.0	0.16		01/23/08 13:12
7440-09-7	Potassium, Total	900	mg/kg dry wt.	1	50	5.3		01/24/08 11:57
7440-23-5	Sodium, Total	520	mg/kg dry wt.	1	100	13		01/24/08 15:40
7440-66-6	Zinc, Total	150	mg/kg dry wt.	1	5.0	1.0		01/23/08 13:12

JIS

03652

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:10
Solids: 77.53
Laboratory ID: 0801253-08

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.4998 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	22000	mg/kg dry wt.	100	1000	210		01/23/08 15:27
7440-39-3	Barium, Total	72	mg/kg dry wt.	1	1.0	0.17		01/23/08 13:17
7440-41-7	Beryllium, Total	2.1	mg/kg dry wt.	1	1.0	0.021		01/24/08 12:03
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/23/08 13:17
7440-70-2	Calcium, Total	57	mg/kg dry wt.	1	50	4.2		01/23/08 13:17
7440-47-3	Chromium, Total	22	mg/kg dry wt.	1	5.0	0.72		01/23/08 13:17
7440-48-4	Cobalt, Total	16	mg/kg dry wt.	1	2.0	0.37		01/23/08 13:17
7439-89-6	Iron, Total	67000	mg/kg dry wt.	1000	10000	480		01/23/08 15:40
7439-95-4	Magnesium, Total	630	mg/kg dry wt.	1	50	5.0		01/23/08 13:17
7439-96-5	Manganese, Total	3400	mg/kg dry wt.	100	100	16		01/23/08 15:27
7440-09-7	Potassium, Total	920	mg/kg dry wt.	1	50	5.3		01/24/08 12:03
7440-23-5	Sodium, Total	1100	mg/kg dry wt.	5	500	66		01/25/08 10:37
7440-66-6	Zinc, Total	33	mg/kg dry wt.	1	5.0	1.0		01/23/08 13:17

J, S

03653

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:30
Solids: 74.00
Laboratory ID: 0801253-09

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	25000	mg/kg dry wt.	1	10	2.1		01/23/08 13:40
7440-39-3	Barium, Total	230	mg/kg dry wt.	1	1.0	0.17		01/23/08 13:40
7440-41-7	Beryllium, Total	1.9	mg/kg dry wt.	1	1.0	0.021		01/24/08 12:27
7440-43-9	Cadmium, Total	1.1	mg/kg dry wt.	1	2.0	0.11	J	01/23/08 13:40
7440-70-2	Calcium, Total	180	mg/kg dry wt.	1	50	4.2		01/23/08 13:40
7440-47-3	Chromium, Total	37	mg/kg dry wt.	1	5.0	0.72		01/23/08 13:40
7440-48-4	Cobalt, Total	30	mg/kg dry wt.	1	2.0	0.37		01/23/08 13:40
7439-89-6	Iron, Total	55000	mg/kg dry wt.	1000	10000	480		01/25/08 08:44
7439-95-4	Magnesium, Total	1000	mg/kg dry wt.	1	50	5.0		01/23/08 13:40
7439-96-5	Manganese, Total	6000	mg/kg dry wt.	1	1.0	0.16		01/23/08 13:40
7440-09-7	Potassium, Total	1300	mg/kg dry wt.	1	50	5.3		01/24/08 12:27
7440-23-5	Sodium, Total	880	mg/kg dry wt.	1	100	13		01/24/08 16:18
7440-66-6	Zinc, Total	97	mg/kg dry wt.	1	5.0	1.0		01/23/08 13:40

J,S

03654

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:35
Solids: 73.53
Laboratory ID: 0801253-10

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 08:00
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0800656

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	25000	mg/kg dry wt.	1	10	2.1		01/23/08 13:45
7440-39-3	Barium, Total	87	mg/kg dry wt.	1	1.0	0.17		01/23/08 13:45
7440-41-7	Beryllium, Total	2.6	mg/kg dry wt.	1	1.0	0.021		01/24/08 12:32
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	U	01/23/08 13:45
7440-70-2	Calcium, Total	94	mg/kg dry wt.	1	50	4.2		01/23/08 13:45
7440-47-3	Chromium, Total	29	mg/kg dry wt.	1	5.0	0.72		01/23/08 13:45
7440-48-4	Cobalt, Total	19	mg/kg dry wt.	1	2.0	0.37		01/23/08 13:45
7439-89-6	Iron, Total	74000	mg/kg dry wt.	10	100	4.8		01/23/08 16:10
7439-95-4	Magnesium, Total	600	mg/kg dry wt.	1	50	5.0		01/23/08 13:45
7439-96-5	Manganese, Total	3200	mg/kg dry wt.	1	1.0	0.16		01/23/08 13:45
7440-09-7	Potassium, Total	890	mg/kg dry wt.	1	50	5.3		01/24/08 12:32
7440-23-5	Sodium, Total	970	mg/kg dry wt.	1	100	13		01/24/08 16:23
7440-66-6	Zinc, Total	40	mg/kg dry wt.	1	5.0	1.0		01/23/08 13:45

J,5

03655

SAMPLE ID SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-47

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB14A	0801213-01
57SB14B	0801213-02
57SB14C	0801213-03
57SB1AB	0801213-04
DUP-4	0801213-05
57SB9A	0801213-06
57SB9AB	0801213-07
EQBK-3	0801213-08
57SB6A	0801213-10
57SB6AB	0801213-11
57SB6B	0801213-12
EQBK-4	0801230-01
57SB6C	0801233-01
57SB7A	0801233-02
57SB7AB	0801233-03
57SB7B	0801233-04
57SB7C	0801233-05
57SB4AB	0801233-06
57SB4B	0801233-07
57SB4C	0801233-08
DUP-5	0801233-09
EQBK-5	0801250-01
57SB5A	0801253-01
57SB5AB	0801253-02
57SB5B	0801253-03
57SB5C	0801253-04
DUP-6	0801253-06
57SB8A	0801253-07
57SB8AB	0801253-08
57SB8B	0801253-09
57SB8C	0801253-10

64522

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB14A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 08:10
Solids: 86.34
Laboratory ID: 0801213-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 14:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0800505

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.93	mg/kg dry wt.	1	0.20	0.042		01/21/08 15:28

64524

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB14A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 08:10
Solids: 86.34
Laboratory ID: 0801213-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:20
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800544

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.6	mg/kg dry wt.	1	0.20	0.071		01/22/08 11:21	Lim
7440-50-8	Copper, Total	5.2	mg/kg dry wt.	1	0.20	0.044	B	01/22/08 11:21	Lim
7439-92-1	Lead, Total	15	mg/kg dry wt.	1	0.20	0.022		01/23/08 10:33	
7440-02-0	Nickel, Total	5.6	mg/kg dry wt.	1	0.10	0.036		01/22/08 11:21	J, S
7782-49-2	Selenium, Total	0.50	mg/kg dry wt.	1	0.30	0.089		01/22/08 11:21	Lim
7440-22-4	Silver, Total	0.043	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 11:21	
7440-28-0	Thallium, Total	0.17	mg/kg dry wt.	1	0.10	0.0049		01/23/08 10:33	
7440-62-2	Vanadium, Total	16	mg/kg dry wt.	1	0.10	0.034		01/22/08 14:28	Lim

64525

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB14B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 08:25
Solids: 79.37
Laboratory ID: 0801213-02

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 14:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800505

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.11	mg/kg dry wt.	1	0.20	0.042	J	01/21/08 15:43

045326

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB14B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 08:25
Solids: 79.37
Laboratory ID: 0801213-02

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:20
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0800544

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.2	mg/kg dry wt.	1	0.20	0.071		01/22/08 11:41	L,M
7440-50-8	Copper, Total	11	mg/kg dry wt.	1	0.20	0.044	B	01/22/08 11:41	L,M
7439-92-1	Lead, Total	13	mg/kg dry wt.	1	0.20	0.022		01/23/08 11:18	
7440-02-0	Nickel, Total	9.6	mg/kg dry wt.	1	0.10	0.036		01/22/08 11:41	J,S
7782-49-2	Selenium, Total	0.27	mg/kg dry wt.	1	0.30	0.089	J	01/22/08 11:41	L,M
7440-22-4	Silver, Total	0.042	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 11:41	
7440-28-0	Thallium, Total	0.18	mg/kg dry wt.	1	0.10	0.0049		01/23/08 11:18	
7440-62-2	Vanadium, Total	23	mg/kg dry wt.	1	0.10	0.034		01/22/08 14:45	L,M

84527

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB14C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 09:07
Solids: 72.10
Laboratory ID: 0801213-03

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 14:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0800505

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.21	mg/kg dry wt.	1	0.20	0.042		01/21/08 15:45

045526

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB14C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 09:07
Solids: 72.10
Laboratory ID: 0801213-03

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:20
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800544

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	5.1	mg/kg dry wt.	1	0.20	0.071		01/22/08 11:44	L,M
7440-50-8	Copper, Total	25	mg/kg dry wt.	1	0.20	0.044	B	01/22/08 11:44	L,M
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022		01/23/08 11:20	
7440-02-0	Nickel, Total	39	mg/kg dry wt.	1	0.10	0.036		01/22/08 11:44	J,S
7782-49-2	Selenium, Total	0.59	mg/kg dry wt.	1	0.30	0.089		01/22/08 11:44	L,M
7440-22-4	Silver, Total	0.089	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 11:44	
7440-28-0	Thallium, Total	0.22	mg/kg dry wt.	1	0.10	0.0049		01/23/08 11:20	
7440-62-2	Vanadium, Total	31	mg/kg dry wt.	1	0.10	0.034		01/22/08 14:47	L,M

64523

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB1AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 10:55
Solids: 77.72
Laboratory ID: 0801213-04

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 14:00
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800505

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.17	mg/kg dry wt.	1	0.20	0.042	J	01/21/08 15:47

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB1AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 10:55
Solids: 77.72
Laboratory ID: 0801213-04

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:20
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0800544

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.6	mg/kg dry wt.	1	0.20	0.071		01/22/08 11:47	L,M
7440-50-8	Copper, Total	11	mg/kg dry wt.	1	0.20	0.044	B	01/22/08 11:47	L,M
7439-92-1	Lead, Total	15	mg/kg dry wt.	1	0.20	0.022		01/23/08 11:22	
7440-02-0	Nickel, Total	9.3	mg/kg dry wt.	1	0.10	0.036		01/22/08 11:47	J,S
7782-49-2	Selenium, Total	0.24	mg/kg dry wt.	1	0.30	0.089	J	01/22/08 11:47	L,M
7440-22-4	Silver, Total	0.046	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 11:47	
7440-28-0	Thallium, Total	0.20	mg/kg dry wt.	1	0.10	0.0049		01/23/08 11:22	
7440-62-2	Vanadium, Total	24	mg/kg dry wt.	1	0.10	0.034		01/22/08 14:50	L,M

64531

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 12:00
Solids: 77.38
Laboratory ID: 0801213-05

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 14:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800505

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.16	mg/kg dry wt.	1	0.20	0.042	J	01/21/08 15:49

64532

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 12:00
Solids: 77.38
Laboratory ID: 0801213-05

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:20
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800544

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.7	mg/kg dry wt.	1	0.20	0.071		01/22/08 11:50	L,M
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044	B	01/22/08 11:50	L,M
7439-92-1	Lead, Total	15	mg/kg dry wt.	1	0.20	0.022		01/23/08 11:25	
7440-02-0	Nickel, Total	9.1	mg/kg dry wt.	1	0.10	0.036		01/22/08 11:50	J,S
7782-49-2	Selenium, Total	0.20	mg/kg dry wt.	1	0.30	0.089	J	01/22/08 11:50	L,M
7440-22-4	Silver, Total	0.040	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 11:50	
7440-28-0	Thallium, Total	0.19	mg/kg dry wt.	1	0.10	0.0049		01/23/08 11:25	
7440-62-2	Vanadium, Total	25	mg/kg dry wt.	1	0.10	0.034		01/22/08 14:52	L,M

64533

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 12:55
Solids: 85.84
Laboratory ID: 0801213-06

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 14:00
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800505

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.40	mg/kg dry wt.	1	0.20	0.042		01/21/08 15:51

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 12:55
Solids: 85.84
Laboratory ID: 0801213-06

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:20
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0800544

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.1	mg/kg dry wt.	1	0.20	0.071		01/22/08 11:53	L,M
7440-50-8	Copper, Total	21	mg/kg dry wt.	1	0.20	0.044	B	01/22/08 11:53	L,M
7439-92-1	Lead, Total	20	mg/kg dry wt.	1	0.20	0.022		01/23/08 11:27	
7440-02-0	Nickel, Total	6.9	mg/kg dry wt.	1	0.10	0.036		01/22/08 11:53	J,S
7782-49-2	Selenium, Total	0.35	mg/kg dry wt.	1	0.30	0.089		01/22/08 11:53	L,M
7440-22-4	Silver, Total	0.054	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 11:53	
7440-28-0	Thallium, Total	0.21	mg/kg dry wt.	1	0.10	0.0049		01/23/08 11:27	
7440-62-2	Vanadium, Total	21	mg/kg dry wt.	1	0.10	0.034		01/22/08 14:54	L,M

6U535

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB9AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 13:30
Solids: 79.97
Laboratory ID: 0801213-07

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 14:00
Initial/Final: 0.4996 g / 250 mL
QC Batch: 0800505

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.071	mg/kg dry wt.	1	0.20	0.042	J	01/21/08 15:53

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB9AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 13:30
Solids: 79.97
Laboratory ID: 0801213-07

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:20
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800544

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.5	mg/kg dry wt.	1	0.20	0.071		01/22/08 11:55	LIM
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044	B	01/22/08 11:55	LIM
7439-92-1	Lead, Total	14	mg/kg dry wt.	1	0.20	0.022		01/23/08 11:29	
7440-02-0	Nickel, Total	8.9	mg/kg dry wt.	1	0.10	0.036		01/22/08 11:55	JLS
7782-49-2	Selenium, Total	0.26	mg/kg dry wt.	1	0.30	0.089	J	01/22/08 11:55	LIM
7440-22-4	Silver, Total	0.037	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 11:55	
7440-28-0	Thallium, Total	0.20	mg/kg dry wt.	1	0.10	0.0049		01/23/08 11:29	
7440-62-2	Vanadium, Total	25	mg/kg dry wt.	1	0.10	0.034		01/22/08 14:57	LIM

64537

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/10/08 14:10
Solids: 0.00
Laboratory ID: 0801213-08

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 01/18/08 07:15
Initial/Final: 25 mL / 125 mL
QC Batch: 0800644

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	01/23/08 11:33
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	01/22/08 17:55
7440-39-3	Barium, Total	0.69	ug/L	1	2.0	0.52	J	01/22/08 17:55
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	01/22/08 17:55
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	01/22/08 17:55
7440-47-3	Chromium, Total	0.86	ug/L	1	2.0	0.31	J	01/22/08 17:55 B,P
7440-48-4	Cobalt, Total	1.0	ug/L	1	1.0	0.096	U	01/22/08 17:55
7439-96-5	Manganese, Total	3.5	ug/L	1	3.0	0.43		01/22/08 17:55
7440-02-0	Nickel, Total	2.0	ug/L	1	2.0	0.28	U	01/22/08 17:55
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	01/22/08 17:55
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	01/22/08 17:55
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	01/22/08 17:55

04538

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/10/08 14:10
Solids: 0.00
Laboratory ID: 0801213-08

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 01/23/08 09:00
Initial/Final: 25 mL / 125 mL
QC Batch: 0800833

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-50-8	Copper, Total	1.0	ug/L	1	1.0	0.33	U	01/23/08 20:00
7439-92-1	Lead, Total	0.36	ug/L	1	1.0	0.33	J	01/23/08 20:00
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	01/23/08 20:00
7440-66-6	Zinc, Total	9.9	ug/L	1	10	0.84	J	01/23/08 20:00

B, P

61599

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 15:40
Solids: 28.65
Laboratory ID: 0801213-10

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 14:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0800505

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	280	mg/kg dry wt.	10	2.0	0.42		01/21/08 18:36

04546

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 15:40
Solids: 28.65
Laboratory ID: 0801213-10

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:20
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800544

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	4.9	mg/kg dry wt.	1	0.20	0.071		01/22/08 12:08	L,M
7440-50-8	Copper, Total	93	mg/kg dry wt.	2	0.40	0.088	B	01/22/08 12:38	L,M
7439-92-1	Lead, Total	200	mg/kg dry wt.	10	2.0	0.22		01/23/08 11:42	
7440-02-0	Nickel, Total	11	mg/kg dry wt.	1	0.10	0.036		01/22/08 12:08	J,S
7782-49-2	Selenium, Total	0.89	mg/kg dry wt.	1	0.30	0.089		01/22/08 12:08	L,M
7440-22-4	Silver, Total	0.10	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 12:08	
7440-28-0	Thallium, Total	0.25	mg/kg dry wt.	1	0.10	0.0049		01/23/08 11:35	
7440-62-2	Vanadium, Total	310	mg/kg dry wt.	10	1.0	0.34		01/22/08 15:04	L,M

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB6AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 15:40
Solids: 77.38
Laboratory ID: 0801213-11

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 14:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800505

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	2.2	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:02

84542

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB6AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 15:40
Solids: 77.38
Laboratory ID: 0801213-11

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:20
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800544

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.6	mg/kg dry wt.	2	0.40	0.14		01/22/08 12:41	L,M
7440-50-8	Copper, Total	17	mg/kg dry wt.	2	0.40	0.088	B	01/22/08 12:41	L,M
7439-92-1	Lead, Total	23	mg/kg dry wt.	1	0.20	0.022		01/23/08 11:37	
7440-02-0	Nickel, Total	9.3	mg/kg dry wt.	2	0.20	0.071		01/22/08 12:41	J,S
7782-49-2	Selenium, Total	0.26	mg/kg dry wt.	2	0.60	0.18	J	01/22/08 12:41	L,M
7440-22-4	Silver, Total	0.056	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 12:11	
7440-28-0	Thallium, Total	0.77	mg/kg dry wt.	1	0.10	0.0049		01/23/08 11:37	
7440-62-2	Vanadium, Total	32	mg/kg dry wt.	2	0.20	0.069		01/22/08 15:13	L,M

045543

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB6B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 17:00
Solids: 69.91
Laboratory ID: 0801213-12

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/15/08 14:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800505

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	17	mg/kg dry wt.	1	0.20	0.042		01/21/08 16:04

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB6B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 17:00
Solids: 69.91
Laboratory ID: 0801213-12

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/16/08 07:20
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800544

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.0	mg/kg dry wt.	1	0.20	0.071		01/22/08 12:14	Lim
7440-50-8	Copper, Total	16	mg/kg dry wt.	1	0.20	0.044	B	01/22/08 12:14	Lim
7439-92-1	Lead, Total	23	mg/kg dry wt.	1	0.20	0.022		01/23/08 11:40	
7440-02-0	Nickel, Total	15	mg/kg dry wt.	1	0.10	0.036		01/22/08 12:14	J,S
7782-49-2	Selenium, Total	0.33	mg/kg dry wt.	1	0.30	0.089		01/22/08 12:14	Lim
7440-22-4	Silver, Total	0.058	mg/kg dry wt.	1	0.10	0.013	J	01/22/08 12:14	
7440-28-0	Thallium, Total	0.24	mg/kg dry wt.	1	0.10	0.0049		01/23/08 11:40	
7440-62-2	Vanadium, Total	37	mg/kg dry wt.	1	0.10	0.034		01/22/08 15:08	Lim

64545

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/11/08 13:40
Solids: 0.00
Laboratory ID: 0801230-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 01/18/08 07:15
Initial/Final: 25 mL / 125 mL
QC Batch: 0800644

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	01/23/08 11:36
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	01/22/08 17:59
7440-39-3	Barium, Total	2.0	ug/L	1	2.0	0.52	U	01/22/08 17:59
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	01/22/08 17:59
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	01/22/08 17:59
7440-47-3	Chromium, Total	0.75	ug/L	1	2.0	0.31	J	01/22/08 17:59
7440-48-4	Cobalt, Total	1.0	ug/L	1	1.0	0.096	U	01/22/08 17:59
7439-96-5	Manganese, Total	2.2	ug/L	1	3.0	0.43	J	01/22/08 17:59
7440-02-0	Nickel, Total	1.5	ug/L	1	2.0	0.28	J	01/22/08 17:59
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	01/22/08 17:59
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	01/22/08 17:59
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	01/22/08 17:59

B1P

64546

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/11/08 13:40
Solids: 0.00
Laboratory ID: 0801230-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 01/23/08 09:00
Initial/Final: 25 mL / 125 mL
QC Batch: 0800833

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-50-8	Copper, Total	1.0	ug/L	1	1.0	0.33	U	01/23/08 20:03
7439-92-1	Lead, Total	0.61	ug/L	1	1.0	0.33	J	01/23/08 20:03
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	01/23/08 20:03
7440-66-6	Zinc, Total	9.9	ug/L	1	10	0.84	J	01/23/08 20:03

B,P

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB6C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 08:15
Solids: 73.67
Laboratory ID: 0801233-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.39	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:09

84548

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB6C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 08:15
Solids: 73.67
Laboratory ID: 0801233-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.4995 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	4.0	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:07	L,M
7440-50-8	Copper, Total	15	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:07	L,M
7439-92-1	Lead, Total	5.4	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:07	
7440-02-0	Nickel, Total	17	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:07	J,S
7782-49-2	Selenium, Total	0.34	mg/kg dry wt.	1	0.30	0.089		01/24/08 10:07	L,M
7440-22-4	Silver, Total	0.058	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:07	
7440-28-0	Thallium, Total	0.10	mg/kg dry wt.	1	0.10	0.0049		01/24/08 10:07	
7440-62-2	Vanadium, Total	23	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:07	L,M

04549

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 09:05
Solids: 37.36
Laboratory ID: 0801233-02

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	340	mg/kg dry wt.	10	2.0	0.42		01/21/08 18:34

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 09:05
Solids: 37.36
Laboratory ID: 0801233-02

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	5.1	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:10	Lim
7440-50-8	Copper, Total	110	mg/kg dry wt.	5	1.0	0.22		01/24/08 12:17	Lim
7439-92-1	Lead, Total	680	mg/kg dry wt.	40	8.0	0.90		01/24/08 12:14	
7440-02-0	Nickel, Total	14	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:10	J,S
7782-49-2	Selenium, Total	0.62	mg/kg dry wt.	1	0.30	0.089		01/24/08 10:10	Lim
7440-22-4	Silver, Total	0.20	mg/kg dry wt.	1	0.10	0.013		01/24/08 10:10	
7440-28-0	Thallium, Total	0.34	mg/kg dry wt.	1	0.10	0.0049		01/24/08 10:10	
7440-62-2	Vanadium, Total	1200	mg/kg dry wt.	40	4.0	1.4		01/24/08 12:14	Lim

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB7AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 09:05
Solids: 71.69
Laboratory ID: 0801233-03

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	4.2	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:17

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB7AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 09:05
Solids: 71.69
Laboratory ID: 0801233-03

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	3.6	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:13	L,M
7440-50-8	Copper, Total	16	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:13	L,M
7439-92-1	Lead, Total	21	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:13	
7440-02-0	Nickel, Total	10	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:13	J,S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 10:13	U L,M
7440-22-4	Silver, Total	0.033	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:13	
7440-28-0	Thallium, Total	0.34	mg/kg dry wt.	1	0.10	0.0049		01/24/08 10:13	
7440-62-2	Vanadium, Total	39	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:13	L,M

01559

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 09:10
Solids: 80.43
Laboratory ID: 0801233-04

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.34	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:19

64554

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 09:10
Solids: 80.43
Laboratory ID: 0801233-04

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.4997 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	3.9	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:16	L,M
7440-50-8	Copper, Total	10	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:16	L,M
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:16	
7440-02-0	Nickel, Total	9.1	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:16	J,S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 10:16	U L,M
7440-22-4	Silver, Total	0.014	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:16	
7440-28-0	Thallium, Total	0.14	mg/kg dry wt.	1	0.10	0.0049		01/24/08 10:16	
7440-62-2	Vanadium, Total	20	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:16	L,M

64355

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 10:05
Solids: 69.25
Laboratory ID: 0801233-05

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.28	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:21

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 10:05
Solids: 69.25
Laboratory ID: 0801233-05

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	4.3	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:25	L, m
7440-50-8	Copper, Total	22	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:25	L, m
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:25	
7440-02-0	Nickel, Total	18	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:25	J, S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 14:19	V L, m
7440-22-4	Silver, Total	0.041	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:25	
7440-28-0	Thallium, Total	0.19	mg/kg dry wt.	1	0.10	0.0049		01/24/08 10:25	
7440-62-2	Vanadium, Total	40	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:25	L, m

04857

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB4AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 12:05
Solids: 76.38
Laboratory ID: 0801233-06

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.81	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:23

64558

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB4AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 12:05
Solids: 76.38
Laboratory ID: 0801233-06

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.7	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:28	L,M
7440-50-8	Copper, Total	13	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:28	L,M
7439-92-1	Lead, Total	13	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:28	
7440-02-0	Nickel, Total	6.6	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:28	J,S
7782-49-2	Selenium, Total	0.095	mg/kg dry wt.	1	0.30	0.089	J	01/24/08 13:35	L,M
7440-22-4	Silver, Total	0.036	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:28	
7440-28-0	Thallium, Total	0.15	mg/kg dry wt.	1	0.10	0.0049		01/24/08 10:28	
7440-62-2	Vanadium, Total	22	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:28	L,M

6459

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB4B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 12:40
Solids: 78.19
Laboratory ID: 0801233-07

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.4996 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.40	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:26

04560

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB4B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 12:40
Solids: 78.19
Laboratory ID: 0801233-07

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	3.4	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:31	L,M
7440-50-8	Copper, Total	9.8	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:31	L,M
7439-92-1	Lead, Total	6.9	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:31	
7440-02-0	Nickel, Total	4.9	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:31	J,S
7782-49-2	Selenium, Total	0.17	mg/kg dry wt.	1	0.30	0.089	J	01/25/08 13:58	L,M
7440-22-4	Silver, Total	0.039	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:31	
7440-28-0	Thallium, Total	0.12	mg/kg dry wt.	1	0.10	0.0049		01/24/08 10:31	
7440-62-2	Vanadium, Total	21	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:31	L,M

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB4C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 13:00
Solids: 78.10
Laboratory ID: 0801233-08

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.045	mg/kg dry wt.	1	0.20	0.042	J	01/21/08 17:28

04362

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB4C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 13:00
Solids: 78.10
Laboratory ID: 0801233-08

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	0.85	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:34	L,M
7440-50-8	Copper, Total	1.4	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:34	L,M
7439-92-1	Lead, Total	0.86	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:34	
7440-02-0	Nickel, Total	12	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:34	J,S
7782-49-2	Selenium, Total	0.26	mg/kg dry wt.	1	0.30	0.089	J	01/24/08 13:39	L,M
7440-22-4	Silver, Total	0.018	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:34	
7440-28-0	Thallium, Total	0.041	mg/kg dry wt.	1	0.10	0.0049	J	01/24/08 10:34	
7440-62-2	Vanadium, Total	11	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:34	L,M

64563

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 00:00
Solids: 80.32
Laboratory ID: 0801233-09

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.4995 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.80	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:30

04564

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 00:00
Solids: 80.32
Laboratory ID: 0801233-09

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.3	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:37	L,M
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:37	L,M
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:37	
7440-02-0	Nickel, Total	5.9	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:37	J,S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 13:41	U,L,M
7440-22-4	Silver, Total	0.023	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:37	
7440-28-0	Thallium, Total	0.14	mg/kg dry wt.	1	0.10	0.0049		01/24/08 10:37	
7440-62-2	Vanadium, Total	22	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:37	L,M

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/14/08 14:30
Solids: 0.00
Laboratory ID: 0801250-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 01/18/08 07:15
Initial/Final: 25 mL / 125 mL
QC Batch: 0800644

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	01/23/08 11:39
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	01/22/08 18:04
7440-39-3	Barium, Total	2.0	ug/L	1	2.0	0.52	U	01/22/08 18:04
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	01/22/08 18:04
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	01/22/08 18:04
7440-47-3	Chromium, Total	0.90	ug/L	1	2.0	0.31	J	01/22/08 18:04
7440-48-4	Cobalt, Total	1.0	ug/L	1	1.0	0.096	U	01/22/08 18:04
7439-96-5	Manganese, Total	3.0	ug/L	1	3.0	0.43	U	01/22/08 18:04
7440-02-0	Nickel, Total	2.0	ug/L	1	2.0	0.28	U	01/22/08 18:04
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	01/22/08 18:04
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	01/22/08 18:04
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	01/22/08 18:04

B,P

64566

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/14/08 14:30
Solids: 0.00
Laboratory ID: 0801250-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 01/23/08 09:00
Initial/Final: 25 mL / 125 mL
QC Batch: 0800833

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-50-8	Copper, Total	0.55	ug/L	1	1.0	0.33	J	01/23/08 20:06
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	01/23/08 20:06
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	01/23/08 20:06
7440-66-6	Zinc, Total	15	ug/L	1	10	0.84		01/23/08 20:06

0L4567

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 12:55
Solids: 73.68
Laboratory ID: 0801253-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	14	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:32

04568

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 12:55
Solids: 73.68
Laboratory ID: 0801253-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	3.1	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:40	L,M
7440-50-8	Copper, Total	19	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:40	L,M
7439-92-1	Lead, Total	31	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:40	
7440-02-0	Nickel, Total	17	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:40	J,S
7782-49-2	Selenium, Total	0.14	mg/kg dry wt.	1	0.30	0.089	J	01/24/08 13:43	L,M
7440-22-4	Silver, Total	0.024	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:40	
7440-28-0	Thallium, Total	0.34	mg/kg dry wt.	1	0.10	0.0049		01/24/08 10:40	
7440-62-2	Vanadium, Total	40	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:40	L,M

64569

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB5AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 12:55
Solids: 75.19
Laboratory ID: 0801253-02

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.4995 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.51	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:34

64576

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB5AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 12:55
Solids: 75.19
Laboratory ID: 0801253-02

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.0	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:43	L,M
7440-50-8	Copper, Total	10	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:43	L,M
7439-92-1	Lead, Total	15	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:43	
7440-02-0	Nickel, Total	7.5	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:43	J,S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 13:45	U L,M
7440-22-4	Silver, Total	0.020	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:43	
7440-28-0	Thallium, Total	0.55	mg/kg dry wt.	1	0.10	0.0049		01/24/08 10:43	
7440-62-2	Vanadium, Total	41	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:43	L,M

0457

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB5B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 14:00
Solids: 71.94
Laboratory ID: 0801253-03

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.52	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:40

04572

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB5B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 14:00
Solids: 71.94
Laboratory ID: 0801253-03

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	4.7	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:45	L, M
7440-50-8	Copper, Total	22	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:45	L, M
7439-92-1	Lead, Total	12	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:45	
7440-02-0	Nickel, Total	15	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:45	J, S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 13:47	U, L, M
7440-22-4	Silver, Total	0.054	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:45	
7440-28-0	Thallium, Total	0.15	mg/kg dry wt.	1	0.10	0.0049		01/24/08 10:45	
7440-62-2	Vanadium, Total	30	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:45	L, M

04373

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB5C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 14:10
Solids: 77.24
Laboratory ID: 0801253-04

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.26	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:42

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB5C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 14:10
Solids: 77.24
Laboratory ID: 0801253-04

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.9	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:48	L,M
7440-50-8	Copper, Total	22	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:48	L,M
7439-92-1	Lead, Total	5.1	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:48	
7440-02-0	Nickel, Total	13	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:48	J,S
7782-49-2	Selenium, Total	0.35	mg/kg dry wt.	1	0.30	0.089		01/24/08 13:49	L,M
7440-22-4	Silver, Total	0.041	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:48	
7440-28-0	Thallium, Total	0.064	mg/kg dry wt.	1	0.10	0.0049	J	01/24/08 10:48	
7440-62-2	Vanadium, Total	18	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:48	L,M

04575

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-6

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 00:00
Solids: 74.13
Laboratory ID: 0801253-06

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.48	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:44

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-6

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 00:00
Solids: 74.13
Laboratory ID: 0801253-06

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.9	mg/kg dry wt.	1	0.20	0.071		01/24/08 10:51	L, M
7440-50-8	Copper, Total	9.3	mg/kg dry wt.	1	0.20	0.044		01/24/08 10:51	L, M
7439-92-1	Lead, Total	18	mg/kg dry wt.	1	0.20	0.022		01/24/08 10:51	
7440-02-0	Nickel, Total	7.9	mg/kg dry wt.	1	0.10	0.036		01/24/08 10:51	J, S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/24/08 13:51	U L, M
7440-22-4	Silver, Total	0.020	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 10:51	
7440-28-0	Thallium, Total	0.43	mg/kg dry wt.	1	0.10	0.0049		01/24/08 10:51	
7440-62-2	Vanadium, Total	30	mg/kg dry wt.	1	0.10	0.034		01/24/08 10:51	L, M

04577

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:10
Solids: 71.41
Laboratory ID: 0801253-07

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.4997 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	15	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:46

0457B

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:10
Solids: 71.41
Laboratory ID: 0801253-07

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	2.7	mg/kg dry wt.	1	0.20	0.071		01/24/08 11:13	L,M
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044		01/24/08 11:13	L,M
7439-92-1	Lead, Total	20	mg/kg dry wt.	1	0.20	0.022		01/24/08 11:13	
7440-02-0	Nickel, Total	6.3	mg/kg dry wt.	1	0.10	0.036		01/24/08 11:13	J,S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/25/08 14:00	UL,M
7440-22-4	Silver, Total	0.023	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 11:13	
7440-28-0	Thallium, Total	0.30	mg/kg dry wt.	1	0.10	0.0049		01/24/08 11:13	
7440-62-2	Vanadium, Total	30	mg/kg dry wt.	1	0.10	0.034		01/24/08 11:13	L,M

61579

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:10
Solids: 77.53
Laboratory ID: 0801253-08

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.21	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:48

04580

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:10
Solids: 77.53
Laboratory ID: 0801253-08

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.4995 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.4	mg/kg dry wt.	1	0.20	0.071		01/24/08 11:15	L,M
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044		01/24/08 11:15	L,M
7439-92-1	Lead, Total	19	mg/kg dry wt.	1	0.20	0.022		01/24/08 11:15	
7440-02-0	Nickel, Total	6.8	mg/kg dry wt.	1	0.10	0.036		01/24/08 11:15	J,S
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U	01/25/08 13:36	UL,M
7440-22-4	Silver, Total	0.029	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 11:15	
7440-28-0	Thallium, Total	0.22	mg/kg dry wt.	1	0.10	0.0049		01/24/08 11:15	
7440-62-2	Vanadium, Total	19	mg/kg dry wt.	1	0.10	0.034		01/24/08 11:15	L,M

04581

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:30
Solids: 74.00
Laboratory ID: 0801253-09

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	14	mg/kg dry wt.	1	0.20	0.042		01/21/08 17:59

04582

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:30
Solids: 74.00
Laboratory ID: 0801253-09

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.5	mg/kg dry wt.	1	0.20	0.071		01/24/08 11:30	L,M
7440-50-8	Copper, Total	14	mg/kg dry wt.	1	0.20	0.044		01/24/08 11:30	L,M
7439-92-1	Lead, Total	25	mg/kg dry wt.	1	0.20	0.022		01/24/08 11:30	
7440-02-0	Nickel, Total	9.8	mg/kg dry wt.	1	0.10	0.036		01/24/08 11:30	J,S
7782-49-2	Selenium, Total	0.11	mg/kg dry wt.	1	0.30	0.089	J	01/25/08 13:46	L,M
7440-22-4	Silver, Total	0.031	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 11:30	
7440-28-0	Thallium, Total	0.37	mg/kg dry wt.	1	0.10	0.0049		01/24/08 11:30	
7440-62-2	Vanadium, Total	29	mg/kg dry wt.	1	0.10	0.034		01/24/08 11:30	L,M

04589

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:35
Solids: 73.53
Laboratory ID: 0801253-10

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/17/08 11:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0800613

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	1.2	mg/kg dry wt.	1	0.20	0.042		01/21/08 18:05

04584

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:35
Solids: 73.53
Laboratory ID: 0801253-10

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3050B Digestion
Prepared: 01/18/08 07:15
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0800657

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-38-2	Arsenic, Total	1.5	mg/kg dry wt.	1	0.20	0.071		01/24/08 11:33	L, M
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044		01/24/08 11:33	L, M
7439-92-1	Lead, Total	20	mg/kg dry wt.	1	0.20	0.022		01/24/08 11:33	
7440-02-0	Nickel, Total	7.3	mg/kg dry wt.	1	0.10	0.036		01/24/08 11:33	J, S
7782-49-2	Selenium, Total	0.14	mg/kg dry wt.	1	0.30	0.089	J	01/25/08 13:48	L, M
7440-22-4	Silver, Total	0.029	mg/kg dry wt.	1	0.10	0.013	J	01/24/08 11:33	
7440-28-0	Thallium, Total	0.26	mg/kg dry wt.	1	0.10	0.0049		01/24/08 11:33	
7440-62-2	Vanadium, Total	22	mg/kg dry wt.	1	0.10	0.034		01/24/08 11:33	L, M

64565

SAMPLE ID SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
EQBK-3	0801213-08
EQBK-4	0801230-01
EQBK-5	0801250-01

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

EQBK-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/10/08 14:10
Solids: 0.00
Laboratory ID: 0801213-08

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A Digestion - Total
Prepared: 01/21/08 14:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0800695

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	01/22/08 16:43

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

EQBK-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/11/08 13:40
Solids: 0.00
Laboratory ID: 0801230-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A Digestion - Total
Prepared: 01/21/08 14:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0800695

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	01/22/08 17:00

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

EQBK-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 01/14/08 14:30
Solids: 0.00
Laboratory ID: 0801250-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A Digestion - Total
Prepared: 01/21/08 14:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0800695

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	01/22/08 17:05

SAMPLE ID SUMMARY

USEPA-7471A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-47

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB14A	0801213-01
57SB14B	0801213-02
57SB14C	0801213-03
57SB1AB	0801213-04
DUP-4	0801213-05
57SB9A	0801213-06
57SB9AB	0801213-07
57SB6A	0801213-10
57SB6AB	0801213-11
57SB6B	0801213-12
57SB6C	0801233-01
57SB7A	0801233-02
57SB7AB	0801233-03
57SB7B	0801233-04
57SB7C	0801233-05
57SB4AB	0801233-06
57SB4B	0801233-07
57SB4C	0801233-08
DUP-5	0801233-09
57SB5A	0801253-01
57SB5AB	0801253-02
57SB5B	0801253-03
57SB5C	0801253-04
DUP-6	0801253-06
57SB8A	0801253-07
57SB8AB	0801253-08
57SB8B	0801253-09
57SB8C	0801253-10

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB14A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 08:10
Solids: 86.34
Laboratory ID: 0801213-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3004 g / 50 mL
QC Batch: 0800545

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.033	mg/kg dry wt.	1	0.050	0.0075	J	01/17/08 08:13

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB14B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 08:25
Solids: 79.37
Laboratory ID: 0801213-02

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0800545

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.025	mg/kg dry wt.	1	0.050	0.0075	J	01/17/08 08:28

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB14C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 09:07
Solids: 72.10
Laboratory ID: 0801213-03

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0800545

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.056	mg/kg dry wt.	1	0.050	0.0075		01/17/08 08:32

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB1AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 10:55
Solids: 77.72
Laboratory ID: 0801213-04

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0800545

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.14	mg/kg dry wt.	1	0.050	0.0075		01/17/08 08:37

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 12:00
Solids: 77.38
Laboratory ID: 0801213-05

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0800545

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.091	mg/kg dry wt.	1	0.050	0.0075		01/17/08 08:42

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 12:55
Solids: 85.84
Laboratory ID: 0801213-06

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0800545

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.76	mg/kg dry wt.	1	0.050	0.0075		01/17/08 08:47

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB9AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 13:30
Solids: 79.97
Laboratory ID: 0801213-07

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.2996 g / 50 mL
QC Batch: 0800545

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.034	mg/kg dry wt.	1	0.050	0.0075	J	01/17/08 09:02

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 15:40
Solids: 28.65
Laboratory ID: 0801213-10

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0800545

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.16	mg/kg dry wt.	1	0.050	0.0075		01/17/08 09:07

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB6AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 15:40
Solids: 77.38
Laboratory ID: 0801213-11

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.2997 g / 50 mL
QC Batch: 0800545

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.067	mg/kg dry wt.	1	0.050	0.0075		01/17/08 09:12

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB6B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 17:00
Solids: 69.91
Laboratory ID: 0801213-12

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/16/08 15:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0800545

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.066	mg/kg dry wt.	1	0.050	0.0075		01/17/08 09:16

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB6C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 08:15
Solids: 73.67
Laboratory ID: 0801233-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.015	mg/kg dry wt.	1	0.050	0.0075	J	01/24/08 12:30

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 09:05
Solids: 37.36
Laboratory ID: 0801233-02

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.17	mg/kg dry wt.	1	0.050	0.0075		01/24/08 12:45

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB7AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 09:05
Solids: 71.69
Laboratory ID: 0801233-03

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.17	mg/kg dry wt.	1	0.050	0.0075		01/24/08 12:50

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 09:10
Solids: 80.43
Laboratory ID: 0801233-04

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.062	mg/kg dry wt.	1	0.050	0.0075		01/24/08 12:55

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 10:05
Solids: 69.25
Laboratory ID: 0801233-05

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.014	mg/kg dry wt.	1	0.050	0.0075	J	01/24/08 13:00

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB4AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 12:05
Solids: 76.38
Laboratory ID: 0801233-06

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3004 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.047	mg/kg dry wt.	1	0.050	0.0075	J	01/24/08 13:06

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB4B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 12:40
Solids: 78.19
Laboratory ID: 0801233-07

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.035	mg/kg dry wt.	1	0.050	0.0075	J	01/24/08 13:11

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB4C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 13:00
Solids: 78.10
Laboratory ID: 0801233-08

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.050	mg/kg dry wt.	1	0.050	0.0075	U	01/24/08 13:16

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 00:00
Solids: 80.32
Laboratory ID: 0801233-09

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.044	mg/kg dry wt.	1	0.050	0.0075	J	01/24/08 13:21

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 12:55
Solids: 73.68
Laboratory ID: 0801253-01

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.2998 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.087	mg/kg dry wt.	1	0.050	0.0075		01/24/08 13:26

05669

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB5AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 12:55
Solids: 75.19
Laboratory ID: 0801253-02

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.086	mg/kg dry wt.	1	0.050	0.0075		01/24/08 13:31

05616

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB5B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 14:00
Solids: 71.94
Laboratory ID: 0801253-03

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.040	mg/kg dry wt.	1	0.050	0.0075	J	01/24/08 13:46

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB5C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 14:10
Solids: 77.24
Laboratory ID: 0801253-04

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.2996 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.012	mg/kg dry wt.	1	0.050	0.0075	J	01/24/08 13:51

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-6

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 00:00
Solids: 74.13
Laboratory ID: 0801253-06

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.2997 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.081	mg/kg dry wt.	1	0.050	0.0075		01/24/08 13:56

65613

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:10
Solids: 71.41
Laboratory ID: 0801253-07

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.066	mg/kg dry wt.	1	0.050	0.0075		01/24/08 14:02

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:10
Solids: 77.53
Laboratory ID: 0801253-08

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.048	mg/kg dry wt.	1	0.050	0.0075	J	01/24/08 14:07

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:30
Solids: 74.00
Laboratory ID: 0801253-09

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.058	mg/kg dry wt.	1	0.050	0.0075		01/24/08 14:22

05516

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

57SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:35
Solids: 73.53
Laboratory ID: 0801253-10

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7471A Mercury Digestio
Prepared: 01/23/08 14:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0800800

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.041	mg/kg dry wt.	1	0.050	0.0075	J	01/24/08 14:27

0561 7

SAMPLE ID SUMMARY

MSA 29-3.5.2

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57SB4A Physical Sample	0801233-10
57SB5AB Physical Sample	0801253-05

65575

INORGANIC ANALYSIS DATA SHEET

MSA 29-3.5.2

57SB4A Physical Sample

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/11/08 12:05
Solids: 0.00
Laboratory ID: 0801233-10

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: Method-Specific Prepara
Prepared: 01/23/08 09:00
Initial/Final: 0.8 g / 0.8 mL
QC Batch: 0800885

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-44-0	Carbon, Total Organic	0.81	%	1	0.10	0.047		01/23/08 09:00

0567

INORGANIC ANALYSIS DATA SHEET

MSA 29-3.5.2

57SB5AB Physical Sample

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 12:55
Solids: 0.00
Laboratory ID: 0801253-05

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: Method-Specific Prepara
Prepared: 01/23/08 09:00
Initial/Final: 0.81 g / 0.81 mL
QC Batch: 0800885

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-44-0	Carbon, Total Organic	0.24	%	1	0.10	0.047		01/23/08 09:00

05678

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-47
Project No.: 11105042)

Project Name: Radford
Reviewer: RA
Date: 2/19/08

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓			✓			✓					
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓			✓			✓					
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓			✓			✓				
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{O}C \pm 2\ ^{O}C$)	✓			✓			✓					
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓			✓			✓					

Note: _____

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		✓			✓			✓				

Note: _____

3.0 Instrument Calibration

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	✓			✓			✓					
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	✓			✓			✓					
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.												
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	✓			✓			✓					
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	✓			✓			✓					
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	✓			✓			✓					
	ICV and CCV:												
	Action: L(+)/R(-) L(+)/UL(-) K(+)												
	Mercury < 65% 65% - 79% > 120%												
	Cyanide < 65% 65% - 84% > 115%												
	Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	✓			✓								
	<50% 50%-79% >120%												
	2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K												

Note: _____

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓			✓			✓					
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	✓			✓			✓					
4.3	Are there reported MB or ICB/CCBs values > MDL?	✓			✓				✓				
	Sample Results > MDL												
	< 5X Blank Contamination B		✓			✓			✓				
4.4	Are there negative blank results with the absolute value > MDL?		✓			✓			✓				
	Sample Results Non-detects > MDL												
	< 5X absolute Blank Contamination UL L	✓											
4.5	Are there reported field blank > ± MDL?	✓			✓				✓				
	Sample Results > MDL												
	< 5X Blank Contamination B												

Note: 6010 → Soil MB, Be, Cd, Co, Fe, Na, water MB → Na < 5X, B, P & EBs, Co, Fe → all 5X, No action
6020 → Soil MBs Copper, Vanadium, lead, Water MB → Cr, Pb → < 5X B, P
EBs → Ba, Mn, Ni, all 5X FB, No action

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	✓			✓								
5.2	Are the ICS AB recoveries within 80% - 120%?	✓			✓								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	✓			✓								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			✓			✓						
	If not...												
	Action: Not Spiked Analytes < -MDL L(+)/UL(-); > MDL K(+); Spiked analytes (ICS AB analytes) < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note:

URS

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	✓			✓			✓					
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		✓			✓			✓				
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note:

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	✓			✓								
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	✓			✓								

Note:

URS

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	✓			✓			✓					
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous matrices or lab limits for soil matrices?		✓		✓			✓					
	%R > 125% / 30%< %R < 74% / < 30%												
	Positive: K / L / L												
	Non-detect: None / UL / R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	✓					✓	✓					

Note: 6020 MS for 575B14A<QC at 74%.
6020 MS/MSD for 575B8AB<QC As 63%./63%., Copper 74%., Se 60%.,59%., V 73%.
LL/LM in all samples

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	✓			✓			✓					

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	✓			✓								
10.2	Was a five-fold dilution performed?	✓			✓								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).		✓			✓							

Note: 6010 → for 575B14A Al → 19%. all Pos → J/S
6020 → for 575B8AB Copper 16%., Ni 20%., and Vanadium 19%.
Pos → J/S unless prev for MS anomalies

Cu, Ni, V

URS

11.0 Field Duplicate Samples

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	✓			✓			✓					
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	✓			✓			✓					

Note: Hg → 575B1AB RL DUP-4 575B5AB RL DUP-6
Hg 0.14 0.05 0.091 OK✓ Hg 0.086 0.05 0.081 OK✓
575B4AB DUP-5
Hg 0.047 0.05 0.044 OK✓ see attached

12.0 Result Verification/ Internal Standards/ Tune

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	✓			✓			✓					
12.2	Were all dilution reflected in the positive results and detection limits?	✓			✓			✓					
12.3	Were the Internal Standard recoveries within 30-120%	✓			✓								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	✓											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	✓											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	✓											

Note:

13.0 Completeness Calculation

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	✓			✓			✓					
13.1.1	Number of samples:												
13.1.2	Number of target compounds in each analysis:												
13.1.3	Number of results rejected and not reported:												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%												

Note:

Field DUPs for Method 6020

	575B1AB	DUP-4	RL	%RPD
Sb	0.17J	0.16J	0.2	OKV
As	1.6	1.7	0.2	OKV
Cu	11	12	0.2	9% ✓
Pb	15	15	0.2	OKV
Ni	9.3	9.1	0.1	OKV
Se	0.24	0.2	0.3	OKV
Ag	0.046	0.04	0.1	OKV
Tl	0.2	0.19	0.1	OKV
V	24	25	0.1	4% OKV

	575B4AB	DUP-5	RL	%RPD
Sb	0.81	0.8	0.2	OKV
As	2.7	2.3	0.2	OKV
Cu	13	12	0.2	8% ✓
Pb	13	11	0.2	17% ✓
Ni	6.6	5.9	0.1	11% ✓
Se	0.095J	ND	0.3	OKV
Ag	0.036J	0.023J	0.1	OKV
Tl	0.15	0.14	0.1	OKV
V	22	22	0.1	OKV

	575B5AB	DUP-6	RL	RPD
Sb	0.51	0.48	0.2	OKV
As	2	1.9	0.2	OKV
Cu	10	9.3	0.2	7% ✓
Pb	15	18	0.2	18% ✓
Ni	7.5	7.9	0.1	5% ✓
Ag	0.02J	0.02J	0.1	OKV
Tl	0.55	0.43	0.1	OKV
V	41	30	0.1	31% ✓

Field Dups for Method 6010

	S75B1AB	DUP-4	RL	RPD
Al	26000 mg/kg	28,000	10	7% ✓
Ba	49	45	1	8% ✓
Be	1.1	1.1	1	0 ✓
Ca	710	490	50	37% ✓
Cr	24	25	5	4% ✓
Co	4.1	3.5	2	0 ✓
Fe	34000	37000	10	8% ✓
Mg	1200	1100	50	8% ✓
Mn	180	170	1	6% ✓
K	950	1000	50	5% ✓
Na	48	52	100	0 ✓ 8% ✓
Zn	40	43	5	7% ✓

	S75B4AB	DUP-5	RL	RPD
Al	26000	24000	10	8% ✓
Ba	54	52	1	4% ✓
Be	0.8J	0.765	1	0 ✓
Ca	730	640	50	13% ✓ 0 ✓
Cr	23	23	5	0 ✓
Co	4	4.1	2	0 ✓
Fe	24000	33000	10	3% ✓
Mg	830	780	50	6% ✓
Mn	300	320	1	7% ✓
K	840	810	50	4% ✓
Na	120	110	100	9% ✓
Zn	35	37	5	7% ✓

Field Dups for 6010 continued

	575B5AB,	DUP-6	RL	RPD
Al	19000 mg/kg	18,000	10	5% ✓
Ba	100	95	1	5% ✓
Be	0.83 J	1.1	1	OK ✓
Cd	2.5	2.6	2	OK ✓
Ca	410	390	50	5% ✓
Cr	48	35	5	31% ✓
Co	18	20	2	10% ✓
Fe	30,000	28,000	10	7% ✓
Mg	760	820	50	8% ✓
Mn	2100	2100	1	OK ✓
K	850	910	50	7% ✓
Na	100	89	100	12% ✓
Zn	35	29	5	19% ✓

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800541-BLK1
File ID: 8011709-035
Prepared: 01/16/08 07:15
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 01/18/08 10:26
Instrument: 101
QC Batch: 0800541
Sequence: 8011709
Calibration: 8A21002

CAS No.	Analyte	MDL	MRL	Concentration	Q
7429-90-5	Aluminum, Total	2.1	10	10 mg/kg dry wt.	U
7440-39-3	Barium, Total	0.17	1.0	1.0 mg/kg dry wt.	U
7440-41-7	Beryllium, Total	0.021	1.0	0.0239 mg/kg dry wt.	J
7440-43-9	Cadmium, Total	0.11	2.0	0.115 mg/kg dry wt.	J
7440-70-2	Calcium, Total	4.2	50	8.06 mg/kg dry wt.	J
7440-47-3	Chromium, Total	0.72	5.0	5.0 mg/kg dry wt.	U
7440-48-4	Cobalt, Total	0.37	2.0	2.0 mg/kg dry wt.	U
7439-89-6	Iron, Total	0.48	10	2.90 mg/kg dry wt.	J
7439-95-4	Magnesium, Total	5.0	50	50 mg/kg dry wt.	U
7439-96-5	Manganese, Total	0.16	1.0	1.0 mg/kg dry wt.	U
7440-09-7	Potassium, Total	5.3	50	50 mg/kg dry wt.	U
7440-23-5	Sodium, Total	13	100	22.7 mg/kg dry wt.	J
7440-66-6	Zinc, Total	1.0	5.0	5.0 mg/kg dry wt.	U

Be 0.1195
Cd 0.575
Ca 40.3
Fe 14.5
Na 113.5

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0800636-BLK1
File ID: 8012209-018
Prepared: 01/18/08 07:00
Preparation: 3010A Digestion
Initial/Final: 25 mL / 25 mL
Analyzed: 01/22/08 10:43
Instrument: 116
QC Batch: 0800636
Sequence: 8012209
Calibration: 8A22007

CAS No.	Analyte	MDL	MRL	Concentration	Q
7429-90-5	Aluminum, Total	44	200	200 ug/L	U
7440-70-2	Calcium, Total	40	500	500 ug/L	U
7439-95-4	Magnesium, Total	38	500	500 ug/L	U
7440-09-7	Potassium, Total	54	200	200 ug/L	U
7440-23-5	Sodium, Total	84	500	99.0 ug/L	J

Na 495

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800656-BLK1
File ID: 8012309-024
Prepared: 01/18/08 08:00
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 01/23/08 11:33
Instrument: 101
QC Batch: 0800656
Sequence: 8012309
Calibration: 8A24006

CAS No.	Analyte	MDL	MRL	Concentration	Q
7429-90-5	Aluminum, Total	2.1	10	10 mg/kg dry wt.	U
7440-39-3	Barium, Total	0.17	1.0	1.0 mg/kg dry wt.	U
7440-41-7	Beryllium, Total	0.021	1.0	0.0444 mg/kg dry wt.	J
7440-43-9	Cadmium, Total	0.11	2.0	2.0 mg/kg dry wt.	U
7440-70-2	Calcium, Total	4.2	50	50 mg/kg dry wt.	U
7440-47-3	Chromium, Total	0.72	5.0	5.0 mg/kg dry wt.	U
7440-48-4	Cobalt, Total	0.37	2.0	2.0 mg/kg dry wt.	U
7439-89-6	Iron, Total	0.48	10	0.845 mg/kg dry wt.	J
7439-95-4	Magnesium, Total	5.0	50	50 mg/kg dry wt.	U
7439-96-5	Manganese, Total	0.16	1.0	1.0 mg/kg dry wt.	U
7440-09-7	Potassium, Total	5.3	50	50 mg/kg dry wt.	U
7440-66-6	Zinc, Total	1.0	5.0	5.0 mg/kg dry wt.	U

Be 0.22

Fe 4.225

SERIAL DILUTION

USEPA-6010B

57SB14A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

% Solids: 86.34

Laboratory ID: 8012231-SRD2

Lab Source ID: 0801213-01

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

QC Batch: 8012231

Sequence: 8012231

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Aluminum, Total	1.16		0.941		19.0	*	mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

03769

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0800833-BLK1
File ID: 8012332-037
Prepared: 01/23/08 09:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL
Analyzed: 01/23/08 19:48
Instrument: 114
QC Batch: 0800833
Sequence: 8012332
Calibration: 8A24001

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-50-8	Copper, Total	0.33	1.0	1.0 ug/L	U
7439-92-1	Lead, Total	0.33	1.0	0.442 ug/L	J
7440-28-0	Thallium, Total	0.17	1.0	1.0 ug/L	U
7440-66-6	Zinc, Total	0.84	10	10 ug/L	U

Pb 2.21

04669

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0800644-BLK1
File ID: 8012242-015
Prepared: 01/18/08 07:15
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL
Analyzed: 01/22/08 17:24
Instrument: 114
QC Batch: 0800644
Sequence: 8012242
Calibration: 8A23012

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-38-2	Arsenic, Total	0.74	3.0	3.0 ug/L	U
7440-39-3	Barium, Total	0.52	2.0	2.0 ug/L	U
7440-41-7	Beryllium, Total	0.31	2.0	2.0 ug/L	U
7440-43-9	Cadmium, Total	0.062	0.20	0.20 ug/L	U
7440-47-3	Chromium, Total	0.31	2.0	0.411 ug/L	J
7440-48-4	Cobalt, Total	0.096	1.0	1.0 ug/L	U
7439-96-5	Manganese, Total	0.43	3.0	3.0 ug/L	U
7440-02-0	Nickel, Total	0.28	2.0	2.0 ug/L	U
7782-49-2	Selenium, Total	0.92	3.0	3.0 ug/L	U
7440-22-4	Silver, Total	0.12	0.50	0.50 ug/L	U
7440-62-2	Vanadium, Total	0.83	5.0	5.0 ug/L	U

Cr 2.055

61666

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800544-BLK1
File ID: 8012206-044
Prepared: 01/16/08 07:20
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 250 mL
Analyzed: 01/22/08 11:15
Instrument: 114
QC Batch: 0800544
Sequence: 8012206
Calibration: 8A22009

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-38-2	Arsenic, Total	0.071	0.20	0.20 mg/kg dry wt.	U
7440-50-8	Copper, Total	0.044	0.20	0.146 mg/kg dry wt.	J
7440-02-0	Nickel, Total	0.036	0.10	0.10 mg/kg dry wt.	U
7782-49-2	Selenium, Total	0.089	0.30	0.30 mg/kg dry wt.	U
7440-22-4	Silver, Total	0.013	0.10	0.10 mg/kg dry wt.	U

Cu 0.73

84662

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800544-BLK2
File ID: 8012230-026
Prepared: 01/16/08 07:20
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 250 mL
Analyzed: 01/22/08 14:23
Instrument: 114
QC Batch: 0800544
Sequence: 8012230
Calibration: 8A23010

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-62-2	Vanadium, Total	0.034	0.10	0.0380 mg/kg dry wt.	J

V 0.19

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800544-BLK3
File ID: 8012238-126
Prepared: 01/16/08 07:20
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 250 mL
Analyzed: 01/23/08 10:29
Instrument: 201
QC Batch: 0800544
Sequence: 8012238
Calibration: 8A23017

CAS No.	Analyte	MDL	MRL	Concentration	Q
7439-92-1	Lead, Total	0.022	0.20	0.0260 mg/kg dry wt.	J
7440-28-0	Thallium, Total	0.0049	0.10	0.10 mg/kg dry wt.	U

Pb 0.13

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

57SB14A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3050B Digestion

Initial/Final: 0.5005 g / 250 mL

Laboratory ID: 0800544-MS1

QC Batch: 0800544

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Arsenic, Total	20.0	1.61	17.0	77 OK	80 - 120	mg/kg dry wt.
Copper, Total	20.0	5.20	23.3	91	80 - 120	mg/kg dry wt.
Nickel, Total	20.0	5.59	23.9	92	80 - 120	mg/kg dry wt.
Selenium, Total	20.0	0.499	15.3	74 *	80 - 120	mg/kg dry wt.
Silver, Total	20.0	0.0430	18.8	94	75 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

64672

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3050B Digestion

Initial/Final: 0.5004 g / 250 mL

Laboratory ID: 0800657-MS1

QC Batch: 0800657

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Arsenic, Total	20.0	1.36	13.9	63 *	80 - 120	mg/kg dry wt.
Copper, Total	20.0	11.7	26.6	75 OK	80 - 120	mg/kg dry wt.
Lead, Total	20.0	19.4	40.1	104	80 - 120	mg/kg dry wt.
Nickel, Total	20.0	6.82	22.2	77 OK*	80 - 120	mg/kg dry wt.
Silver, Total	20.0	0.0285	19.4	97	75 - 120	mg/kg dry wt.
Thallium, Total	20.0	0.219	19.5	96	80 - 120	mg/kg dry wt.
Vanadium, Total	20.0	19.4	34.8	77 OK*	80 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Region III Limits: 75-125 % RA

64686

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3050B Digestion

Initial/Final: 0.5003 g / 250 mL

Laboratory ID: 0800657-MSD1

QC Batch: 0800657

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Arsenic, Total	20.0	13.9	63 *	0.3	20	80 - 120	mg/kg dry wt.
Copper, Total	20.0	26.6	74 *	0.2	20	80 - 120	mg/kg dry wt.
Lead, Total	20.0	39.9	102	0.7	20	80 - 120	mg/kg dry wt.
Nickel, Total	20.0	22.5	78 OK*	1	20	80 - 120	mg/kg dry wt.
Silver, Total	20.0	19.6	98	0.7	20	75 - 120	mg/kg dry wt.
Thallium, Total	20.0	19.6	97	0.5	20	80 - 120	mg/kg dry wt.
Vanadium, Total	20.0	34.0	73 *	2	20	80 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

04561

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3050B Digestion

Initial/Final: 0.5004 g / 250 mL

Laboratory ID: 0800657-MS2

QC Batch: 0800657

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Selenium, Total	20.0	ND	12.0	60 *	80 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

04662

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3050B Digestion

Initial/Final: 0.5003 g / 250 mL

Laboratory ID: 0800657-MSD2

QC Batch: 0800657

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Selenium, Total	20.0	11.8	59 *	2	20	80 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

04663

SERIAL DILUTION

USEPA-6020A

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-47

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil

% Solids: 77.53

Laboratory ID: 8012401-SRD2

QC Batch: 8012401

Lab Source ID: 0801253-08

Sequence: 8012401

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Arsenic, Total	0.00273		0.00263		4.0 #		mg/L	10
Copper, Total	0.0234		0.0271		16.0	*	mg/L	10
Lead, Total	0.0387		0.0413		7.0		mg/L	10
Nickel, Total	0.0136		0.0163		20.0	*	mg/L	10
Silver, Total	0.0000570	J	-0.0000450	U	179.0 #		mg/L	10
Thallium, Total	0.000438		0.000475	J	8.0 #		mg/L	10
Vanadium, Total	0.0387		0.0442		14.0	*	mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

61765

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Total Metals by EPA 6000/7000 Series Methods

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-6020A

Sample/Analyte:			
	0801213-01	57SB14A	Arsenic
	0801213-01	57SB14A	Selenium
	0801253-08	57SB8AB	Arsenic
	0801253-08	57SB8AB	Copper
	0801253-08	57SB8AB	Nickel
	0801253-08	57SB8AB	Selenium
	0801253-08	57SB8AB	Vanadium

Qualification: The analyte concentration in the associated MB was greater than or equal to 1/2 the RL. The positive sample result, which was greater than 5 times the MB value, is not considered estimated.

Analysis: USEPA-6020A

Sample/Analyte:			
	0801213-01	57SB14A	Copper
	0801213-02	57SB14B	Copper
	0801213-03	57SB14C	Copper
	0801213-04	57SB1AB	Copper
	0801213-05	DUP-4	Copper
	0801213-06	57SB9A	Copper
	0801213-07	57SB9AB	Copper
	0801213-10	57SB6A	Copper
	0801213-11	57SB6AB	Copper
	0801213-12	57SB6B	Copper

Qualification: The % difference in results between the sample and a serial dilution of the sample exceeded the control limit. Sample matrix interference is suspected and the reported result is considered estimated.

Analysis: USEPA-6010B

Sample/Analyte:			
	0801213-01	57SB14A	Aluminum

Analysis: USEPA-6020A

Sample/Analyte:			
	0801253-08	57SB8AB	Copper
	0801253-08	57SB8AB	Nickel
	0801253-08	57SB8AB	Vanadium

Qualification: The post-digestion spike recovery for this sample was outside the control limit. Sample matrix interference is suspected and the reported result must be considered as estimated.

This report shall not be reproduced except in full, without written authorization of TriMatrix Laboratories, Inc.
Individual sample results relate only to the sample tested.
5560 Corporate Exchange Court SE • Grand Rapids, MI 49512 • (616) 975-4500 • Fax (616) 942-7469

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Total Metals by EPA 6000/7000 Series Methods

Analysis:	USEPA-6020A		
Sample/Analyte:	0801253-08	57SB8AB	Copper
	0801253-08	57SB8AB	Nickel
	0801253-08	57SB8AB	Vanadium

Qualification: This analyte was not present in this sample at a concentration greater than 50 times the MDL, therefore serial dilution is not required.

Analysis:	USEPA-6010B		
Sample/Analyte:	0801213-01	57SB14A	Cobalt
	0801253-08	57SB8AB	Sodium

Qualification: This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.

Analysis:	USEPA-6020A		
Sample/Analyte:	0801213-01	57SB14A	Arsenic
	0801213-01	57SB14A	Selenium
	0801213-01	57SB14A	Thallium

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was greater than or equal to 4 times the spiked amount; the non-spiked sample result is not qualified.

Analysis:	USEPA-6010B		
Sample/Analyte:	0801213-01	57SB14A	Aluminum
	0801213-01	57SB14A	Barium
	0801213-01	57SB14A	Iron
	0801213-01	57SB14A	Manganese
	0801253-08	57SB8AB	Aluminum
	0801253-08	57SB8AB	Iron
	0801253-08	57SB8AB	Manganese

Qualification: Due to sample matrix-related Internal Standard failure, the sample was reanalyzed at dilution. The RL for this analyte has been elevated.

Analysis:	USEPA-6020A		
Sample/Analyte:	0801213-11	57SB6AB	Arsenic
	0801213-11	57SB6AB	Copper
	0801213-11	57SB6AB	Nickel
	0801213-11	57SB6AB	Selenium
	0801213-11	57SB6AB	Vanadium

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Individual sample results relate only to the sample tested.
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DATA VALIDATION WORKSHEET

Total Organic Carbon

Reviewer: RA
Date: 2/20/08
DV Level: II III IV

Review Document:

_X__ Region III Modified for National Functional Guidelines
_X__ Methods of Soil Analyses for soil by Walkley Black
_X__ Project QAPP/SAP

Project Name: Radford
Project Number: 11656421.30000
Laboratory: TriMatrix
SDG No.: 30440-47
Test Name: TOC
Method No.: Walkley Black

All QC OK ✓

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do sample preservation, collection and storage condition meet method requirement? (4C and <2)	✓		
	If samples were received with the cooler temperature exceeding 20 ^{O}C, then flag L(+)/UL(-).			
1.4	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Have any technical holding times (28 days), determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field / equipment blanks have positive results? If yes, use same rules above.			✓

Notes:

URS

4.0 Calibration		Yes	No	NA
4.1	Was a titration blank analyzed before processing the samples?	✓		
4.2	Is titrant normality within 0.5 +/- 0.05N? If no, J/UJ	✓		

Notes:

5.0 Laboratory Control Sample (LCS)		Yes	No	NA
5.1	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.2	Are there any %R for LCS/LCSD recoveries outside the laboratory's QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
5.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.			✓

Notes:

6.0 Laboratory Duplicate		Yes	No	NA
6.1	Was a laboratory duplicate analyzed at required frequency (one per 20 samples per batch) ?	✓		
6.2	Is the RPD within the laboratory's QC limits?	✓		
	If no, J flag positive results only.			

Notes:

7.0 Field Duplicate		Yes	No	NA
7.1	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended should be noted during data validation and discussed in the DV report.			✓

Notes:

8.0 Compound Identification and Detection Limit Verification		Yes	No	NA
8.1	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes:

9.0 Data Completeness		Yes	No	NA
9.1	Is % completeness for certainty? (Control limit 90%)	✓		
9.1.1	Number of samples:_____			
9.1.2	Number of target compounds in each analysis: 1			
9.1.3	Number of results that are uncertain at comparison criteria standard:_____			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100%.			

Notes:

DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: RA
Date: 2/16/08
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford
Project Number: 1165.6421
Laboratory: TN Metrix
SDG No.: 36440-47
Test Name: VOC
Method No.: 8260B

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.	✓		

Notes: Note. 575B7A 38% Solid → No action
575B6A 29% " → " "

2.0 Holding Times		Yes	No	NA
2.1	Were samples preserved on ice for soils and on ice with HCL for aqueous samples?	✓		
2.2	Have any technical holding times (14 days), determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (every 12 hour period per GCMS, matrix, and level)?	✓		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample]≤ 5X[associated blank]. (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone)	✓		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	✓		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	✓		

Notes: WMB → acetone 1.68 ug/L <10X → B/E in Trip and EBS
SMB → 1,4-DCB 8.5 ug/Kg MCB 16 ug/Kg, 1,4-DCB and NPS, <10X B/E for MCB and samples
Trip blanks pos for MCB and toluene <10X for MCB and <5X for toluene B/E
EBS → Chloroform at 0.84 ug/L all NPS in all samples, NO action
EGBK-5 ↓

one

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve?Are at least five standards included in the calibration curve?	✓		
4.2	Was an initial calibration analyzed at the beginning of each analysis?	✓		
4.3	Was a second source calibration verification analyzed for each calibration curve?	✓		
4.4	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	✓		
4.5	Are all calibration standard %RSDs, correlation coefficient, or % drift within the control limits (%RSD <15%, r>0.995 or r^2>0.99; for 2° source: %D<+20%; and for CCC, %D < 20%)?		✓	
For initial calibration: %RSD > 15%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>20% J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				
4.6	Are any CCCs (chloroform, 1,1-DCE, 1,2-DCPA, ethylbenzene, toluene, and vinyl chloride) displaying an RSD greater than 30%? If yes, L(+)/R(-) all associated results.		✓	
4.7	Do any SPCC have an RRF low? (<0.10 for chloromethane, 1,1-dichloroethane, and bromoform or <0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane) If yes, L(+)/R(-) all associated results.		✓	

Notes: CC Sequence 8011735 7QC acetone 22% neg. bias, carbon disulfide 35.5% pos. bias, all acetone results were pos→J/C, pos carbon disulfide J/C

CC sequence 8011744 carbon disulfide 87.3% pos bias → pos, J/C

CC Sequence 8012120 bromomethane 21.2% pos bias

[redacted] all NDs, No action

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	✓		
5.2	Have all samples been analyzed within twelve hours of the BFB tune? If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".	✓		
5.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag "R".	✓		

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			✓
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm			
6.3	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/			✓

	1 or more <10%	1 high/low	2 or 3 high/low	2 or 3 all low	2 or 3 all high
Positives	L	J	J	L	K
Non-detects	R	UJ	UJ	UJ	NONE

Note: The B qualifier remains over surrogate flagging.

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes: MS/MSD for 575B14A7QC 1,1-DCA, 1,2-dichloropropane, isopropylbenzene, methyl tert-butyl ether → Jim
1,1,2,2-TECA, chloroform, 1,2-dibromo-3-chloropropane — see attached pos. also <QC for Styrene, 1,2,3-TCB, 1,2,4-TCB all NDs in Parent → UJ/N

MS/MSD for 575B8AB7QC 1,2-dibromo-3-chloropropane, 2-butanone, 1,1,2,2-TECA, 1,2-DCB, isopropylbenzene all NDs in Parent, No action, RPD>QC 1,2,3-TCB, 1,2,4-TCB all NDs <QC for acetone, Methyl acetate, methylcyclohexane, 1,2,4-TCB, 1,1,2-trichloro-1,2,2-trifluoroethane J/UJ in Parent

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are %R for LCS/LCSD recoveries outside the QC limits? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).	✓		
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.		✓	

Notes: batch 800592 Carbon disulfide 188%>160%.
& 800595 & 163%>160%, 155%>160%.
Pos J, all unless prev. flagged for calibration anomaly.

URS

575B5AB DUP-6 RL RPD
acetone 36 39 27 OKV
carbon disulfide 2.7J 2.8J 6.6 OKV
methylacetate 2.8J 2.4J 27 OKV
TCE 0.68J ND OKV
→ also

9.0 Internal Standard

		Yes	No	NA
9.1	Are internal standard area of every sample and blank within +100% or -50% of the mid point calibration standard? If not, J(+)/UJ(-).		✓	
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	✓		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes: 1,4-dichlorobenzene-d4 <50% in 575B6A 48%
575B5AB 49%
and results NDs → UJ, J

10.0 Field Duplicate

		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	✓		
	For sample results > 5 x RL, use 50% RPD. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 x RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV	✓		

Notes:

575B1AB		DUP-4	RL	RPD
acetone	38	28	26	OKV
Chloroform	1.5J	0.84J	6.4	OKV
methylacetate	3.4J	3.5J	26	OKV

575B4AB		RL	DUP-5	RPD
acetone	51	26	76	OKV
carbon disulfide	1.6J	6.5	1.2J	OKV
methylacetate	12J	26	3.1	OKV
2-butanone	11J	26	9.2J	OKV

11.0 Detection Limit Verification

		Yes	No	NA
11.1	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	✓		
11.2	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated		✓	

Notes: acetone E in 575B14A → J (9)

12.0 Data Completeness

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
12.1.1	Number of samples:			
12.1.2	Number of target compounds in each analysis:			
12.1.3	Number of results rejected and not reported:			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100%			

Notes:

QC BATCH SUMMARY

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

QC Batch: 0800593 QC Batch Matrix: Water

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 5030B Aqueous Purge & Trap

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	0800593-BLK1	01/16/08 08:00	
LCS	0800593-BS1	01/16/08 08:00	
LCS Dup	0800593-BSD1	01/16/08 08:00	
EQBK-3	0801213-08	01/16/08 08:00	
Trip Blank	0801213-09	01/16/08 08:00	
EQBK-4	0801230-01	01/16/08 08:00	
Trip Blank	0801230-02	01/16/08 08:00	
EQBK-5	0801250-01	01/16/08 08:00	
Trip Blank	0801250-02	01/16/08 08:00	

acetone 16.8

01730

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0800593-BLK1 File ID: BLK0116AA.D

Prepared: 01/16/08 08:00 Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

Analyzed: 01/16/08 12:01 Instrument: 224

QC Batch: 0800593 Sequence: 8011719 Calibration: 8A17002

CAS No.	Analyte	MDL	MRL	Concentration	Q
67-64-1	Acetone	1.2	20	1.68 ug/L	J
71-43-2	Benzene	0.12	1.0	1.0 ug/L	U
74-97-5	Bromochloromethane	0.20	1.0	1.0 ug/L	U
75-27-4	Bromodichloromethane	0.19	1.0	1.0 ug/L	U
75-25-2	Bromoform	0.23	1.0	1.0 ug/L	U
74-83-9	Bromomethane	0.19	1.0	1.0 ug/L	U
75-15-0	Carbon Disulfide	0.28	5.0	5.0 ug/L	U
56-23-5	Carbon Tetrachloride	0.15	1.0	1.0 ug/L	U
108-90-7	Chlorobenzene	0.12	1.0	1.0 ug/L	U
75-00-3	Chloroethane	0.20	1.0	1.0 ug/L	U
67-66-3	Chloroform	0.061	1.0	1.0 ug/L	U
74-87-3	Chloromethane	0.060	1.0	1.0 ug/L	U
110-82-7	Cyclohexane	0.14	5.0	5.0 ug/L	U
96-12-8	1,2-Dibromo-3-chloropropane	0.29	5.0	5.0 ug/L	U
124-48-1	Dibromochloromethane	0.14	1.0	1.0 ug/L	U
106-93-4	1,2-Dibromoethane	0.22	1.0	1.0 ug/L	U
95-50-1	1,2-Dichlorobenzene	0.065	1.0	1.0 ug/L	U
541-73-1	1,3-Dichlorobenzene	0.12	1.0	1.0 ug/L	U
106-46-7	1,4-Dichlorobenzene	0.13	1.0	1.0 ug/L	U
75-71-8	Dichlorodifluoromethane	0.17	1.0	1.0 ug/L	U
75-34-3	1,1-Dichloroethane	0.076	1.0	1.0 ug/L	U
107-06-2	1,2-Dichloroethane	0.15	1.0	1.0 ug/L	U
75-35-4	1,1-Dichloroethene	0.14	1.0	1.0 ug/L	U
156-59-2	cis-1,2-Dichloroethene	0.17	1.0	1.0 ug/L	U
156-60-5	trans-1,2-Dichloroethene	0.16	1.0	1.0 ug/L	U
78-87-5	1,2-Dichloropropane	0.10	1.0	1.0 ug/L	U
10061-01-5	cis-1,3-Dichloropropene	0.14	1.0	1.0 ug/L	U
10061-02-6	trans-1,3-Dichloropropene	0.16	1.0	1.0 ug/L	U
100-41-4	Ethylbenzene	0.13	1.0	1.0 ug/L	U
591-78-6	2-Hexanone	0.42	10	10 ug/L	U

01728

QC BATCH SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
QC Batch: 0800703 QC Batch Matrix: Soil
Preparation: 5030B Aqueous Purge & Trap

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	0800703-BLK1	01/18/08 12:00	
LCS	0800703-BS1	01/18/08 12:00	
57SB14C	0801213-03	01/18/08 12:00	
57SB9A	0801213-06	01/18/08 12:00	

1,4-DCB 42.5
MCB 100

01746

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800703-BLK1
File ID: BLK0118B.D
Prepared: 01/18/08 12:00
Preparation: 5030B Aqueous Purge &
Initial/Final: 10 g / 500 mL
Analyzed: 01/18/08 14:19
Instrument: 224
QC Batch: 0800703
Sequence: 8012120
Calibration: 8A21004

CAS No.	Analyte	MDL	MRL	Concentration	Q
67-64-1	Acetone	60	750	750 ug/kg wet	U
71-43-2	Benzene	5.9	50	50 ug/kg wet	U
74-97-5	Bromochloromethane	9.8	50	50 ug/kg wet	U
75-27-4	Bromodichloromethane	9.7	50	50 ug/kg wet	U
75-25-2	Bromoform	12	50	50 ug/kg wet	U
74-83-9	Bromomethane	9.6	50	50 ug/kg wet	U
75-15-0	Carbon Disulfide	14	250	250 ug/kg wet	U
56-23-5	Carbon Tetrachloride	7.6	50	50 ug/kg wet	U
108-90-7	Chlorobenzene	6.0	50	50 ug/kg wet	U
75-00-3	Chloroethane	10	50	50 ug/kg wet	U
67-66-3	Chloroform	3.1	50	50 ug/kg wet	U
74-87-3	Chloromethane	3.0	50	50 ug/kg wet	U
110-82-7	Cyclohexane	6.9	250	250 ug/kg wet	U
96-12-8	1,2-Dibromo-3-chloropropane	14	250	250 ug/kg wet	U
124-48-1	Dibromochloromethane	6.9	50	50 ug/kg wet	U
106-93-4	1,2-Dibromoethane	11	50	50 ug/kg wet	U
95-50-1	1,2-Dichlorobenzene	3.3	50	50 ug/kg wet	U
541-73-1	1,3-Dichlorobenzene	6.0	50	50 ug/kg wet	U
106-46-7	1,4-Dichlorobenzene	6.7	50	8.50 ug/kg wet	J
75-71-8	Dichlorodifluoromethane	8.4	50	50 ug/kg wet	U
75-34-3	1,1-Dichloroethane	3.8	50	50 ug/kg wet	U
107-06-2	1,2-Dichloroethane	7.7	50	50 ug/kg wet	U
75-35-4	1,1-Dichloroethene	6.9	50	50 ug/kg wet	U
156-59-2	cis-1,2-Dichloroethene	8.3	50	50 ug/kg wet	U
156-60-5	trans-1,2-Dichloroethene	7.9	50	50 ug/kg wet	U
78-87-5	1,2-Dichloropropane	5.2	50	50 ug/kg wet	U
10061-01-5	cis-1,3-Dichloropropene	7.1	50	50 ug/kg wet	U
10061-02-6	trans-1,3-Dichloropropene	7.8	50	50 ug/kg wet	U
100-41-4	Ethylbenzene	6.6	50	50 ug/kg wet	U
591-78-6	2-Hexanone	21	2500	2500 ug/kg wet	U

01738

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-47

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil Laboratory ID: 0800703-BLK1 File ID: BLK0118B.D

Prepared: 01/18/08 12:00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

Analyzed: 01/18/08 14:19 Instrument: 224

QC Batch: 0800703 Sequence: 8012120 Calibration: 8A21004

CAS No.	Analyte	MDL	MRL	Concentration	Q
98-82-8	Isopropylbenzene	6.2	50	50 ug/kg wet	U
79-20-9	Methyl Acetate	8.3	250	250 ug/kg wet	U
1634-04-4	Methyl tert-Butyl Ether	4.8	50	50 ug/kg wet	U
108-87-2	Methylcyclohexane	7.4	250	250 ug/kg wet	U
75-09-2	Methylene Chloride	8.0	250	16.0 ug/kg wet	J
78-93-3	2-Butanone (MEK)	16	2500	2500 ug/kg wet	U
108-10-1	4-Methyl-2-pentanone (MIBK)	19	2500	2500 ug/kg wet	U
100-42-5	Styrene	5.4	50	50 ug/kg wet	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	50	50 ug/kg wet	U
127-18-4	Tetrachloroethene	7.5	50	50 ug/kg wet	U
108-88-3	Toluene	3.6	50	50 ug/kg wet	U
87-61-6	1,2,3-Trichlorobenzene	6.7	100	100 ug/kg wet	U
120-82-1	1,2,4-Trichlorobenzene	8.1	100	100 ug/kg wet	U
71-55-6	1,1,1-Trichloroethane	5.5	50	50 ug/kg wet	U
79-00-5	1,1,2-Trichloroethane	10	50	50 ug/kg wet	U
79-01-6	Trichloroethene	8.5	50	50 ug/kg wet	U
75-69-4	Trichlorofluoromethane	9.0	50	50 ug/kg wet	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.2	250	250 ug/kg wet	U
75-01-4	Vinyl Chloride	8.7	50	50 ug/kg wet	U
1330-20-7	Xylene (Total)	18	150	150 ug/kg wet	U

System Monitoring Compound	Added (ug/L)	Conc. (ug/L)	% REC	QC Limits	Q
Dibromofluoromethane	40.0	40.7	102	78 - 121	
1,2-Dichloroethane-d4	40.0	44.2	111	66 - 124	
Toluene-d8	40.0	39.6	99	85 - 115	
4-Bromofluorobenzene	40.0	38.3	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	1030696	5.14	1098591	5.14	
Chlorobenzene-d5	867509	8.08	933741	8.08	
1,4-Dichlorobenzene-d4	444883	10.38	536532	10.38	

01739

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 139
Lab File ID: CCV0116.D
Sequence: 8011735
Lab Sample ID: 8011735-CCV1

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Calibration: 8A16008
Calibration Date: 12/29/07 00:00
Injection Date: 01/16/08
Injection Time: 08:19

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	L	40.0	31.2	7.961295E-02	0.0513494		-22.0	40
Benzene	A	40.0	42.1	0.999569	1.05209		5.3	25
Bromochloromethane	A	40.0	41.3	0.2496273	0.257954		3.3	25
Bromodichloromethane	L	40.0	40.8	0.2485901	0.314905		2.1	25
Bromoform	A	40.0	39.0	0.4957425	0.483923	0.1	-2.4	25
Bromomethane	A	40.0	38.4	0.1923732	0.184594		-4.0	25
Carbon Disulfide	A	40.0	54.5	0.4674097	0.633142		35.5	25 *
Carbon Tetrachloride	A	40.0	41.1	0.2975228	0.305752		2.8	25
Chlorobenzene	A	40.0	40.9	1.779175	1.81848	0.3	2.2	25
Chloroethane	A	40.0	41.0	0.1320845	0.135502		2.6	25
Chloroform	A	40.0	43.8	0.41534	0.454523		9.4	20
Chloromethane	A	40.0	34.5	0.2816954	0.242774	0.1	-13.8	25
Cyclohexane	A	40.0	41.6	0.4622016	0.480409		3.9	25
1,2-Dibromo-3-chloropropane	A	40.0	32.5	0.1116763	0.0906594		-18.8	25
Dibromochloromethane	L	40.0	40.6	0.5888946	0.672799		1.4	25
1,2-Dibromoethane	L	40.0	39.5	0.5161316	0.574556		-1.2	25
1,2-Dichlorobenzene	A	40.0	39.4	1.2978	1.27799		-1.5	25
1,3-Dichlorobenzene	A	40.0	38.8	1.38448	1.34295		-3.0	25
1,4-Dichlorobenzene	A	40.0	37.5	1.431077	1.34239		-6.2	25
Dichlorodifluoromethane	A	40.0	35.2	0.2052762	0.180499		-12.1	25
1,1-Dichloroethane	A	40.0	37.8	0.4571295	0.43235	0.1	-5.4	25
1,2-Dichloroethane	A	40.0	42.3	0.2655666	0.280542		5.6	25
1,1-Dichloroethene	A	40.0	46.6	0.1682085	0.19596		16.5	20
cis-1,2-Dichloroethene	A	40.0	43.4	0.2867374	0.311303		8.6	25
trans-1,2-Dichloroethene	A	40.0	35.4	0.282183	0.24947		-11.6	25
1,2-Dichloropropane	A	40.0	41.5	0.2602898	0.270054		3.8	20
cis-1,3-Dichloropropene	L	40.0	38.8	0.2996018	0.365043		-3.0	25
trans-1,3-Dichloropropene	L	40.0	40.1	0.2329778	0.291893		0.2	25
Ethylbenzene	A	40.0	40.9	2.675435	2.8909		8.1	20

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 139
Lab File ID: BS0117.D
Sequence: 8011744
Lab Sample ID: 8011744-CCV1

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Calibration: 8A16008
Calibration Date: 12/29/07 00:00
Injection Date: 01/17/08
Injection Time: 09:12

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	L	40.0	33.3	7.961295E-02	0.0539621		-16.8	40
Benzene	A	40.0	41.4	0.999569	1.03339		3.4	25
Bromochloromethane	A	40.0	41.2	0.2496273	0.257173		3.0	25
Bromodichloromethane	L	40.0	41.7	0.2485901	0.321944		4.3	25
Bromoform	A	40.0	40.1	0.4957425	0.496988	0.1	0.3	25
Bromomethane	A	40.0	35.2	0.1923732	0.169306		-12.0	25
Carbon Disulfide	A	40.0	75.3	0.4674097	0.875315		87.3	25 *
Carbon Tetrachloride	A	40.0	38.8	0.2975228	0.288335		-3.1	25
Chlorobenzene	A	40.0	41.5	1.779175	1.84758	0.3	3.8	25
Chloroethane	A	40.0	38.2	0.1320845	0.126013		-4.6	25
Chloroform	A	40.0	42.1	0.41534	0.437322		5.3	20
Chloromethane	A	40.0	34.6	0.2816954	0.24336	0.1	-13.6	25
Cyclohexane	A	40.0	40.9	0.4622016	0.472903		2.3	25
1,2-Dibromo-3-chloropropane	A	40.0	34.0	0.1116763	0.0949766		-15.0	25
Dibromochloromethane	L	40.0	39.6	0.5888946	0.657478		-0.9	25
1,2-Dibromoethane	L	40.0	39.1	0.5161316	0.568825		-2.2	25
1,2-Dichlorobenzene	A	40.0	38.9	1.2978	1.26193		-2.8	25
1,3-Dichlorobenzene	A	40.0	38.2	1.38448	1.32385		-4.4	25
1,4-Dichlorobenzene	A	40.0	37.4	1.431077	1.33845		-6.5	25
Dichlorodifluoromethane	A	40.0	34.5	0.2052762	0.177054		-13.7	25
1,1-Dichloroethane	A	40.0	43.1	0.4571295	0.492632	0.1	7.8	25
1,2-Dichloroethane	A	40.0	40.3	0.2655666	0.267817		0.8	25
1,1-Dichloroethene	A	40.0	37.6	0.1682085	0.158229		-5.9	20
cis-1,2-Dichloroethene	A	40.0	42.2	0.2867374	0.302739		5.6	25
trans-1,2-Dichloroethene	A	40.0	41.7	0.282183	0.294466		4.4	25
1,2-Dichloropropane	A	40.0	42.5	0.2602898	0.276339		6.2	20
cis-1,3-Dichloropropene	L	40.0	38.9	0.2996018	0.36626		-2.8	25
trans-1,3-Dichloropropene	L	40.0	39.8	0.2329778	0.289694		-0.4	25
Ethylbenzene	A	40.0	40.8	2.675435	2.8809		7.7	20

02298

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 224
Lab File ID: CCV0118B.D
Sequence: 8012120
Lab Sample ID: 8012120-CCV1

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Calibration: 8A21004
Calibration Date: 01/11/08 00:00
Injection Date: 01/18/08
Injection Time: 13:11

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	A	40.0	41.7	6.790821E-02	0.0707552		4.2	40
Benzene	A	40.0	40.5	1.335989	1.35155		1.2	25
Bromochloromethane	A	40.0	40.6	0.2246222	0.227715		1.4	25
Bromodichloromethane	A	40.0	47.2	0.3108761	0.366422		17.9	25
Bromoform	L	40.0	39.2	0.1604038	0.210313	0.1	-2.0	25
Bromomethane	L	40.0	48.5	0.2292109	0.225239		21.2	25
Carbon Disulfide	L	40.0	40.2	0.3985462	0.501091		0.4	25
Carbon Tetrachloride	A	40.0	48.1	0.3097234	0.372343		20.2	25
Chlorobenzene	A	40.0	40.4	1.130531	1.14335	0.3	1.1	25
Chloroethane	A	40.0	39.2	0.2191118	0.215006		-1.9	25
Chloroform	A	40.0	41.1	0.4988197	0.512046		2.7	20
Chloromethane	A	40.0	37.5	0.3023891	0.283418	0.1	-6.3	25
Cyclohexane	A	40.0	42.9	0.5141283	0.551479		7.3	25
1,2-Dibromo-3-chloropropane	L	40.0	39.5	0.1138636	0.13834		-1.3	25
Dibromochloromethane	L	40.0	41.6	0.2587386	0.340792		4.1	25
1,2-Dibromoethane	A	40.0	44.9	0.2806566	0.315166		12.3	25
1,2-Dichlorobenzene	A	40.0	41.9	1.392555	1.45805		4.7	25
1,3-Dichlorobenzene	A	40.0	41.4	1.430853	1.47954		3.4	25
1,4-Dichlorobenzene	A	40.0	39.8	1.54517	1.53864		-0.4	25
Dichlorodifluoromethane	A	40.0	42.7	0.3817842	0.40762		6.8	25
1,1-Dichloroethane	A	40.0	41.0	0.5169789	0.530025	0.1	2.5	25
1,2-Dichloroethane	A	40.0	41.9	0.3756562	0.393707		4.8	25
1,1-Dichloroethene	A	40.0	41.4	0.2515128	0.260464		3.6	20
cis-1,2-Dichloroethene	A	40.0	40.7	0.3320738	0.337812		1.7	25
trans-1,2-Dichloroethene	A	40.0	40.8	0.2994483	0.305516		2.0	25
1,2-Dichloropropane	A	40.0	40.3	0.3021694	0.304693		0.8	20
cis-1,3-Dichloropropene	L	40.0	39.6	0.379128	0.452126		-0.9	25
trans-1,3-Dichloropropene	L	40.0	39.5	0.3121495	0.392705		-1.3	25
Ethylbenzene	A	40.0	43.8	1.818753	1.99198		9.5	20

02247

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8260B

57SB14A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 5035 Soil Purge & Trap - MS

Initial/Final: 5 g / 5 mL

Laboratory ID: 0800592-MS1

QC Batch: 0800592

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Acetone	46.3	259	269	22	20 - 160	ug/kg dry
Benzene	46.3	ND	55.6	120	75 - 125	ug/kg dry
Bromochloromethane	46.3	ND	54.8	118	70 - 125	ug/kg dry
Bromodichloromethane	46.3	ND	54.5	118	70 - 130	ug/kg dry
Bromoform	46.3	ND	55.4	119	55 - 135	ug/kg dry
Bromomethane	46.3	ND	50.7	109	30 - 160	ug/kg dry
Carbon Disulfide	46.3	0.359	51.4	110	45 - 160	ug/kg dry
Carbon Tetrachloride	46.3	ND	53.2	115	65 - 135	ug/kg dry
Chlorobenzene	46.3	ND	52.0	112	75 - 125	ug/kg dry
Chloroethane	46.3	ND	53.8	116	40 - 155	ug/kg dry
Chloroform	46.3	ND	57.9	125	70 - 125	ug/kg dry
Chloromethane	46.3	ND	51.2	111	50 - 130	ug/kg dry
Cyclohexane	46.3	ND	56.1	121	70 - 130	ug/kg dry
1,2-Dibromo-3-chloropropane	46.3	ND	61.1	132	40 - 135	ug/kg dry
Dibromochloromethane	46.3	ND	55.4	119	65 - 130	ug/kg dry
1,2-Dibromoethane	46.3	ND	55.6	120	70 - 125	ug/kg dry
1,2-Dichlorobenzene	46.3	ND	50.3	109	75 - 120	ug/kg dry
1,3-Dichlorobenzene	46.3	ND	48.2	104	70 - 125	ug/kg dry
1,4-Dichlorobenzene	46.3	ND	48.6	105	70 - 125	ug/kg dry
Dichlorodifluoromethane	46.3	ND	51.8	112	35 - 135	ug/kg dry
1,1-Dichloroethane	46.3	ND	60.3	130 *	75 - 125	ug/kg dry
1,2-Dichloroethane	46.3	ND	57.1	123	70 - 135	ug/kg dry
1,1-Dichloroethene	46.3	ND	50.8	110	65 - 135	ug/kg dry
cis-1,2-Dichloroethene	46.3	ND	55.7	120	65 - 125	ug/kg dry
trans-1,2-Dichloroethene	46.3	ND	51.9	112	65 - 135	ug/kg dry
1,2-Dichloropropane	46.3	ND	56.5	122 *	70 - 120	ug/kg dry
cis-1,3-Dichloropropene	46.3	ND	44.0	95	70 - 125	ug/kg dry
trans-1,3-Dichloropropene	46.3	ND	40.7	88	65 - 125	ug/kg dry
Ethylbenzene	46.3	ND	54.8	118	75 - 125	ug/kg dry
2-Hexanone	46.3	ND	62.6	135	45 - 145	ug/kg dry
Isopropylbenzene	46.3	ND	72.7	157 *	75 - 130	ug/kg dry
Methyl Acetate	46.3	21.9	76.3	117	70 - 130	ug/kg dry
Methyl tert-Butyl Ether	46.3	ND	62.5	135 *	63 - 127	ug/kg dry

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8260B

57SB14A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 5035 Soil Purge & Trap - MS

Initial/Final: 5 g / 5 mL

Laboratory ID: 0800592-MS1

QC Batch: 0800592

Analyte	Spike Added	Sample Conc.	MS Conc,	MS % Rec. #	QC Limits Rec.	Units
Methylcyclohexane	46.3	ND	50.4	109	70 - 130	ug/kg dry
Methylene Chloride	46.3	4.84	52.8	104	55 - 140	ug/kg dry
2-Butanone (MEK)	46.3	21.8	78.0	121	30 - 160	ug/kg dry
4-Methyl-2-pentanone (MIBK)	46.3	ND	58.7	127	45 - 145	ug/kg dry
Styrene	46.3	ND	26.2	57 *	75 - 125	ug/kg dry
1,1,2,2-Tetrachloroethane	46.3	ND	74.5	161 *	55 - 130	ug/kg dry
Tetrachloroethene	46.3	ND	53.7	116	65 - 140	ug/kg dry
Toluene	46.3	ND	51.0	110	70 - 125	ug/kg dry
1,2,3-Trichlorobenzene	46.3	ND	26.2	57 *	60 - 135	ug/kg dry
1,2,4-Trichlorobenzene	46.3	ND	27.9	60 *	65 - 130	ug/kg dry
1,1,1-Trichloroethane	46.3	ND	58.3	126	70 - 135	ug/kg dry
1,1,2-Trichloroethane	46.3	ND	54.0	117	60 - 125	ug/kg dry
Trichloroethene	46.3	ND	51.1	110	75 - 125	ug/kg dry
Trichlorofluoromethane	46.3	ND	52.6	114	25 - 185	ug/kg dry
1,1,2-Trichloro-1,2,2-trifluoroetha	46.3	ND	51.0	110	80 - 120	ug/kg dry
Vinyl Chloride	46.3	ND	52.2	113	60 - 125	ug/kg dry
Xylene (Total)	139	ND	152	109	75 - 125	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

57SB14A

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-47

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Soil

Preparation: 5035 Soil Purge & Trap - MS

Initial/Final: 5 g / 5 mL

Laboratory ID: 0800592-MSD1

QC Batch: 0800592

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Acetone	46.3	323	138	18	30	20 - 160	ug/kg dry
Benzene	46.3	58.1	125	4	30	75 - 125	ug/kg dry
Bromochloromethane	46.3	54.9	118	0.2	30	70 - 125	ug/kg dry
Bromodichloromethane	46.3	55.9	121	3	30	70 - 130	ug/kg dry
Bromoform	46.3	59.5	128	7	30	55 - 135	ug/kg dry
Bromomethane	46.3	53.7	116	6	30	30 - 160	ug/kg dry
Carbon Disulfide	46.3	42.3	90	19	30	45 - 160	ug/kg dry
Carbon Tetrachloride	46.3	55.5	120	4	30	65 - 135	ug/kg dry
Chlorobenzene	46.3	54.8	118	5	30	75 - 125	ug/kg dry
Chloroethane	46.3	56.6	122	5	30	40 - 155	ug/kg dry
Chloroform	46.3	58.9	127 *	2	30	70 - 125	ug/kg dry
Chloromethane	46.3	51.9	112	1	30	50 - 130	ug/kg dry
Cyclohexane	46.3	55.5	120	1	30	70 - 130	ug/kg dry
1,2-Dibromo-3-chloropropane	46.3	76.9	166 *	23	30	40 - 135	ug/kg dry
Dibromochloromethane	46.3	59.1	128	7	30	65 - 130	ug/kg dry
1,2-Dibromoethane	46.3	60.9	132 *	9	30	70 - 125	ug/kg dry
1,2-Dichlorobenzene	46.3	56.3	122 *	11	30	75 - 120	ug/kg dry
1,3-Dichlorobenzene	46.3	52.6	114	9	30	70 - 125	ug/kg dry
1,4-Dichlorobenzene	46.3	52.5	113	8	30	70 - 125	ug/kg dry
Dichlorodifluoromethane	46.3	52.6	114	1	30	35 - 135	ug/kg dry
1,1-Dichloroethane	46.3	62.4	135 *	3	30	75 - 125	ug/kg dry
1,2-Dichloroethane	46.3	58.2	126	2	30	70 - 135	ug/kg dry
1,1-Dichloroethene	46.3	53.7	116	6	30	65 - 135	ug/kg dry
cis-1,2-Dichloroethene	46.3	58.2	126 *	4	30	65 - 125	ug/kg dry
trans-1,2-Dichloroethene	46.3	52.8	114	2	30	65 - 135	ug/kg dry
1,2-Dichloropropane	46.3	60.1	130 *	6	30	70 - 120	ug/kg dry
cis-1,3-Dichloropropene	46.3	44.8	97	2	30	70 - 125	ug/kg dry
trans-1,3-Dichloropropene	46.3	44.2	95	8	30	65 - 125	ug/kg dry
Ethylbenzene	46.3	56.3	122	3	30	75 - 125	ug/kg dry
2-Hexanone	46.3	71.6	155 *	13	30	45 - 145	ug/kg dry
Isopropylbenzene	46.3	74.9	162 *	3	30	75 - 130	ug/kg dry
Methyl Acetate	46.3	114	199 *	40 *	30	70 - 130	ug/kg dry
Methyl tert-Butyl Ether	46.3	63.0	136 *	0.8	30	63 - 127	ug/kg dry
Methylcyclohexane	46.3	48.3	104	4	30	70 - 130	ug/kg dry

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

57SB14A

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 5035 Soil Purge & Trap - MS

Initial/Final: 5 g / 5 mL

Laboratory ID: 0800592-MSD1

QC Batch: 0800592

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Methylene Chloride	46.3	54.4	107	3	30	55 - 140	ug/kg dry
2-Butanone (MEK)	46.3	83.1	132	6	30	30 - 160	ug/kg dry
4-Methyl-2-pentanone (MIBK)	46.3	64.6	139	10	30	45 - 145	ug/kg dry
Styrene	46.3	30.5	66 *	15	30	75 - 125	ug/kg dry
1,1,2,2-Tetrachloroethane	46.3	82.5	178 *	10	30	55 - 130	ug/kg dry
Tetrachloroethene	46.3	52.4	113	2	30	65 - 140	ug/kg dry
Toluene	46.3	54.4	117	6	30	70 - 125	ug/kg dry
1,2,3-Trichlorobenzene	46.3	31.9	69	20	30	60 - 135	ug/kg dry
1,2,4-Trichlorobenzene	46.3	31.6	68	12	30	65 - 130	ug/kg dry
1,1,1-Trichloroethane	46.3	59.9	129	3	30	70 - 135	ug/kg dry
1,1,2-Trichloroethane	46.3	57.5	124	6	30	60 - 125	ug/kg dry
Trichloroethene	46.3	52.1	113	2	30	75 - 125	ug/kg dry
Trichlorofluoromethane	46.3	54.4	117	3	30	25 - 185	ug/kg dry
1,1,2-Trichloro-1,2,2-trifluoroetha	46.3	49.7	107	3	30	80 - 120	ug/kg dry
Vinyl Chloride	46.3	56.2	121	7	30	60 - 125	ug/kg dry
Xylene (Total)	139	159	114	5	30	75 - 125	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8260B

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 5035 Soil Purge & Trap - MS

Initial/Final: 5 g / 5 mL

Laboratory ID: 0800595-MS1

QC Batch: 0800595

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Acetone	51.6	187	192	11 *	20 - 160	ug/kg dry
Benzene	51.6	ND	58.1	113	75 - 125	ug/kg dry
Bromochloromethane	51.6	ND	57.9	112	70 - 125	ug/kg dry
Bromodichloromethane	51.6	ND	56.7	110	70 - 130	ug/kg dry
Bromoform	51.6	ND	59.8	116	55 - 135	ug/kg dry
Bromomethane	51.6	ND	53.5	104	30 - 160	ug/kg dry
Carbon Disulfide	51.6	ND	51.8	100	45 - 160	ug/kg dry
Carbon Tetrachloride	51.6	ND	52.2	101	65 - 135	ug/kg dry
Chlorobenzene	51.6	ND	47.8	93	75 - 125	ug/kg dry
Chloroethane	51.6	ND	55.1	107	40 - 155	ug/kg dry
Chloroform	51.6	ND	59.4	115	70 - 125	ug/kg dry
Chloromethane	51.6	ND	51.5	100	50 - 130	ug/kg dry
Cyclohexane	51.6	ND	44.6	86	70 - 130	ug/kg dry
1,2-Dibromo-3-chloropropane	51.6	ND	73.6	143 *	40 - 135	ug/kg dry
Dibromochloromethane	51.6	ND	54.7	106	65 - 130	ug/kg dry
1,2-Dibromoethane	51.6	ND	59.3	115	70 - 125	ug/kg dry
1,2-Dichlorobenzene	51.6	ND	51.1	99	75 - 120	ug/kg dry
1,3-Dichlorobenzene	51.6	ND	44.7	87	70 - 125	ug/kg dry
1,4-Dichlorobenzene	51.6	ND	43.7	85	70 - 125	ug/kg dry
Dichlorodifluoromethane	51.6	ND	43.2	84	35 - 135	ug/kg dry
1,1-Dichloroethane	51.6	ND	62.5	121	75 - 125	ug/kg dry
1,2-Dichloroethane	51.6	ND	60.8	118	70 - 135	ug/kg dry
1,1-Dichloroethene	51.6	ND	50.8	99	65 - 135	ug/kg dry
cis-1,2-Dichloroethene	51.6	ND	58.4	113	65 - 125	ug/kg dry
trans-1,2-Dichloroethene	51.6	ND	54.6	106	65 - 135	ug/kg dry
1,2-Dichloropropane	51.6	ND	59.0	114	70 - 120	ug/kg dry
cis-1,3-Dichloropropene	51.6	ND	47.1	91	70 - 125	ug/kg dry
trans-1,3-Dichloropropene	51.6	ND	46.8	91	65 - 125	ug/kg dry
Ethylbenzene	51.6	ND	46.4	90	75 - 125	ug/kg dry
2-Hexanone	51.6	ND	68.7	133	45 - 145	ug/kg dry
Isopropylbenzene	51.6	ND	49.7	96	75 - 130	ug/kg dry
Methyl Acetate	51.6	3.53	8.51	10 *	70 - 130	ug/kg dry
Methyl tert-Butyl Ether	51.6	ND	59.1	115	63 - 127	ug/kg dry

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8260B

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 5035 Soil Purge & Trap - MS

Initial/Final: 5 g / 5 mL

Laboratory ID: 0800595-MS1

QC Batch: 0800595

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Methylcyclohexane	51.6	ND	34.5	67 *	70 - 130	ug/kg dry
Methylene Chloride	51.6	ND	53.0	103	55 - 140	ug/kg dry
2-Butanone (MEK)	51.6	ND	91.8	178 *	30 - 160	ug/kg dry
4-Methyl-2-pentanone (MIBK)	51.6	ND	70.7	137	45 - 145	ug/kg dry
Styrene	51.6	ND	41.0	80	75 - 125	ug/kg dry
1,1,2,2-Tetrachloroethane	51.6	ND	75.3	146 *	55 - 130	ug/kg dry
Tetrachloroethene	51.6	ND	40.7	79	65 - 140	ug/kg dry
Toluene	51.6	ND	50.8	98	70 - 125	ug/kg dry
1,2,3-Trichlorobenzene	51.6	ND	31.4	61	60 - 135	ug/kg dry
1,2,4-Trichlorobenzene	51.6	ND	29.4	57 *	65 - 130	ug/kg dry
1,1,1-Trichloroethane	51.6	ND	56.0	109	70 - 135	ug/kg dry
1,1,2-Trichloroethane	51.6	ND	61.2	119	60 - 125	ug/kg dry
Trichloroethene	51.6	ND	48.8	95	75 - 125	ug/kg dry
Trichlorofluoromethane	51.6	ND	47.7	92	25 - 185	ug/kg dry
1,1,2-Trichloro-1,2,2-trifluoroetha	51.6	ND	40.0	78 *	80 - 120	ug/kg dry
Vinyl Chloride	51.6	ND	54.7	106	60 - 125	ug/kg dry
Xylene (Total)	155	ND	131	84	75 - 125	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

57SB8AB

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 5035 Soil Purge & Trap - MS

Initial/Final: 5 g / 5 mL

Laboratory ID: 0800595-MSD1

QC Batch: 0800595

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Acetone	51.6	96.4	-175 *	66 *	30	20 - 160	ug/kg dry
Benzene	51.6	60.6	117	4	30	75 - 125	ug/kg dry
Bromochloromethane	51.6	58.1	113	0.3	30	70 - 125	ug/kg dry
Bromodichloromethane	51.6	60.1	116	6	30	70 - 130	ug/kg dry
Bromoform	51.6	64.5	125	7	30	55 - 135	ug/kg dry
Bromomethane	51.6	50.8	98	5	30	30 - 160	ug/kg dry
Carbon Disulfide	51.6	51.7	100	0.2	30	45 - 160	ug/kg dry
Carbon Tetrachloride	51.6	57.7	112	10	30	65 - 135	ug/kg dry
Chlorobenzene	51.6	56.4	109	17	30	75 - 125	ug/kg dry
Chloroethane	51.6	53.3	103	3	30	40 - 155	ug/kg dry
Chloroform	51.6	61.0	118	3	30	70 - 125	ug/kg dry
Chloromethane	51.6	47.7	92	8	30	50 - 130	ug/kg dry
Cyclohexane	51.6	60.1	116	30	30	70 - 130	ug/kg dry
1,2-Dibromo-3-chloropropane	51.6	82.7	160 *	12	30	40 - 135	ug/kg dry
Dibromochloromethane	51.6	58.3	113	6	30	65 - 130	ug/kg dry
1,2-Dibromoethane	51.6	60.8	118	2	30	70 - 125	ug/kg dry
1,2-Dichlorobenzene	51.6	63.7	123 *	22	30	75 - 120	ug/kg dry
1,3-Dichlorobenzene	51.6	56.1	109	23	30	70 - 125	ug/kg dry
1,4-Dichlorobenzene	51.6	53.8	104	21	30	70 - 125	ug/kg dry
Dichlorodifluoromethane	51.6	52.2	101	19	30	35 - 135	ug/kg dry
1,1-Dichloroethane	51.6	62.4	121	0.2	30	75 - 125	ug/kg dry
1,2-Dichloroethane	51.6	59.2	115	3	30	70 - 135	ug/kg dry
1,1-Dichloroethene	51.6	56.4	109	10	30	65 - 135	ug/kg dry
cis-1,2-Dichloroethene	51.6	59.8	116	2	30	65 - 125	ug/kg dry
trans-1,2-Dichloroethene	51.6	56.3	109	3	30	65 - 135	ug/kg dry
1,2-Dichloropropane	51.6	61.7	120	4	30	70 - 120	ug/kg dry
cis-1,3-Dichloropropene	51.6	49.7	96	5	30	70 - 125	ug/kg dry
trans-1,3-Dichloropropene	51.6	50.2	97	7	30	65 - 125	ug/kg dry
Ethylbenzene	51.6	57.8	112	22	30	75 - 125	ug/kg dry
2-Hexanone	51.6	63.7	123	8	30	45 - 145	ug/kg dry
Isopropylbenzene	51.6	74.8	145 *	40 *	30	75 - 130	ug/kg dry
Methyl Acetate	51.6	6.97	7 *	20	30	70 - 130	ug/kg dry
Methyl tert-Butyl Ether	51.6	59.8	116	1	30	63 - 127	ug/kg dry
Methylcyclohexane	51.6	59.7	116	53 *	30	70 - 130	ug/kg dry

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8260B

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 5035 Soil Purge & Trap - MS

Initial/Final: 5 g / 5 mL

Laboratory ID: 0800595-MSD1

QC Batch: 0800595

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Methylene Chloride	51.6	51.8	100	2	30	55 - 140	ug/kg dry
2-Butanone (MEK)	51.6	68.7	133	29	30	30 - 160	ug/kg dry
4-Methyl-2-pentanone (MIBK)	51.6	67.9	132	4	30	45 - 145	ug/kg dry
Styrene	51.6	52.4	102	24	30	75 - 125	ug/kg dry
1,1,2,2-Tetrachloroethane	51.6	83.2	161 *	10	30	55 - 130	ug/kg dry
Tetrachloroethene	51.6	54.4	105	29	30	65 - 140	ug/kg dry
Toluene	51.6	58.3	113	14	30	70 - 125	ug/kg dry
1,2,3-Trichlorobenzene	51.6	48.5	94	43 *	30	60 - 135	ug/kg dry
1,2,4-Trichlorobenzene	51.6	44.7	87	41 *	30	65 - 130	ug/kg dry
1,1,1-Trichloroethane	51.6	61.5	119	9	30	70 - 135	ug/kg dry
1,1,2-Trichloroethane	51.6	59.9	116	2	30	60 - 125	ug/kg dry
Trichloroethene	51.6	56.7	110	15	30	75 - 125	ug/kg dry
Trichlorofluoromethane	51.6	55.7	108	15	30	25 - 185	ug/kg dry
1,1,2-Trichloro-1,2,2-trifluoroetha	51.6	54.2	105	30	30	80 - 120	ug/kg dry
Vinyl Chloride	51.6	53.3	103	3	30	60 - 125	ug/kg dry
Xylene (Total)	155	161	104	21	30	75 - 125	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

Laboratory ID: 0800592-BS5

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 5035 Soil Purge & Trap - MS
Initial/Final: 5 g / 5 mL
QC Batch: 0800592
Sequence: 8011744

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Acetone	40.0	33.3	83	20 - 160	ug/kg wet
Benzene	40.0	41.4	103	75 - 125	ug/kg wet
Bromochloromethane	40.0	41.2	103	70 - 125	ug/kg wet
Bromodichloromethane	40.0	41.7	104	70 - 130	ug/kg wet
Bromoform	40.0	40.1	100	55 - 135	ug/kg wet
Bromomethane	40.0	35.2	88	30 - 160	ug/kg wet
Carbon Disulfide	40.0	75.3	188 *	45 - 160	ug/kg wet
Carbon Tetrachloride	40.0	38.8	97	65 - 135	ug/kg wet
Chlorobenzene	40.0	41.5	104	75 - 125	ug/kg wet
Chloroethane	40.0	38.2	95	40 - 155	ug/kg wet
Chloroform	40.0	42.1	105	70 - 125	ug/kg wet
Chloromethane	40.0	34.6	86	50 - 130	ug/kg wet
Cyclohexane	40.0	40.9	102	70 - 130	ug/kg wet
1,2-Dibromo-3-chloropropane	40.0	34.0	85	40 - 135	ug/kg wet
Dibromochloromethane	40.0	39.6	99	65 - 130	ug/kg wet
1,2-Dibromoethane	40.0	39.1	98	70 - 125	ug/kg wet
1,2-Dichlorobenzene	40.0	38.9	97	75 - 120	ug/kg wet
1,3-Dichlorobenzene	40.0	38.2	96	70 - 125	ug/kg wet
1,4-Dichlorobenzene	40.0	37.4	94	70 - 125	ug/kg wet
Dichlorodifluoromethane	40.0	34.5	86	35 - 135	ug/kg wet
1,1-Dichloroethane	40.0	43.1	108	75 - 125	ug/kg wet
1,2-Dichloroethane	40.0	40.3	101	70 - 135	ug/kg wet
1,1-Dichloroethene	40.0	37.6	94	65 - 135	ug/kg wet
cis-1,2-Dichloroethene	40.0	42.2	106	65 - 125	ug/kg wet
trans-1,2-Dichloroethene	40.0	41.7	104	65 - 135	ug/kg wet
1,2-Dichloropropane	40.0	42.5	106	70 - 120	ug/kg wet
cis-1,3-Dichloropropene	40.0	38.9	97	70 - 125	ug/kg wet
trans-1,3-Dichloropropene	40.0	39.8	100	65 - 125	ug/kg wet
Ethylbenzene	40.0	40.8	102	75 - 125	ug/kg wet

LCS / LCS DUPLICATE RECOVERY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

Laboratory ID: 0800595-BS2

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 5035 Soil Purge & Trap - MS
Initial/Final: 5 g / 5 mL
QC Batch: 0800595
Sequence: 8011742

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Acetone	40.0	37.4	94	20 - 160	ug/kg wet
Benzene	40.0	43.5	109	75 - 125	ug/kg wet
Bromochloromethane	40.0	42.7	107	70 - 125	ug/kg wet
Bromodichloromethane	40.0	42.9	107	70 - 130	ug/kg wet
Bromoform	40.0	44.5	111	55 - 135	ug/kg wet
Bromomethane	40.0	37.3	93	30 - 160	ug/kg wet
Carbon Disulfide	40.0	65.2	163 *	45 - 160	ug/kg wet
Carbon Tetrachloride	40.0	40.8	102	65 - 135	ug/kg wet
Chlorobenzene	40.0	42.9	107	75 - 125	ug/kg wet
Chloroethane	40.0	37.4	93	40 - 155	ug/kg wet
Chloroform	40.0	44.8	112	70 - 125	ug/kg wet
Chloromethane	40.0	37.6	94	50 - 130	ug/kg wet
Cyclohexane	40.0	41.7	104	70 - 130	ug/kg wet
1,2-Dibromo-3-chloropropane	40.0	41.1	103	40 - 135	ug/kg wet
Dibromochloromethane	40.0	42.4	106	65 - 130	ug/kg wet
1,2-Dibromoethane	40.0	42.7	107	70 - 125	ug/kg wet
1,2-Dichlorobenzene	40.0	42.1	105	75 - 120	ug/kg wet
1,3-Dichlorobenzene	40.0	39.5	99	70 - 125	ug/kg wet
1,4-Dichlorobenzene	40.0	39.4	99	70 - 125	ug/kg wet
Dichlorodifluoromethane	40.0	34.5	86	35 - 135	ug/kg wet
1,1-Dichloroethane	40.0	44.3	111	75 - 125	ug/kg wet
1,2-Dichloroethane	40.0	44.5	111	70 - 135	ug/kg wet
1,1-Dichloroethene	40.0	37.5	94	65 - 135	ug/kg wet
cis-1,2-Dichloroethene	40.0	44.1	110	65 - 125	ug/kg wet
trans-1,2-Dichloroethene	40.0	41.2	103	65 - 135	ug/kg wet
1,2-Dichloropropane	40.0	42.6	106	70 - 120	ug/kg wet
cis-1,3-Dichloropropene	40.0	41.0	102	70 - 125	ug/kg wet
trans-1,3-Dichloropropene	40.0	40.8	102	65 - 125	ug/kg wet
Ethylbenzene	40.0	43.7	109	75 - 125	ug/kg wet

01715

LCS / LCS DUPLICATE RECOVERY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

Laboratory ID: 0800595-BS3

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 5035 Soil Purge & Trap - MS
Initial/Final: 5 g / 5 mL
QC Batch: 0800595
Sequence: 8011744

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Acetone	40.0	33.3	83	20 - 160	ug/kg wet
Benzene	40.0	41.4	103	75 - 125	ug/kg wet
Bromochloromethane	40.0	41.2	103	70 - 125	ug/kg wet
Bromodichloromethane	40.0	41.7	104	70 - 130	ug/kg wet
Bromoform	40.0	40.1	100	55 - 135	ug/kg wet
Bromomethane	40.0	35.2	88	30 - 160	ug/kg wet
Carbon Disulfide	40.0	75.3	188 *	45 - 160	ug/kg wet
Carbon Tetrachloride	40.0	38.8	97	65 - 135	ug/kg wet
Chlorobenzene	40.0	41.5	104	75 - 125	ug/kg wet
Chloroethane	40.0	38.2	95	40 - 155	ug/kg wet
Chloroform	40.0	42.1	105	70 - 125	ug/kg wet
Chloromethane	40.0	34.6	86	50 - 130	ug/kg wet
Cyclohexane	40.0	40.9	102	70 - 130	ug/kg wet
1,2-Dibromo-3-chloropropane	40.0	34.0	85	40 - 135	ug/kg wet
Dibromochloromethane	40.0	39.6	99	65 - 130	ug/kg wet
1,2-Dibromoethane	40.0	39.1	98	70 - 125	ug/kg wet
1,2-Dichlorobenzene	40.0	38.9	97	75 - 120	ug/kg wet
1,3-Dichlorobenzene	40.0	38.2	96	70 - 125	ug/kg wet
1,4-Dichlorobenzene	40.0	37.4	94	70 - 125	ug/kg wet
Dichlorodifluoromethane	40.0	34.5	86	35 - 135	ug/kg wet
1,1-Dichloroethane	40.0	43.1	108	75 - 125	ug/kg wet
1,2-Dichloroethane	40.0	40.3	101	70 - 135	ug/kg wet
1,1-Dichloroethene	40.0	37.6	94	65 - 135	ug/kg wet
cis-1,2-Dichloroethene	40.0	42.2	106	65 - 125	ug/kg wet
trans-1,2-Dichloroethene	40.0	41.7	104	65 - 135	ug/kg wet
1,2-Dichloropropane	40.0	42.5	106	70 - 120	ug/kg wet
cis-1,3-Dichloropropene	40.0	38.9	97	70 - 125	ug/kg wet
trans-1,3-Dichloropropene	40.0	39.8	100	65 - 125	ug/kg wet
Ethylbenzene	40.0	40.8	102	75 - 125	ug/kg wet

01717

INTERNAL STANDARD AREA AND RT SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Sequence: 8011735
Instrument: 139
Matrix: Soil
Calibration: 8A16008

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (8011735-CCV1)			**Lab File ID: CCV0116.D**			**Analyzed: 01/16/08 08:19**			
Fluorobenzene	846261	7.3	896575	7.36	94	50 - 200	-0.0600	+/-0.50	
Chlorobenzene-d5	353868	17.36	369835	17.41	96	50 - 200	-0.0500	+/-0.50	
1,4-Dichlorobenzene-d4	422284	22.41	404368	22.44	104	50 - 200	-0.0300	+/-0.50	
LCS (0800592-BS4)			**Lab File ID: BS0116.D**			**Analyzed: 01/16/08 08:52**			
Fluorobenzene	858017	7.31	846261	7.3	101	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	364636	17.37	353868	17.36	103	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	434618	22.41	422284	22.41	103	50 - 200	0.0000	+/-0.50	
LCS (0800595-BS1)			**Lab File ID: BS0116.D**			**Analyzed: 01/16/08 08:52**			
Fluorobenzene	858017	7.31	846261	7.3	101	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	364636	17.37	353868	17.36	103	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	434618	22.41	422284	22.41	103	50 - 200	0.0000	+/-0.50	
Blank (0800592-BLK4)			**Lab File ID: BLK0116.D**			**Analyzed: 01/16/08 09:57**			
Fluorobenzene	822932	7.31	846261	7.3	97	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	351907	17.37	353868	17.36	99	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	379125	22.42	422284	22.41	90	50 - 200	0.0100	+/-0.50	
Blank (0800595-BLK1)			**Lab File ID: BLK0116.D**			**Analyzed: 01/16/08 09:57**			
Fluorobenzene	822932	7.31	846261	7.3	97	50 - 200	0.0100	+/-0.50	
Chlorobenzene-d5	351907	17.37	353868	17.36	99	50 - 200	0.0100	+/-0.50	
1,4-Dichlorobenzene-d4	379125	22.42	422284	22.41	90	50 - 200	0.0100	+/-0.50	
57SB9AB (0801213-07)			**Lab File ID: 21307.D**			**Analyzed: 01/16/08 11:03**			
Fluorobenzene	790263	7.33	846261	7.3	93	50 - 200	0.0300	+/-0.50	
Chlorobenzene-d5	337410	17.38	353868	17.36	95	50 - 200	0.0200	+/-0.50	
1,4-Dichlorobenzene-d4	363839	22.43	422284	22.41	86	50 - 200	0.0200	+/-0.50	
57SB6A (0801213-10)			**Lab File ID: 21310.D**			**Analyzed: 01/16/08 11:36**			
Fluorobenzene	724371	7.32	846261	7.3	86	50 - 200	0.0200	+/-0.50	
Chlorobenzene-d5	279951	17.38	353868	17.36	79	50 - 200	0.0200	+/-0.50	
1,4-Dichlorobenzene-d4	202961	22.43	422284	22.41	48	50 - 200	0.0200	+/-0.50	*
57SB6AB (0801213-11)			**Lab File ID: 21311.D**			**Analyzed: 01/16/08 12:09**			
Fluorobenzene	748670	7.34	846261	7.3	88	50 - 200	0.0400	+/-0.50	
Chlorobenzene-d5	310245	17.39	353868	17.36	88	50 - 200	0.0300	+/-0.50	
1,4-Dichlorobenzene-d4	267218	22.43	422284	22.41	63	50 - 200	0.0200	+/-0.50	
57SB6B (0801213-12)			**Lab File ID: 21312.D**			**Analyzed: 01/16/08 12:41**			
Fluorobenzene	710661	7.34	846261	7.3	84	50 - 200	0.0400	+/-0.50	
Chlorobenzene-d5	291515	17.38	353868	17.36	82	50 - 200	0.0200	+/-0.50	
1,4-Dichlorobenzene-d4	235263	22.43	422284	22.41	56	50 - 200	0.0200	+/-0.50	

01762

Method Path : C:\MSDCHEM\1\METHODS\
Method File : 8260B-A47.M
Title : VOLATILE GC/MS BY EPA 8260B/624/524.2
Last Update : Mon Jan 14 13:44:57 2008
Response Via : Initial Calibration

									B= -0.030		
45)		4-methyl-2-pent	0.152	0.157	0.166	0.175	0.188	0.198	0.222	0.180	13.74
46)	s	#Toluene-d8	0.996	0.988	0.998	1.010	1.004	1.009	1.014	1.002	0.92
47)	C	toluene	1.660	1.474	1.460	1.444	1.463	1.397	1.457	1.479	5.64#
48)		trans-1,3-dichl	0.236	0.296	0.336	0.364	0.391	0.417	0.452	-----	
								L M= 0.453 R=0.999			
									B= -0.036		
49)		1,1,2-trichloro	0.202	0.218	0.226	0.227	0.224	0.221	0.231	0.221	4.32
50)		Chlorobenzene-d5	----------	ISTD	----------						
51)		tetrachloroethe	0.420	0.456	0.444	0.442	0.452	0.435	0.452	0.443	2.83
52)		1,3-dichloropro	0.588	0.595	0.621	0.620	0.609	0.601	0.621	0.608	2.23
53)		2-hexanone (MBK		0.122	0.131	0.134	0.149	0.161	0.180	0.146	14.83
54)		dibromochlorome	0.207	0.246	0.270	0.299	0.325	0.348	0.379	-----	
								L M= 0.380 R=0.998			
									B= -0.032		
55)		1,2-dibromoetha	0.267	0.293	0.305	0.308	0.302	0.300	0.315	0.299	5.21
56)	P	chlorobenzene	1.192	1.134	1.121	1.122	1.125	1.088	1.117	1.128	2.79
57)		1,1,1,2-tetrach	0.270	0.306	0.327	0.345	0.356	0.365	0.385	0.336	11.56
58)		1-chlorohexane		0.313	0.282	0.283	0.288	0.269	0.276	0.285	5.29
59)	C	ethylbenzene	1.569	1.654	1.725	1.746	1.808	1.771	1.852	1.732	5.50#
60)		m+p-xylene	0.594	0.622	0.667	0.693	0.574	0.706	0.729	0.655	9.02
61)		o-xylene	0.504	0.587	0.637	0.666	0.702	0.687	0.712	0.642	11.57
62)		styrene	0.788	0.958	1.064	1.158	1.210	1.209	1.256	-----	
								L M= 1.258 R=1.000			
									B= -0.046		
63)	P	bromoform	0.118	0.130	0.144	0.164	0.184	0.212	0.239	-----	
								L M= 0.240 R=0.997			
									B= -0.030		
64)	S	#4-Bromofluorob	0.444	0.453	0.460	0.473	0.474	0.478	0.482	0.466	3.03
65)	I	1,4-Dichlorobenzene-d	----------	ISTD	----------						
66)		isopropylbenzen	2.341	2.841	2.932	2.994	3.144	2.978	3.110	2.906	9.26
67)		bromobenzene	1.554	1.552	1.487	1.412	1.376	1.266	1.277	1.418	8.46
68)	P	1,1,2,2-tetrach	0.941	0.974	0.951	0.874	0.815	0.749	0.752	0.865	10.95
69)		1,4-dichloro-2-	0.174	0.190	0.185	0.184	0.184	0.180	0.191	0.184	3.27
70)		1,2,3-trichloro	0.373	0.353	0.331	0.306	0.288	0.263	0.270	0.312	13.41
71)		n-propylbenzene	0.575	0.671	0.690	0.713	0.769	0.764	0.821	0.715	11.22
72)		2-chlorotoluene	0.723	0.799	0.822	0.823	0.820	0.779	0.797	0.795	4.49
73)		1,3,5-trimethyl	1.708	2.036	2.133	2.183	2.329	2.292	2.440	2.160	11.10
74)		4-chlorotoluene	2.256	2.487	2.549	2.498	2.522	2.388	2.472	2.453	4.10
75)		tert-butylbenze	1.270	1.412	1.444	1.460	1.566	1.598	1.769	1.503	10.58
76)		1,2,4-trimethyl	1.679	1.969	2.019	2.065	2.217	2.247	2.426	2.089	11.44
77)		sec-butylbenzen	1.471	1.708	1.668	1.737	1.956	2.042	2.304	-----	
								L M= 2.298 R=0.997			
									B= -0.213		
78)		4-isopropyltolu	1.382	1.492	1.533	1.548	1.755	1.859	2.143	-----	
								L M= 2.136 R=0.996			
									B= -0.226		
79)		1,3-dichloroben	1.394	1.435	1.495	1.492	1.500	1.432	1.498	1.463	2.92
80)		1,4-dichloroben	1.571	1.558	1.548	1.546	1.546	1.502	1.566	1.548	1.46
81)		1,2,3-trimethyl	1.997	2.097	2.064	2.086	2.272	2.306	2.541	2.195	8.64
82)		1,2-dichloroben	1.325	1.366	1.424	1.446	1.455	1.412	1.465	1.413	3.62
83)		n-butylbenzene	1.169	1.108	1.046	0.997	1.135	1.226	1.436	1.160	12.37
84)		1,2-dibromo-3-c	0.091	0.098	0.105	0.106	0.110	0.118	0.133	0.109	12.67
85)		hexachloroethan	0.160	0.164	0.162	0.175	0.202	0.233	0.271	-----	
								L M= 0.271 R=0.995			
									B= -0.037		
86)		1,2,4-trichloro	0.791	0.729	0.698	0.646	0.656	0.657	0.718	0.699	7.41
87)		hexachlorobutad	0.304	0.266	0.237	0.214	0.223	0.222	0.250	0.245	12.90
88)		naphthalene	1.776	1.900	1.893	1.788	1.728	1.588	1.673	1.764	6.39
89)		1,2,3-trichloro	0.720	0.732	0.698	0.628	0.619	0.598	0.646	0.663	8.01
90)		2-methylnaphtha	0.506	0.542	0.579	0.604	0.655	0.681	0.748	0.616	13.58

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Volatile Organic Compounds by EPA Method 8260B

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8260B

Sample/Analyte:		
0801213-01	57SB14A	1,1,2,2-Tetrachloroethane
0801213-01	57SB14A	1,1-Dichloroethane
0801213-01	57SB14A	1,2-Dichloropropane
0801213-01	57SB14A	Isopropylbenzene
0801213-01	57SB14A	Methyl Acetate
0801213-01	57SB14A	Methyl tert-Butyl Ether
0801213-01	57SB14A	Styrene
0801253-08	57SB8AB	1,1,2,2-Tetrachloroethane
0801253-08	57SB8AB	1,2,4-Trichlorobenzene
0801253-08	57SB8AB	1,2-Dibromo-3-chloroprop ane
0801253-08	57SB8AB	Acetone
0801253-08	57SB8AB	Isopropylbenzene
0801253-08	57SB8AB	Methyl Acetate
0801253-08	57SB8AB	Methylcyclohexane

Qualification: The RPD between the MS and MSD results exceeded the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8260B

Sample/Analyte:		
0801213-01	57SB14A	Methyl Acetate
0801253-08	57SB8AB	1,2,3-Trichlorobenzene
0801253-08	57SB8AB	1,2,4-Trichlorobenzene
0801253-08	57SB8AB	Acetone
0801253-08	57SB8AB	Isopropylbenzene
0801253-08	57SB8AB	Methylcyclohexane

Qualification: The MS or MSD recovery, but not both, was outside the control limit. The RPD is within the control limit. The unspiked sample result is considered estimated.

Analysis: USEPA-8260B

Sample/Analyte:		
0801213-01	57SB14A	1,2,3-Trichlorobenzene
0801213-01	57SB14A	1,2,4-Trichlorobenzene
0801213-01	57SB14A	1,2-Dibromo-3-chloroprop ane
0801213-01	57SB14A	1,2-Dibromoethane
0801213-01	57SB14A	1,2-Dichlorobenzene

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SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Volatile Organic Compounds by EPA Method 8260B

Sample/Analyte:	0801213-01	57SB14A	2-Hexanone
	0801213-01	57SB14A	Chloroform
	0801213-01	57SB14A	cis-1,2-Dichloroethene
	0801253-08	57SB8AB	1,1,2-Trichloro-1,2,2-trifluoroethane
	0801253-08	57SB8AB	1,2-Dichlorobenzene
	0801253-08	57SB8AB	2-Butanone (MEK)

Qualification: The LCS recovery exceeded the control limit but it was within the marginal exceedance for a compound that is not a project-specific analyte of concern. The result for this analyte in any sample from the associated QC batch is not considered qualified.

Analysis: USEPA-8260B

Sample/Analyte:	0801233-01	57SB6C	Carbon Disulfide
	0801233-07	57SB4B	Carbon Disulfide

Qualification: The LCS recovery exceeded both the control limit and the marginal exceedance for a compound that is not a project-specific analyte of concern. The result for this analyte in any sample from the associated QC batch is considered qualified.

Analysis: USEPA-8260B

Sample/Analyte:	0801213-05	DUP-4	Carbon Disulfide
	0801233-08	57SB4C	Carbon Disulfide
	0801233-09	DUP-5	Carbon Disulfide
	0801253-01	57SB5A	Carbon Disulfide
	0801253-02	57SB5AB	Carbon Disulfide
	0801253-03	57SB5B	Carbon Disulfide
	0801253-04	57SB5C	Carbon Disulfide
	0801253-06	DUP-6	Carbon Disulfide
	0801253-07	57SB8A	Carbon Disulfide
	0801253-08	57SB8AB	Carbon Disulfide
	0801253-09	57SB8B	Carbon Disulfide
	0801253-10	57SB8C	Carbon Disulfide

Qualification: Concentration exceeds calibration range

Analysis: USEPA-8260B

Sample/Analyte:	0800592-MS1		Acetone
	0800592-MSD		Acetone
	0801213-01	57SB14A	Acetone

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DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: RA
Date: 2/19/08
DV Level: II III IV
Review Document:
_X_ SW-846
_X_ NFG - Region III Modifications
_X_ Project QAPP/SAP

Project Name: Radford
Project Number: 11656421
Laboratory: TriMatrix
SDG No.: 36440-47
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 °C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.	✓		

Notes: 575B6A 29% Solid
575B7A 37% "

2.0 Holding Times

		Yes	No	NA
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per batch)?	✓		
3.2	Do any blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank] (or 10 times for the common phthalate contaminants).	✓		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	✓		

Notes: aqueous MB → butyl benzyl phthalate 0.11 ug/L, di-n-butyl phthalate 0.56 ug/L < 10xB, 7 in EBs
soil MBs di-n-butyl phthalate 1.33 ug/kg, bis(2-ethylhexyl) phthalate 1.67 ug/kg
" " 1.33 " < 10xB, Z

EB-4 → acetophenone 0.075 ug/L
EQBK-5 diethyl phthalate 0.038) naphthalene 0.066 ug/L,
phenanthrene 0.019 ug/L

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve?	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve?	✓		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis?	✓		
4.4	Are all calibration standard %RSD ≤15%, r>0.995, or r^2<0.99), second source ±30% or %D(≤20%) within the control limits?	✓		
For initial calibration: %RSD > 15% but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>30% J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				
4.5	Are any SPCCs RF < 0.05 and/or CCC >30%? If yes reject all associated data.		✓	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	✓		
5.2	Are DFTPP monitored ions within specification? If no, flag R.	✓		
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune? If no, flag R.	✓		
5.4	Have ion abundance criteria for DFTPP been met for each instrument used? If no, flag R.	✓		

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			✓
6.3	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			✓
	If No, for 2 or 3 %Rs > UCL, K(+) only; for 2 or 3 %Rs < LCL, but > 10%, L(+)/UL (-); for 2 or 3 %Rs mixed high/low, J(+)/UJ(-); for %R < 10%, L(+)/R(-).			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate outside the QC limits?	✓		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS/MSD results in conjunction with other QC criteria to determine the need for qualification of the data.			

Notes: MS/MSD for 575B8AB
%RS>QC for carbazole 168%, 172%. ND; No action
%RS>QC for 4,6-dinitro-2-methylphenol 25%, 29%, 2,4-dinitrophenol 12%. ND; w/m in parent
RPD>QC caprolactam 32%, hexachlorocyclopentadiene 32%.
ND ← No action → ND

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS outside the QC limits? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).		✓	
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.		✓	

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard areas within +100% and -50% of the mid point initail calibration? If No, J(+)/UJ(-).	✓		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration?			
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.	✓		

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Are all analyte duplicate results within control limits (use RPD limits of matrix spikes)? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes:

See attached

11.0 Detection Limit Verification		Yes	No	NA
11.1	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	✓		

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
12.1.1	Number of samples:			
12.1.2	Number of target compounds in each analysis:			
12.1.3	Number of results rejected and not reported:			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100%			

Notes:

Field DUPs for SVOCs

	575B4AB	&	DUP-5	RL	RPD
acenaphthene	0.87 49/kgJ		ND	22	OKV
butyl benzyl phthalate	6.1 J		ND	220	OKV
diethyl phthalate	0.87J		ND	220	OKV
bis(2-ethylhexyl)...	82J		74	220	OKV
naphthalene	0.44J		ND	21	OKV
di-n-butyl phthalate	20J		ND	210	OKV

	57565AB	&	DUP-6	RL	RPD
acenaphthene	0.89 J		ND	23	OKV
benzo(a) anthracene	0.89J		0.9J	23	OKV
Chrysene	1.3 J		ND	23	OKV
di-n-butyl phthalate	18J		ND	230	OKV
bis(2-ethylhexyl)	34J		74J	230	OKV
pyrene	0.89J		0.9J	23	OKV
1,1-biphenyl	ND		0.9J	230	OKV
butyl benzyl phthalate	ND		4.5J	230	OKV
diethyl phthalate	ND		16J	230	OKV
Fluorene	ND		4.5J	23	OKV
2-methylnaphthalene	ND		1.3J	230	OKV
naphthalene	ND		0.45J	23	OKV
phenol	ND		1.3J	230	OKV

QC BATCH SUMMARY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
QC Batch: 0800629
QC Batch Matrix: Water
Preparation: 3510C Liquid-Liquid Extraction

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	0800629-BLK2	01/18/08 08:05	Added for URS 0801230,0801250
LCS	0800629-BS2	01/18/08 08:05	Added for URS 0801230,0801250
EQBK-4	0801230-01	01/18/08 08:05	
EQBK-5	0801250-01	01/18/08 08:05	

butyl benzyl 1.1
di-n-butyl 5.6

METHOD BLANK DATA SHEET
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0800629-BLK2
File ID: 800629B1.D
Prepared: 01/18/08 08:05
Preparation: 3510C Liquid-Liquid Extı
Initial/Final: 1000 mL / 1 mL
Analyzed: 01/22/08 20:23
Instrument: 195
QC Batch: 0800629
Sequence: 8012344
Calibration: 8A23018

CAS No.	Analyte	MDL	MRL	Concentration	Q
83-32-9	Acenaphthene	0.013	0.50	0.50 ug/L	U
208-96-8	Acenaphthylene	0.012	0.50	0.50 ug/L	U
98-86-2	Acetophenone	0.043	5.0	5.0 ug/L	U
120-12-7	Anthracene	0.014	0.50	0.50 ug/L	U
1912-24-9	Atrazine	0.026	5.0	5.0 ug/L	U
100-52-7	Benzaldehyde	0.051	5.0	5.0 ug/L	U
56-55-3	Benzo(a)anthracene	0.037	0.50	0.50 ug/L	U
50-32-8	Benzo(a)pyrene	0.023	0.50	0.50 ug/L	U
205-99-2	Benzo(b)fluoranthene	0.040	0.50	0.50 ug/L	U
207-08-9	Benzo(k)fluoranthene	0.036	0.50	0.50 ug/L	U
191-24-2	Benzo(g,h,i)perylene	0.022	0.50	0.50 ug/L	U
92-52-4	1,1'-Biphenyl	0.015	5.0	5.0 ug/L	U
101-55-3	4-Bromophenyl Phenyl Ether	0.026	5.0	5.0 ug/L	U
85-68-7	Butyl Benzyl Phthalate	0.029	5.0	0.110 ug/L	J
105-60-2	Caprolactam	0.14	5.0	5.0 ug/L	U
86-74-8	Carbazole	0.018	5.0	5.0 ug/L	U
59-50-7	4-Chloro-3-methylphenol	0.021	5.0	5.0 ug/L	U
106-47-8	4-Chloroaniline	0.021	5.0	5.0 ug/L	U
111-91-1	Bis(2-chloroethoxy)methane	0.016	5.0	5.0 ug/L	U
111-44-4	Bis(2-chloroethyl) Ether	0.016	5.0	5.0 ug/L	U
108-60-1	Bis(2-chloroisopropyl) Ether	0.047	5.0	5.0 ug/L	U
91-58-7	2-Chloronaphthalene	0.012	5.0	5.0 ug/L	U
95-57-8	2-Chlorophenol	0.016	5.0	5.0 ug/L	U
7005-72-3	4-Chlorophenyl Phenyl Ether	0.016	5.0	5.0 ug/L	U
218-01-9	Chrysene	0.020	0.50	0.50 ug/L	U
53-70-3	Dibenz(a,h)anthracene	0.026	0.50	0.50 ug/L	U
132-64-9	Dibenzofuran	0.016	5.0	5.0 ug/L	U
84-74-2	Di-n-butyl Phthalate	0.38	5.0	0.560 ug/L	J
91-94-1	3,3'-Dichlorobenzidine	0.21	5.0	5.0 ug/L	U
120-83-2	2,4-Dichlorophenol	0.015	5.0	5.0 ug/L	U

02451

QC BATCH SUMMARY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
QC Batch: 0800817
QC Batch Matrix: Soil
Preparation: 3550B Sonication Extraction

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	0800817-BLK1	01/23/08 08:02	
LCS	0800817-BS1	01/23/08 08:02	
57SB8AB	0800817-MS1	01/23/08 08:02	
57SB8AB	0800817-MSD1	01/23/08 08:02	
57SB6A	0801213-10	01/23/08 08:02	
57SB6AB	0801213-11	01/23/08 08:02	
57SB6B	0801213-12	01/23/08 08:02	
57SB6C	0801233-01	01/23/08 08:02	
57SB7A	0801233-02	01/23/08 08:02	
57SB7AB	0801233-03	01/23/08 08:02	
57SB7B	0801233-04	01/23/08 08:02	
57SB7C	0801233-05	01/23/08 08:02	
57SB4AB	0801233-06	01/23/08 08:02	
57SB4B	0801233-07	01/23/08 08:02	
57SB4C	0801233-08	01/23/08 08:02	
DUP-5	0801233-09	01/23/08 08:02	
57SB5A	0801253-01	01/23/08 08:02	
57SB5AB	0801253-02	01/23/08 08:02	
57SB5B	0801253-03	01/23/08 08:02	
57SB5C	0801253-04	01/23/08 08:02	
DUP-6	0801253-06	01/23/08 08:02	
57SB8A	0801253-07	01/23/08 08:02	
57SB8AB	0801253-08	01/23/08 08:02	
57SB8B	0801253-09	01/23/08 08:02	

di-n-butyl 13.3
bis(2-ethylhexyl) 16.7

METHOD BLANK DATA SHEET
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800817-BLK1
File ID: 800817B1.D
Prepared: 01/23/08 08:02
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 1 mL
Analyzed: 01/24/08 16:07
Instrument: 195
QC Batch: 0800817
Sequence: 8012605
Calibration: 8A23018

CAS No.	Analyte	MDL	MRL	Concentration	Q
83-32-9	Acenaphthene	0.40	17	17 ug/kg wet	U
208-96-8	Acenaphthylene	0.60	17	17 ug/kg wet	U
98-86-2	Acetophenone	6.7	170	170 ug/kg wet	U
120-12-7	Anthracene	0.43	17	17 ug/kg wet	U
1912-24-9	Atrazine	1.5	170	170 ug/kg wet	U
100-52-7	Benzaldehyde	26	170	170 ug/kg wet	U
56-55-3	Benzo(a)anthracene	0.54	17	17 ug/kg wet	U
50-32-8	Benzo(a)pyrene	1.0	17	17 ug/kg wet	U
205-99-2	Benzo(b)fluoranthene	0.85	17	17 ug/kg wet	U
207-08-9	Benzo(k)fluoranthene	0.72	17	17 ug/kg wet	U
191-24-2	Benzo(g,h,i)perylene	2.3	67	67 ug/kg wet	U
92-52-4	1,1'-Biphenyl	0.46	170	170 ug/kg wet	U
101-55-3	4-Bromophenyl Phenyl Ether	1.2	170	170 ug/kg wet	U
85-68-7	Butyl Benzyl Phthalate	2.1	170	170 ug/kg wet	U
105-60-2	Caprolactam	23	330	330 ug/kg wet	U
86-74-8	Carbazole	0.50	170	170 ug/kg wet	U
59-50-7	4-Chloro-3-methylphenol	1.8	170	170 ug/kg wet	U
106-47-8	4-Chloroaniline	20	170	170 ug/kg wet	U
111-91-1	Bis(2-chloroethoxy)methane	0.80	170	170 ug/kg wet	U
111-44-4	Bis(2-chloroethyl) Ether	0.90	170	170 ug/kg wet	U
108-60-1	Bis(2-chloroisopropyl) Ether	0.31	170	170 ug/kg wet	U
91-58-7	2-Chloronaphthalene	0.43	170	170 ug/kg wet	U
95-57-8	2-Chlorophenol	0.38	170	170 ug/kg wet	U
7005-72-3	4-Chlorophenyl Phenyl Ether	0.45	170	170 ug/kg wet	U
218-01-9	Chrysene	0.48	17	17 ug/kg wet	U
53-70-3	Dibenz(a,h)anthracene	0.54	67	67 ug/kg wet	U
132-64-9	Dibenzofuran	0.26	170	170 ug/kg wet	U
84-74-2	Di-n-butyl Phthalate	1.2	170	1.33 ug/kg wet	J
91-94-1	3,3´-Dichlorobenzidine	78	330	330 ug/kg wet	U
120-83-2	2,4-Dichlorophenol	6.6	170	170 ug/kg wet	U

METHOD BLANK DATA SHEET
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800817-BLK1
File ID: 800817B1.D
Prepared: 01/23/08 08:02
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 1 mL
Analyzed: 01/24/08 16:07
Instrument: 195
QC Batch: 0800817
Sequence: 8012605
Calibration: 8A23018

CAS No.	Analyte	MDL	MRL	Concentration	Q
84-66-2	Diethyl Phthalate	0.37	170	170 ug/kg wet	U
105-67-9	2,4-Dimethylphenol	5.7	170	170 ug/kg wet	U
131-11-3	Dimethyl Phthalate	0.34	170	170 ug/kg wet	U
534-52-1	4,6-Dinitro-2-methylphenol	36	170	170 ug/kg wet	U
51-28-5	2,4-Dinitrophenol	33	330	330 ug/kg wet	U
121-14-2	2,4-Dinitrotoluene	13	170	170 ug/kg wet	U
606-20-2	2,6-Dinitrotoluene	1.6	170	170 ug/kg wet	U
117-84-0	Di-n-octyl Phthalate	9.8	170	170 ug/kg wet	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1.3	170	1.67 ug/kg wet	J
206-44-0	Fluoranthene	3.8	17	17 ug/kg wet	U
86-73-7	Fluorene	0.28	17	17 ug/kg wet	U
118-74-1	Hexachlorobenzene	0.80	170	170 ug/kg wet	U
87-68-3	Hexachlorobutadiene	0.69	170	170 ug/kg wet	U
77-47-4	Hexachlorocyclopentadiene	3.9	170	170 ug/kg wet	U
67-72-1	Hexachloroethane	0.80	170	170 ug/kg wet	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.70	67	67 ug/kg wet	U
78-59-1	Isophorone	0.40	170	170 ug/kg wet	U
91-57-6	2-Methylnaphthalene	0.48	170	170 ug/kg wet	U
95-48-7	2-Methylphenol	8.1	170	170 ug/kg wet	U
106-44-5	4-Methylphenol	9.1	170	170 ug/kg wet	U
91-20-3	Naphthalene	0.23	17	17 ug/kg wet	U
88-74-4	2-Nitroaniline	13	170	170 ug/kg wet	U
99-09-2	3-Nitroaniline	11	170	170 ug/kg wet	U
100-01-6	4-Nitroaniline	23	170	170 ug/kg wet	U
98-95-3	Nitrobenzene	1.5	170	170 ug/kg wet	U
100-02-7	4-Nitrophenol	11	330	330 ug/kg wet	U
88-75-5	2-Nitrophenol	12	170	170 ug/kg wet	U
86-30-6	N-Nitroso-diphenylamine	0.80	170	170 ug/kg wet	U
621-64-7	N-Nitroso-di-n-propylamine	0.71	170	170 ug/kg wet	U
87-86-5	Pentachlorophenol	3.7	330	330 ug/kg wet	U

02456

QC BATCH SUMMARY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47

Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003

QC Batch: 0800940
QC Batch Matrix: Soil
Preparation: 3550B Sonication Extraction

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	0800940-BLK1	01/25/08 10:34	
LCS	0800940-BS1	01/25/08 10:34	
LCS Dup	0800940-BSD1	01/25/08 10:34	
57SB8C	0801253-10	01/25/08 10:34	

di-n-butyl 13.3

02462

METHOD BLANK DATA SHEET
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Soil
Laboratory ID: 0800940-BLK1
File ID: 800940B1.D
Prepared: 01/25/08 10:34
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 1 mL
Analyzed: 01/26/08 12:52
Instrument: 195
QC Batch: 0800940
Sequence: 8012606
Calibration: 8A23018

CAS No.	Analyte	MDL	MRL	Concentration	Q
83-32-9	Acenaphthene	0.40	17	17 ug/kg wet	U
208-96-8	Acenaphthylene	0.60	17	17 ug/kg wet	U
98-86-2	Acetophenone	6.7	170	170 ug/kg wet	U
120-12-7	Anthracene	0.43	17	17 ug/kg wet	U
1912-24-9	Atrazine	1.5	170	170 ug/kg wet	U
100-52-7	Benzaldehyde	26	170	170 ug/kg wet	U
56-55-3	Benzo(a)anthracene	0.54	17	17 ug/kg wet	U
50-32-8	Benzo(a)pyrene	1.0	17	17 ug/kg wet	U
205-99-2	Benzo(b)fluoranthene	0.85	17	17 ug/kg wet	U
207-08-9	Benzo(k)fluoranthene	0.72	17	17 ug/kg wet	U
191-24-2	Benzo(g,h,i)perylene	2.3	67	67 ug/kg wet	U
92-52-4	1,1'-Biphenyl	0.46	170	170 ug/kg wet	U
101-55-3	4-Bromophenyl Phenyl Ether	1.2	170	170 ug/kg wet	U
85-68-7	Butyl Benzyl Phthalate	2.1	170	170 ug/kg wet	U
105-60-2	Caprolactam	23	330	330 ug/kg wet	U
86-74-8	Carbazole	0.50	170	170 ug/kg wet	U
59-50-7	4-Chloro-3-methylphenol	1.8	170	170 ug/kg wet	U
106-47-8	4-Chloroaniline	20	170	170 ug/kg wet	U
111-91-1	Bis(2-chloroethoxy)methane	0.80	170	170 ug/kg wet	U
111-44-4	Bis(2-chloroethyl) Ether	0.90	170	170 ug/kg wet	U
108-60-1	Bis(2-chloroisopropyl) Ether	0.31	170	170 ug/kg wet	U
91-58-7	2-Chloronaphthalene	0.43	170	170 ug/kg wet	U
95-57-8	2-Chlorophenol	0.38	170	170 ug/kg wet	U
7005-72-3	4-Chlorophenyl Phenyl Ether	0.45	170	170 ug/kg wet	U
218-01-9	Chrysene	0.48	17	17 ug/kg wet	U
53-70-3	Dibenz(a,h)anthracene	0.54	67	67 ug/kg wet	U
132-64-9	Dibenzofuran	0.26	170	170 ug/kg wet	U
84-74-2	Di-n-butyl Phthalate	1.2	170	1.33 ug/kg wet	J
91-94-1	3,3'-Dichlorobenzidine	78	330	330 ug/kg wet	U
120-83-2	2,4-Dichlorophenol	6.6	170	170 ug/kg wet	U

02459

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8270C

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 1 mL

Laboratory ID: 0800817-MS1

QC Batch: 0800817

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Acenaphthene	421	ND	336	80	45 - 110	ug/kg dry
Acenaphthylene	421	ND	344	82	45 - 105	ug/kg dry
Acetophenone	430	ND	359	84	50 - 150	ug/kg dry
Anthracene	421	ND	352	83	55 - 105	ug/kg dry
Atrazine	430	ND	335	78	61 - 146	ug/kg dry
Benzaldehyde	430	ND	357	83	50 - 150	ug/kg dry
Benzo(a)anthracene	421	ND	306	73	50 - 110	ug/kg dry
Benzo(a)pyrene	421	2.58	312	73	50 - 110	ug/kg dry
Benzo(b)fluoranthene	421	2.15	311	73	45 - 115	ug/kg dry
Benzo(k)fluoranthene	421	ND	341	81	45 - 125	ug/kg dry
Benzo(g,h,i)perylene	421	ND	308	73	40 - 125	ug/kg dry
1,1'-Biphenyl	430	1.29	370	86	60 - 131	ug/kg dry
4-Bromophenyl Phenyl Ether	430	ND	381	88	45 - 115	ug/kg dry
Butyl Benzyl Phthalate	430	ND	329	77	50 - 125	ug/kg dry
Caprolactam	430	ND	474	110	62 - 112	ug/kg dry
Carbazole	421	ND	710	168 *	45 - 115	ug/kg dry
4-Chloro-3-methylphenol	430	ND	307	71	45 - 115	ug/kg dry
4-Chloroaniline	430	ND	112	26	10 - 95	ug/kg dry
Bis(2-chloroethoxy)methane	430	ND	355	83	45 - 110	ug/kg dry
Bis(2-chloroethyl) Ether	430	ND	328	76	40 - 105	ug/kg dry
Bis(2-chloroisopropyl) Ether	430	ND	340	79	20 - 115	ug/kg dry
2-Chloronaphthalene	430	ND	335	78	45 - 105	ug/kg dry
2-Chlorophenol	430	ND	358	83	45 - 105	ug/kg dry
4-Chlorophenyl Phenyl Ether	430	ND	344	80	45 - 110	ug/kg dry
Chrysene	421	ND	330	78	55 - 110	ug/kg dry
Dibenz(a,h)anthracene	421	ND	319	76	40 - 125	ug/kg dry
Dibenzofuran	430	ND	361	84	50 - 105	ug/kg dry
Di-n-butyl Phthalate	430	15.9	380	85	55 - 110	ug/kg dry
3,3'-Dichlorobenzidine	860	ND	473	55	10 - 130	ug/kg dry
2,4-Dichlorophenol	430	ND	331	77	45 - 110	ug/kg dry
Diethyl Phthalate	430	4.73	367	84	50 - 115	ug/kg dry
2,4-Dimethylphenol	430	ND	319	74	30 - 105	ug/kg dry
Dimethyl Phthalate	430	ND	402	94	50 - 110	ug/kg dry

02433

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8270C

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 1 mL

Laboratory ID: 0800817-MS1

QC Batch: 0800817

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
4,6-Dinitro-2-methylphenol	430	ND	106	25 *	30 - 135	ug/kg dry
2,4-Dinitrophenol	430	ND	62.8	15	15 - 130	ug/kg dry
2,4-Dinitrotoluene	430	ND	329	77	50 - 115	ug/kg dry
2,6-Dinitrotoluene	430	ND	370	86	50 - 110	ug/kg dry
Di-n-octyl Phthalate	430	ND	387	90	40 - 130	ug/kg dry
Bis(2-ethylhexyl) Phthalate	430	35.3	397	84	45 - 125	ug/kg dry
Fluoranthene	421	ND	333	79	55 - 115	ug/kg dry
Fluorene	421	3.87	345	81	50 - 110	ug/kg dry
Hexachlorobenzene	430	ND	345	80	45 - 120	ug/kg dry
Hexachlorobutadiene	430	ND	279	65	40 - 115	ug/kg dry
Hexachlorocyclopentadiene	430	ND	67.5	16	10 - 113	ug/kg dry
Hexachloroethane	430	ND	215	50	35 - 110	ug/kg dry
Indeno(1,2,3-cd)pyrene	421	ND	312	74	40 - 120	ug/kg dry
Isophorone	430	ND	371	86	45 - 110	ug/kg dry
2-Methylnaphthalene	430	2.58	350	81	45 - 105	ug/kg dry
2-Methylphenol	430	ND	320	74	40 - 105	ug/kg dry
4-Methylphenol	430	ND	358	83	40 - 105	ug/kg dry
Naphthalene	421	0.430	309	73	40 - 105	ug/kg dry
2-Nitroaniline	430	ND	353	82	45 - 120	ug/kg dry
3-Nitroaniline	430	ND	166	39	25 - 110	ug/kg dry
4-Nitroaniline	430	ND	261	61	35 - 115	ug/kg dry
Nitrobenzene	430	ND	325	75	40 - 115	ug/kg dry
4-Nitrophenol	430	ND	158	37	15 - 140	ug/kg dry
2-Nitrophenol	430	ND	252	58	40 - 110	ug/kg dry
N-Nitroso-diphenylamine	430	ND	248	58	50 - 115	ug/kg dry
N-Nitroso-di-n-propylamine	430	ND	350	81	40 - 115	ug/kg dry
Pentachlorophenol	430	ND	171	40	25 - 120	ug/kg dry
Phenanthrene	421	ND	325	77	50 - 110	ug/kg dry
Phenol	430	2.15	329	76	40 - 100	ug/kg dry
Pyrene	421	ND	305	72	45 - 125	ug/kg dry
1,2,4,5-Tetrachlorobenzene	215	ND	171	79	30 - 150	ug/kg dry
2,3,4,6-Tetrachlorophenol	430	ND	291	68	30 - 150	ug/kg dry
2,4,6-Trichlorophenol	430	ND	332	77	45 - 110	ug/kg dry

02434

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8270C

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 1 mL

Laboratory ID: 0800817-MSD1

QC Batch: 0800817

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Acenaphthene	421	342	81	2	30	45 - 110	ug/kg dry
Acenaphthylene	421	351	83	2	30	45 - 105	ug/kg dry
Acetophenone	430	366	85	2	30	50 - 150	ug/kg dry
Anthracene	421	365	87	4	30	55 - 105	ug/kg dry
Atrazine	430	337	78	0.8	30	61 - 146	ug/kg dry
Benzaldehyde	430	359	84	0.6	30	50 - 150	ug/kg dry
Benzo(a)anthracene	421	347	82	12	30	50 - 110	ug/kg dry
Benzo(a)pyrene	421	338	80	8	30	50 - 110	ug/kg dry
Benzo(b)fluoranthene	421	335	79	7	30	45 - 115	ug/kg dry
Benzo(k)fluoranthene	421	374	89	10	30	45 - 125	ug/kg dry
Benzo(g,h,i)perylene	421	333	79	8	30	40 - 125	ug/kg dry
1,1'-Biphenyl	430	372	86	0.6	30	60 - 131	ug/kg dry
4-Bromophenyl Phenyl Ether	430	397	92	4	30	45 - 115	ug/kg dry
Butyl Benzyl Phthalate	430	350	81	6	30	50 - 125	ug/kg dry
Caprolactam	430	344	80	32 *	30	62 - 112	ug/kg dry
Carbazole	421	725	172 *	2	30	45 - 115	ug/kg dry
4-Chloro-3-methylphenol	430	323	75	5	30	45 - 115	ug/kg dry
4-Chloroaniline	430	91.6	21	20	30	10 - 95	ug/kg dry
Bis(2-chloroethoxy)methane	430	363	84	2	30	45 - 110	ug/kg dry
Bis(2-chloroethyl) Ether	430	339	79	3	30	40 - 105	ug/kg dry
Bis(2-chloroisopropyl) Ether	430	344	80	1	30	20 - 115	ug/kg dry
2-Chloronaphthalene	430	344	80	3	30	45 - 105	ug/kg dry
2-Chlorophenol	430	379	88	6	30	45 - 105	ug/kg dry
4-Chlorophenyl Phenyl Ether	430	364	85	6	30	45 - 110	ug/kg dry
Chrysene	421	342	81	4	30	55 - 110	ug/kg dry
Dibenz(a,h)anthracene	421	342	81	7	30	40 - 125	ug/kg dry
Dibenzofuran	430	374	87	4	30	50 - 105	ug/kg dry
Di-n-butyl Phthalate	430	396	88	4	30	55 - 110	ug/kg dry
3,3'-Dichlorobenzidine	860	497	58	5	30	10 - 130	ug/kg dry
2,4-Dichlorophenol	430	337	78	2	30	45 - 110	ug/kg dry
Diethyl Phthalate	430	384	88	5	30	50 - 115	ug/kg dry
2,4-Dimethylphenol	430	335	78	5	30	30 - 105	ug/kg dry
Dimethyl Phthalate	430	425	99	6	30	50 - 110	ug/kg dry
4,6-Dinitro-2-methylphenol	430	104	24 *	2	30	30 - 135	ug/kg dry

02436

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

57SB8AB

USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 1 mL

Laboratory ID: 0800817-MSD1

QC Batch: 0800817

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
2,4-Dinitrophenol	430	53.7	12 *	15	30	15 - 130	ug/kg dry
2,4-Dinitrotoluene	430	365	85	10	30	50 - 115	ug/kg dry
2,6-Dinitrotoluene	430	392	91	6	30	50 - 110	ug/kg dry
Di-n-octyl Phthalate	430	416	97	7	30	40 - 130	ug/kg dry
Bis(2-ethylhexyl) Phthalate	430	419	89	5	30	45 - 125	ug/kg dry
Fluoranthene	421	341	81	2	30	55 - 115	ug/kg dry
Fluorene	421	357	84	3	30	50 - 110	ug/kg dry
Hexachlorobenzene	430	358	83	4	30	45 - 120	ug/kg dry
Hexachlorobutadiene	430	265	62	5	30	40 - 115	ug/kg dry
Hexachlorocyclopentadiene	430	92.9	22	32 *	30	10 - 113	ug/kg dry
Hexachloroethane	430	196	46	10	30	35 - 110	ug/kg dry
Indeno(1,2,3-cd)pyrene	421	337	80	8	30	40 - 120	ug/kg dry
Isophorone	430	390	91	5	30	45 - 110	ug/kg dry
2-Methylnaphthalene	430	358	83	2	30	45 - 105	ug/kg dry
2-Methylphenol	430	332	77	4	30	40 - 105	ug/kg dry
4-Methylphenol	430	372	87	4	30	40 - 105	ug/kg dry
Naphthalene	421	311	74	0.7	30	40 - 105	ug/kg dry
2-Nitroaniline	430	379	88	7	30	45 - 120	ug/kg dry
3-Nitroaniline	430	184	43	10	30	25 - 110	ug/kg dry
4-Nitroaniline	430	286	67	9	30	35 - 115	ug/kg dry
Nitrobenzene	430	334	78	3	30	40 - 115	ug/kg dry
4-Nitrophenol	430	150	35	5	30	15 - 140	ug/kg dry
2-Nitrophenol	430	258	60	3	30	40 - 110	ug/kg dry
N-Nitroso-diphenylamine	430	262	61	6	30	50 - 115	ug/kg dry
N-Nitroso-di-n-propylamine	430	359	84	3	30	40 - 115	ug/kg dry
Pentachlorophenol	430	157	36	8	30	25 - 120	ug/kg dry
Phenanthrene	421	349	83	7	30	50 - 110	ug/kg dry
Phenol	430	344	80	5	30	40 - 100	ug/kg dry
Pyrene	421	318	75	4	30	45 - 125	ug/kg dry
1,2,4,5-Tetrachlorobenzene	215	172	80	0.8	30	30 - 150	ug/kg dry
2,3,4,6-Tetrachlorophenol	430	322	75	10	30	30 - 150	ug/kg dry
2,4,6-Trichlorophenol	430	297	69	11	30	45 - 110	ug/kg dry
2,4,5-Trichlorophenol	430	348	81	4	30	50 - 110	ug/kg dry

02437

STATEMENT OF DATA QUALIFICATIONS

Semivolatile Organic Compounds by EPA Method 8270C

Qualification:	The MS and/or MSD recovery was outside the control limit. The non-spiked sample result is considered estimated.	
Analysis:	USEPA-8270C	
Sample/Analyte:	0801253-08 57SB8AB	2,4-Dinitrophenol
	0801253-08 57SB8AB	4,6-Dinitro-2-methylphenol
	0801253-08 57SB8AB	Carbazole
Qualification:	The RPD between the MS and MSD results exceeded the control limit. The non-spiked sample result is considered estimated.	
Analysis:	USEPA-8270C	
Sample/Analyte:	0801253-08 57SB8AB	Caprolactam
	0801253-08 57SB8AB	Hexachlorocyclopentadiene

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Semivolatile Organic Compounds by EPA Method 8270C

Qualification:	The MS and/or MSD recovery was outside the control limit. The non-spiked sample result is considered estimated.		
Analysis:	USEPA-8270C		
Sample/Analyte:	0801253-08	57SB8AB	2,4-Dinitrophenol
	0801253-08	57SB8AB	4,6-Dinitro-2-methylphenol
	0801253-08	57SB8AB	Carbazole
Qualification:	The RPD between the MS and MSD results exceeded the control limit. The non-spiked sample result is considered estimated.		
Analysis:	USEPA-8270C		
Sample/Analyte:	0801253-08	57SB8AB	Caprolactam
	0801253-08	57SB8AB	Hexachlorocyclopentadiene

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Individual sample results relate only to the sample tested.
5560 Corporate Exchange Court SE • Grand Rapids, MI 49512 • (616) 975-4500 • Fax (616) 9[illegible]17

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: RA
Date: 2/15/06
DV Level: II III IV

Review Document:

X SW-846 - 8081/8082
X NFG - Region III Modifications
X project QAPP

Project Name: Ragd Ford
Project Number: 11654921
Laboratory: TriMatrix
SDG No.: 36440-47
Test Name: Pest / PCBs
Method No.: 8081/8082

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 ^{o}C, then flag L(+)/UL(-).			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.		✓	

Notes:

2.0 Holding Times

		Yes	No	NA
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (one per 20 samples or batch and matrix)?	✓		
3.2	Do any blanks have positive results? If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank].		✓	
3.3	Do any field equipment blanks have positive results? If yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration

		Yes	No	NA
4.1	Are at least five standards included in the calibration curve for 1016, 1260, toxaphene, and technical chlordane; and at least one point for the other arochlors reported? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the control limits?		✓	
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

Rpt → CC for sequence 8020314 %D >20% for endrin 20.9%. for 2nd column. Ass. results NDs, Pos bias, two pos bias No action.

5.0 GC/ECD Instrument Performance Check

		Yes	No	NA
5.1	Has a Performance Evaluation Mixture (PEM) been analyzed at the beginning, every 12 hours, and at the end of every sequence.	✓		
5.2	Is the 4,4'-DDT breakdown </= to 20%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non detect DDT results, DDD/DDE - R(+).	✓		
5.3	Is the endrin breakdown </= to 20%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	✓		
5.4	Is the combined breakdowns less than or equal to 30%? If No, for positive DDT/endrin results, DDT/endrin-L(+), DDD/DD/endrin aldehyde/endrin ketone - NJ(+). For non-detect DDT/endrin results, DDD/DDE/endrin aldehyde/endrin ketone - R(+).	✓		

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	✓		
6.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks? Advisory limit: 60-150%.	✓		
6.3	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?		✓	
6.4	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		✓	

# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
1 out	high/low	No action	No action
2 out	2 high same column	K	No action
	2 low same column	L, UL	No action
	mixed same column	J, UJ	No action
	2 high diff columns	J	Not applicable
	2 low diff columns	J, UJ	Not applicable
	mixed diff columns	Professional judgement	Not applicable
3 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	2 high, 1 low	K (2 high)	J (1 low 2nd column)
	2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
	other mixed	J, UJ	Not applicable
4 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	Mixed	J, UJ	Not applicable

If any recovery is >0% and <10% then L(+)/R(-).
If any recovery is 0% then R(+/-).

Notes: Post → 575B5B tetrachloro-m-xylene 66% <QC 2nd column, amp in 575B5C <QC for 2nd column, Dup-6<QC for 2nd column, 575B8A <QC for 2nd column, 575B8AB, 575B8B and 575B8C. No action based on one surr. failure.

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes: Post → MS/MSD For 575B8AB >QC 4,4'-DDT (156%/158%), toxaphene (260%/170%) 42% RPD) ans. prent results NDs, No action ✓

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8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?	✓		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			

Notes: For pest → QC batch 300925 QC alpha-chlordane (121%, 124%), 4,4-DDE (127%) toxaphene 302% (172%) and results NDs, no action

9.0 Field Duplicate

		Yes	No	NA
9.2	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		✓	

Notes: 575B4AB, DUP-5 — 575B5AB, RL, DUP-6

All NDs ✓

heptachlor epoxide	6.6	2.3	ND	ok
dieldrin	ND	4.5	3.4	ok
PCB-1254	130	45	250	63% RPD → J,f

10.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns <40%? If No, J(+).		✓	
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		

Notes: For PCBs → 575B5A PCB-1260 62.2%) 575B8B PCB-1254 56.2% → J/g

For Pest → heptachlor epoxide 575B5A 85.2%, 575B5AB 90%, dieldrin DUP-6 76.3%, 575B8A 66.1%, 575B8AB 74.2%, 575B8B, endosulfan II 575B6A 94.9% and 575B6B 49.8%.

all → J/g

11.0 Data Completeness

		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
11.1.1	Number of samples: Pest _____ PCB _____			
11.1.2	Number of target compounds in each analysis: PEST _____ PCB _____			
11.1.3	Number of results rejected and not reported: Pest _____ PCB _____			
11.1.4	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = Pest 100% PCB 100%			

Notes:

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CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Instrument ID: 158
Calibration: 8B03011
Lab File ID: B150078-0
Calibration Date: 02/01/08 18:24
Sequence: 8020314
Injection Date: 02/02/08
Lab Sample ID: 8020314-CCV3
Injection Time: 04:36

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift		
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
alpha-BHC [2C]	A	0.0400	0.0438	3702361	4053610		9.5	20	
beta-BHC [2C]	A	0.0400	0.0424	1944260	2062650		6.1	20	
gamma-BHC (Lindane) [2C]	A	0.0400	0.0435	3369427	3661440		8.7	20	
delta-BHC [2C]	A	0.0400	0.0436	2898684	3158340		9.0	20	
alpha-Chlordane [2C]	A	0.0400	0.0427	2642448	2818410		6.7	20	
gamma-Chlordane [2C]	A	0.0400	0.0425	2703147	2873170		6.3	20	
4,4'-DDD [2C]	A	0.0400	0.0464	1672564	1942230		16.1	20	
4,4'-DDE [2C]	A	0.0400	0.0433	2170311	2350730		8.3	20	
4,4'-DDT [2C]	A	0.0400	0.0406	1498901	1519910		1.4	20	
Aldrin [2C]	A	0.0400	0.0422	2888091	3050350		5.6	20	
Dieldrin [2C]	A	0.0400	0.0465	1957516	2276520		16.3	20	
Endosulfan I [2C]	A	0.0400	0.0442	2127596	2351870		10.5	20	
Endosulfan II [2C]	A	0.0400	0.0445	1621291	1803680		11.2	20	
Endosulfan Sulfate [2C]	A	0.0400	0.0417	1493026	1554860		4.1	20	
Endrin [2C] Positive	A	0.0400	0.0484	1458408	1763930		20.9	20	*
Endrin Aldehyde [2C]	A	0.0400	0.0428	1375640	1471710		7.0	20	
Endrin Ketone [2C]	A	0.0400	0.0444	1518516	1684100		10.9	20	
Heptachlor [2C]	A	0.0400	0.0413	3375103	3486850		3.3	20	
Heptachlor Epoxide [2C]	A	0.0400	0.0436	2594171	2825000		8.9	20	
Methoxychlor [2C]	A	0.0400	0.0414	903299.9	935829		3.6	20	

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

01461

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Sequence: 8020735
Instrument: 222
Matrix: Soil
Calibration: 8B07005

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
57SB5B (0801253-03)		**Lab File ID: data014-0**		**Analyzed: 02/06/08 16:35**			
Tetrachloro-m-xylene	8.76	8.77	-0.01	+/-1.0	77	70 - 125	
Tetrachloro-m-xylene [2C]	7.65	7.67	-0.02	+/-1.0	66	70 - 125	*
Decachlorobiphenyl	23.62	23.63	-0.01	+/-1.0	78	55 - 130	
Decachlorobiphenyl [2C]	20.72	20.73	-0.01	+/-1.0	86	55 - 130	
57SB5C (0801253-04)		**Lab File ID: data015-0**		**Analyzed: 02/06/08 17:10**			
Tetrachloro-m-xylene	8.77	8.77	0.00	+/-1.0	88	70 - 125	
Tetrachloro-m-xylene [2C]	7.65	7.67	-0.02	+/-1.0	63	70 - 125	*
Decachlorobiphenyl	23.63	23.63	0.00	+/-1.0	92	55 - 130	
Decachlorobiphenyl [2C]	20.73	20.73	0.00	+/-1.0	87	55 - 130	
DUP-6 (0801253-06)		**Lab File ID: data016-0**		**Analyzed: 02/06/08 17:45**			
Tetrachloro-m-xylene	8.75	8.77	-0.02	+/-1.0	87	70 - 125	
Tetrachloro-m-xylene [2C]	7.64	7.67	-0.03	+/-1.0	59	70 - 125	*
Decachlorobiphenyl	23.61	23.63	-0.02	+/-1.0	97	55 - 130	
Decachlorobiphenyl [2C]	20.72	20.73	-0.01	+/-1.0	84	55 - 130	
57SB8A (0801253-07)		**Lab File ID: data017-0**		**Analyzed: 02/06/08 18:20**			
Tetrachloro-m-xylene	8.77	8.77	0.00	+/-1.0	79	70 - 125	
Tetrachloro-m-xylene [2C]	7.65	7.67	-0.02	+/-1.0	54	70 - 125	*
Decachlorobiphenyl	23.63	23.63	0.00	+/-1.0	86	55 - 130	
Decachlorobiphenyl [2C]	20.73	20.73	0.00	+/-1.0	92	55 - 130	
LCS (0800928-BS2)		**Lab File ID: data018-0**		**Analyzed: 02/06/08 18:55**			
Tetrachloro-m-xylene	8.74	8.77	-0.03	+/-1.0	177	70 - 125	*
Tetrachloro-m-xylene [2C]	7.63	7.67	-0.04	+/-1.0	130	70 - 125	*
Decachlorobiphenyl	23.59	23.63	-0.04	+/-1.0	183	55 - 130	*
Decachlorobiphenyl [2C]	20.70	20.73	-0.03	+/-1.0	169	55 - 130	*
LCS Dup (0800928-BSD2)		**Lab File ID: data019-0**		**Analyzed: 02/06/08 19:30**			
Tetrachloro-m-xylene	8.77	8.77	0.00	+/-1.0	119	70 - 125	
Tetrachloro-m-xylene [2C]	7.65	7.67	-0.02	+/-1.0	79	70 - 125	
Decachlorobiphenyl	23.63	23.63	0.00	+/-1.0	116	55 - 130	
Decachlorobiphenyl [2C]	20.73	20.73	0.00	+/-1.0	104	55 - 130	

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Sequence: 8020735
Instrument: 222
Matrix: Soil
Calibration: 8B07005

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
Calibration Check (8020735-CCV1)		**Lab File ID: data020-0**		**Analyzed: 02/06/08 20:05**			
Tetrachloro-m-xylene	8.75	8.77	-0.02	+/-1.0	90	80 - 120	
Tetrachloro-m-xylene [2C]	7.65	7.67	-0.02	+/-1.0	98	80 - 120	
Decachlorobiphenyl	23.61	23.63	-0.02	+/-1.0	88	80 - 120	
Decachlorobiphenyl [2C]	20.71	20.73	-0.02	+/-1.0	91	80 - 120	
Calibration Check (8020735-CCV2)		**Lab File ID: data021-0**		**Analyzed: 02/06/08 20:40**			
Tetrachloro-m-xylene	8.77	8.77	0.00	+/-1.0	118	80 - 120	
Tetrachloro-m-xylene [2C]	7.67	7.67	0.00	+/-1.0	125	80 - 120	*
Decachlorobiphenyl	23.63	23.63	0.00	+/-1.0	118	80 - 120	
Decachlorobiphenyl [2C]	20.73	20.73	0.00	+/-1.0	120	80 - 120	
57SB8AB (0801253-08)		**Lab File ID: data022-0**		**Analyzed: 02/06/08 21:15**			
Tetrachloro-m-xylene	8.74	8.77	-0.03	+/-1.0	83	70 - 125	
Tetrachloro-m-xylene [2C]	7.63	7.67	-0.04	+/-1.0	53	70 - 125	*
Decachlorobiphenyl	23.60	23.63	-0.03	+/-1.0	86	55 - 130	
Decachlorobiphenyl [2C]	20.70	20.73	-0.03	+/-1.0	81	55 - 130	
57SB8B (0801253-09)		**Lab File ID: data023-0**		**Analyzed: 02/06/08 21:50**			
Tetrachloro-m-xylene	8.75	8.77	-0.02	+/-1.0	76	70 - 125	
Tetrachloro-m-xylene [2C]	7.64	7.67	-0.03	+/-1.0	53	70 - 125	*
Decachlorobiphenyl	23.61	23.63	-0.02	+/-1.0	80	55 - 130	
Decachlorobiphenyl [2C]	20.71	20.73	-0.02	+/-1.0	81	55 - 130	
57SB8C (0801253-10)		**Lab File ID: data024-0**		**Analyzed: 02/06/08 22:25**			
Tetrachloro-m-xylene	8.75	8.77	-0.02	+/-1.0	96	70 - 125	
Tetrachloro-m-xylene [2C]	7.63	7.67	-0.04	+/-1.0	67	70 - 125	*
Decachlorobiphenyl	23.60	23.63	-0.03	+/-1.0	99	55 - 130	
Decachlorobiphenyl [2C]	20.70	20.73	-0.03	+/-1.0	107	55 - 130	
Matrix Spike (0800815-MS1)		**Lab File ID: data025-0**		**Analyzed: 02/06/08 23:00**			
Tetrachloro-m-xylene	8.77	8.77	0.00	+/-1.0	79	70 - 125	
Tetrachloro-m-xylene [2C]	7.66	7.67	-0.01	+/-1.0	65	70 - 125	*
Decachlorobiphenyl	23.63	23.63	0.00	+/-1.0	86	55 - 130	
Decachlorobiphenyl [2C]	20.73	20.73	0.00	+/-1.0	81	55 - 130	

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8081A

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 10 mL

Laboratory ID: 0800815-MS1

QC Batch: 0800815

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
alpha-BHC	17.2	ND	16.0	93	60 - 125	ug/kg dry
alpha-BHC [2C]	17.2	ND	17.0	99	60 - 125	ug/kg dry
beta-BHC	17.2	ND	16.1	94	60 - 125	ug/kg dry
beta-BHC [2C]	17.2	ND	16.7	97	60 - 125	ug/kg dry
gamma-BHC (Lindane)	17.2	ND	16.6	97	60 - 125	ug/kg dry
gamma-BHC (Lindane) [2C]	17.2	ND	17.7	103	60 - 125	ug/kg dry
delta-BHC	17.2	ND	16.6	96	55 - 130	ug/kg dry
delta-BHC [2C]	17.2	ND	18.4	107	55 - 130	ug/kg dry
alpha-Chlordane	17.2	ND	17.5	102	65 - 120	ug/kg dry
alpha-Chlordane [2C]	17.2	ND	18.3	106	65 - 120	ug/kg dry
gamma-Chlordane	17.2	ND	20.0	116	65 - 125	ug/kg dry
gamma-Chlordane [2C]	17.2	ND	18.4	107	65 - 125	ug/kg dry
4,4'-DDD	17.2	ND	16.6	96	30 - 135	ug/kg dry
4,4'-DDD [2C]	17.2	ND	18.0	104	30 - 135	ug/kg dry
4,4'-DDE	17.2	ND	17.5	102	70 - 125	ug/kg dry
4,4'-DDE [2C]	17.2	ND	13.3	77	70 - 125	ug/kg dry
4,4'-DDT	17.2	ND	26.8	156 *	45 - 140	ug/kg dry
4,4'-DDT [2C]	17.2	ND	19.0	110	45 - 140	ug/kg dry
Aldrin	17.2	ND	15.9	92	45 - 140	ug/kg dry
Aldrin [2C]	17.2	ND	16.5	96	45 - 140	ug/kg dry
Dieldrin	17.2	0.688	18.4	103	65 - 125	ug/kg dry
Dieldrin [2C]	17.2	2.67	17.7	87	65 - 125	ug/kg dry
Endosulfan I	17.2	ND	15.5	90	15 - 135	ug/kg dry
Endosulfan I [2C]	17.2	ND	16.9	99	15 - 135	ug/kg dry
Endosulfan II	17.2	ND	19.8	115	35 - 140	ug/kg dry
Endosulfan II [2C]	17.2	ND	18.2	106	35 - 140	ug/kg dry
Endosulfan Sulfate	17.2	ND	16.2	94	60 - 135	ug/kg dry
Endosulfan Sulfate [2C]	17.2	ND	15.8	92	60 - 135	ug/kg dry
Endrin	17.2	ND	19.0	110	60 - 135	ug/kg dry
Endrin [2C]	17.2	ND	20.3	118	60 - 135	ug/kg dry
Endrin Aldehyde	17.2	ND	15.3	89	35 - 145	ug/kg dry
Endrin Aldehyde [2C]	17.2	ND	15.7	91	35 - 145	ug/kg dry
Endrin Ketone	17.2	ND	16.8	97	65 - 135	ug/kg dry

0999

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY
USEPA-8081A

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3550B Sonication Extraction
Initial/Final: 30 g / 10 mL

Laboratory ID: 0800815-MSD1
QC Batch: 0800815

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
alpha-BHC	17.2	16.1	94	0.8	30	60 - 125	ug/kg dry
alpha-BHC [2C]	17.2	18.7	109	10	30	60 - 125	ug/kg dry
beta-BHC	17.2	16.5	96	2	30	60 - 125	ug/kg dry
beta-BHC [2C]	17.2	19.5	114	15	30	60 - 125	ug/kg dry
gamma-BHC (Lindane)	17.2	16.9	98	1	30	60 - 125	ug/kg dry
gamma-BHC (Lindane) [2C]	17.2	19.8	115	11	30	60 - 125	ug/kg dry
delta-BHC	17.2	17.2	100	3	30	55 - 130	ug/kg dry
delta-BHC [2C]	17.2	21.4	124	15	30	55 - 130	ug/kg dry
alpha-Chlordane	17.2	17.2	100	2	30	65 - 120	ug/kg dry
alpha-Chlordane [2C]	17.2	20.4	119	11	30	65 - 120	ug/kg dry
gamma-Chlordane	17.2	20.0	116	0.2	30	65 - 125	ug/kg dry
gamma-Chlordane [2C]	17.2	20.4	118	10	30	65 - 125	ug/kg dry
4,4'-DDD	17.2	16.6	96	0	30	30 - 135	ug/kg dry
4,4'-DDD [2C]	17.2	21.8	127	19	30	30 - 135	ug/kg dry
4,4'-DDE	17.2	17.6	102	0.7	30	70 - 125	ug/kg dry
4,4'-DDE [2C]	17.2	16.0	93	18	30	70 - 125	ug/kg dry
4,4'-DDT	17.2	27.2	158 *	1	30	45 - 140	ug/kg dry
4,4'-DDT [2C]	17.2	22.7	132	18	30	45 - 140	ug/kg dry
Aldrin	17.2	16.0	93	0.5	30	45 - 140	ug/kg dry
Aldrin [2C]	17.2	18.1	105	9	30	45 - 140	ug/kg dry
Dieldrin	17.2	18.2	102	1	30	65 - 125	ug/kg dry
Dieldrin [2C]	17.2	21.5	110	20	30	65 - 125	ug/kg dry
Endosulfan I	17.2	16.2	94	4	30	15 - 135	ug/kg dry
Endosulfan I [2C]	17.2	19.0	110	11	30	15 - 135	ug/kg dry
Endosulfan II	17.2	20.0	116	1	30	35 - 140	ug/kg dry
Endosulfan II [2C]	17.2	21.2	123	15	30	35 - 140	ug/kg dry
Endosulfan Sulfate	17.2	16.7	97	3	30	60 - 135	ug/kg dry
Endosulfan Sulfate [2C]	17.2	19.3	112	20	30	60 - 135	ug/kg dry
Endrin	17.2	19.3	112	2	30	60 - 135	ug/kg dry
Endrin [2C]	17.2	23.0	134	12	30	60 - 135	ug/kg dry
Endrin Aldehyde	17.2	15.1	88	1	30	35 - 145	ug/kg dry
Endrin Aldehyde [2C]	17.2	16.9	99	8	30	35 - 145	ug/kg dry
Endrin Ketone	17.2	17.0	99	2	30	65 - 135	ug/kg dry
Endrin Ketone [2C]	17.2	19.2	112	14	30	65 - 135	ug/kg dry

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

57SB8AB

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 10 mL

Laboratory ID: 0800815-MS2

QC Batch: 0800815

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Toxaphene	430	ND	1120	260 *	40 - 150	ug/kg dry
Toxaphene [2C]	430	ND	1030	239 *	40 - 150	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

21003

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

57SB8AB

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-47

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 10 mL

Laboratory ID: 0800815-MSD2

QC Batch: 0800815

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Toxaphene	430	729	170 *	42 *	30	40 - 150	ug/kg dry
Toxaphene [2C]	430	757	176 *	30	30	40 - 150	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

01024

LCS / LCS DUPLICATE RECOVERY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Laboratory ID: 0800928-BS1

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3550B Sonication Extraction
Initial/Final: 30 g / 10 mL
QC Batch: 0800928
Sequence: 8020735

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
alpha-BHC	13.3	12.6	95	60 - 125	ug/kg wet
alpha-BHC [2C]	13.3	15.4	116	60 - 125	ug/kg wet
beta-BHC	13.3	12.2	92	60 - 125	ug/kg wet
beta-BHC [2C]	13.3	15.4	116	60 - 125	ug/kg wet
gamma-BHC (Lindane)	13.3	12.7	96	60 - 125	ug/kg wet
gamma-BHC (Lindane) [2C]	13.3	15.7	118	60 - 125	ug/kg wet
delta-BHC	13.3	12.6	95	55 - 130	ug/kg wet
delta-BHC [2C]	13.3	16.4	123	55 - 130	ug/kg wet
alpha-Chlordane	13.3	12.8	96	65 - 120	ug/kg wet
alpha-Chlordane [2C]	13.3	16.1	121 *	65 - 120	ug/kg wet
gamma-Chlordane	13.3	13.0	97	65 - 125	ug/kg wet
gamma-Chlordane [2C]	13.3	16.4	123	65 - 125	ug/kg wet
4,4'-DDD	13.3	12.3	92	30 - 135	ug/kg wet
4,4'-DDD [2C]	13.3	15.6	117	30 - 135	ug/kg wet
4,4'-DDE	13.3	12.2	92	70 - 125	ug/kg wet
4,4'-DDE [2C]	13.3	15.6	117	70 - 125	ug/kg wet
4,4'-DDT	13.3	12.0	90	45 - 140	ug/kg wet
4,4'-DDT [2C]	13.3	14.8	111	45 - 140	ug/kg wet
Aldrin	13.3	12.7	96	45 - 140	ug/kg wet
Aldrin [2C]	13.3	15.4	116	45 - 140	ug/kg wet
Dieldrin	13.3	13.4	100	65 - 125	ug/kg wet
Dieldrin [2C]	13.3	14.1	106	65 - 125	ug/kg wet
Endosulfan I	13.3	11.8	88	15 - 135	ug/kg wet
Endosulfan I [2C]	13.3	15.2	114	15 - 135	ug/kg wet
Endosulfan II	13.3	11.9	89	35 - 140	ug/kg wet
Endosulfan II [2C]	13.3	14.8	111	35 - 140	ug/kg wet
Endosulfan Sulfate	13.3	12.1	91	60 - 135	ug/kg wet
Endosulfan Sulfate [2C]	13.3	14.9	112	60 - 135	ug/kg wet
Endrin	13.3	13.1	98	60 - 135	ug/kg wet

01012

LCS / LCS DUPLICATE RECOVERY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

Laboratory ID: 0800928-BSD1

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3550B Sonication Extraction
Initial/Final: 30 g / 10 mL
QC Batch: 0800928
Sequence: 8020735

Analyte	Spike Added ug/kg wet	LCSD Conc.	LCSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
alpha-BHC	13.3	14.2	106	12	30	60 - 125	ug/kg wet
alpha-BHC [2C]	13.3	15.5	116	0.4	30	60 - 125	ug/kg wet
beta-BHC	13.3	14.4	108	17	30	60 - 125	ug/kg wet
beta-BHC [2C]	13.3	15.9	119	3	30	60 - 125	ug/kg wet
gamma-BHC (Lindane)	13.3	14.4	108	12	30	60 - 125	ug/kg wet
gamma-BHC (Lindane) [2C]	13.3	15.8	118	0.4	30	60 - 125	ug/kg wet
delta-BHC	13.3	14.8	111	16	30	55 - 130	ug/kg wet
delta-BHC [2C]	13.3	16.9	127	3	30	55 - 130	ug/kg wet
alpha-Chlordane	13.3	14.5	109	12	30	65 - 120	ug/kg wet
alpha-Chlordane [2C]	13.3	16.5	124 *	2	30	65 - 120	ug/kg wet
gamma-Chlordane	13.3	14.7	110	13	30	65 - 125	ug/kg wet
gamma-Chlordane [2C]	13.3	16.6	125	1	30	65 - 125	ug/kg wet
4,4'-DDD	13.3	14.7	110	17	30	30 - 135	ug/kg wet
4,4'-DDD [2C]	13.3	17.1	128	9	30	30 - 135	ug/kg wet
4,4'-DDE	13.3	14.7	110	19	30	70 - 125	ug/kg wet
4,4'-DDE [2C]	13.3	16.9	127 *	8	30	70 - 125	ug/kg wet
4,4'-DDT	13.3	14.7	110	20	30	45 - 140	ug/kg wet
4,4'-DDT [2C]	13.3	16.3	122	10	30	45 - 140	ug/kg wet
Aldrin	13.3	14.1	106	10	30	45 - 140	ug/kg wet
Aldrin [2C]	13.3	15.3	115	0.9	30	45 - 140	ug/kg wet
Dieldrin	13.3	15.0	112	12	30	65 - 125	ug/kg wet
Dieldrin [2C]	13.3	11.2	84	23	30	65 - 125	ug/kg wet
Endosulfan I	13.3	12.0	90	2	30	15 - 135	ug/kg wet
Endosulfan I [2C]	13.3	13.6	102	11	30	15 - 135	ug/kg wet
Endosulfan II	13.3	14.1	106	17	30	35 - 140	ug/kg wet
Endosulfan II [2C]	13.3	14.7	110	0.5	30	35 - 140	ug/kg wet
Endosulfan Sulfate	13.3	14.3	107	17	30	60 - 135	ug/kg wet
Endosulfan Sulfate [2C]	13.3	16.2	121	8	30	60 - 135	ug/kg wet
Endrin	13.3	14.5	109	10	30	60 - 135	ug/kg wet

01014

LCS / LCS DUPLICATE RECOVERY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

Laboratory ID: 0800928-BS2

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3550B Sonication Extraction
Initial/Final: 30 g / 10 mL
QC Batch: 0800928
Sequence: 8020735

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Toxaphene	333	1010	302 *	40 - 150	ug/kg wet
Toxaphene [2C]	333	983	295 *	40 - 150	ug/kg wet

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

01815

LCS / LCS DUPLICATE RECOVERY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

Laboratory ID: 0800928-BSD2

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3550B Sonication Extraction
Initial/Final: 30 g / 10 mL
QC Batch: 0800928
Sequence: 8020735

Analyte	Spike Added ug/kg wet	LCSD Conc.	LCSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Toxaphene	333	574	172 *	55 *	30	40 - 150	ug/kg wet
Toxaphene [2C]	333	562	169 *	54 *	30	40 - 150	ug/kg wet

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

01017

DUAL COLUMN CONFIRMATION CHECK

57SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 12:55
Solids: 73.68
QC Batch: 0800815
GC Column(1):

Laboratory ID: 0801253-01
Prepared: 01/23/08 07:58
Preparation: 3550B Sonication Extracti
Sequence: 8020314
GC Column(2): RTX CLP Pest2

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, W(
File ID: A150086-0
Analyzed: 02/02/08 09:36
Instrument: 158

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	%D
Heptachlor Epoxide	1	13.89	13.86667	0.0233	12828.45		1.13	
	* 2	15.57	15.59167	0.0217	55049.84		9.59	88.2

* Column used for quantitation

01610

DUAL COLUMN CONFIRMATION CHECK

57SB5AB

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 12:55
Solids: 75.19
QC Batch: 0800815
GC Column(1):

Laboratory ID: 0801253-02
Prepared: 01/23/08 07:58
Preparation: 3550B Sonication Extracti
Sequence: 8020314
GC Column(2): RTX CLP Pest2

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, W(
File ID: A150088-0
Analyzed: 02/02/08 10:46
Instrument: 158

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	%D
Heptachlor Epoxide	1	13.89	13.86667	0.0233	9127.74		0.665	
	* 2	15.57	15.59167	0.0217	38925.89		6.65	90.0

* Column used for quantitation

01611

DUAL COLUMN CONFIRMATION CHECK

DUP-6

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, W(
Matrix: Soil
Laboratory ID: 0801253-06
File ID: data016-0
Sampled: 01/14/08 00:00
Prepared: 01/23/08 07:58
Analyzed: 02/06/08 17:45
Solids: 74.13
Preparation: 3550B Sonication Extracti
Instrument: 222
QC Batch: 0800815
Sequence: 8020735
GC Column(1):
GC Column(2): RTX CLP Pest2

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	%D
Dieldrin	1	16.46	16.47333	0.0133	33961		0.809	
	* 2	14.6	14.61167	0.0117	329054		3.42	76.3

* Column used for quantitation

01612

DUAL COLUMN CONFIRMATION CHECK

57SB8A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, W(
Matrix: Soil
Laboratory ID: 0801253-07
File ID: data017-0
Sampled: 01/14/08 15:10
Prepared: 01/23/08 07:58
Analyzed: 02/06/08 18:20
Solids: 71.41
Preparation: 3550B Sonication Extracti
Instrument: 222
QC Batch: 0800815
Sequence: 8020735
GC Column(1):
GC Column(2): RTX CLP Pest2

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	%D
Dieldrin	1	16.48	16.47333	0.00667	74557		1.82	
	* 2	14.62	14.61167	0.00833	497224		5.37	66.1
Endrin	* 1	17.21	17.21833	0.00833	87250		2.66	3.4
	2	15.13	15.155	0.025	193130		2.57	

* Column used for quantitation

01613

DUAL COLUMN CONFIRMATION CHECK

57SB8AB

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-47
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, W(
Matrix: Soil
Laboratory ID: 0801253-08
File ID: data022-0
Sampled: 01/14/08 15:10
Prepared: 01/23/08 07:58
Analyzed: 02/06/08 21:15
Solids: 77.53
Preparation: 3550B Sonication Extracti
Instrument: 222
QC Batch: 0800815
Sequence: 8020735
GC Column(1):
GC Column(2): RTX CLP Pest2

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	%D
Dieldrin	1	16.45	16.47333	0.0233	30436		0.688	
	* 2	14.59	14.61167	0.0217	271091		2.67	74.2

* Column used for quantitation

DUAL COLUMN CONFIRMATION CHECK

57SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/14/08 15:30
Solids: 74.00
QC Batch: 0800815
GC Column(1):

Laboratory ID: 0801253-09
Prepared: 01/23/08 07:58
Preparation: 3550B Sonication Extracti
Sequence: 8020735
GC Column(2): RTX CLP Pest2

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, W(
File ID: data023-0
Analyzed: 02/06/08 21:50
Instrument: 222

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	%D
Dieldrin	1	16.46	16.47333	0.0133	40735		0.946	
	* 2	14.6	14.61167	0.0117	152017		1.58	40.1

* Column used for quantitation

01615

DUAL COLUMN CONFIRMATION CHECK

57SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 15:40
Solids: 28.65
QC Batch: 0800815
GC Column(1):

Laboratory ID: 0801213-10
Prepared: 01/23/08 07:58
Preparation: 3550B Sonication Extracti
Sequence: 8020314
GC Column(2): RTX CLP Pest2

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, W(
File ID: A150057-0
Analyzed: 02/01/08 16:24
Instrument: 158

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	%D
Endosulfan II	1	16.51	16.53	0.02	13137.84		6.98	
	* 2	18.58	18.57167	0.00833	188916.2		136	94.9

* Column used for quantitation

01616

DUAL COLUMN CONFIRMATION CHECK

57SB6B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 01/10/08 17:00
Solids: 69.91
QC Batch: 0800815
GC Column(1):

Laboratory ID: 0801213-12
Prepared: 01/23/08 07:58
Preparation: 3550B Sonication Extracti
Sequence: 8020735
GC Column(2): RTX CLP Pest2

SDG: 36440-47
Project: RFAAP SWMU 57 RFI/CMS, W(
File ID: data011-0
Analyzed: 02/06/08 14:15
Instrument: 222

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	%D
Dieldrin	1	16.47	16.47333	0.00333	264936		6.67	
	* 2	14.6	14.61167	0.0117	1212714		13.3	49.8
Endrin	* 1	17.2	17.21833	0.0183	202805		6.25	29.1
	2	15.12	15.155	0.035	326631		4.43	

* Column used for quantitation

01617

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Organochlorine Pesticides by EPA Method 8081A

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8081A

Sample/Analyte:			
	0801253-08	57SB8AB	4,4'-DDT
	0801253-08	57SB8AB	Toxaphene
	0801253-08	57SB8AB	Toxaphene [2C]

Qualification: The RPD between the MS and MSD results exceeded the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8081A

Sample/Analyte:			
	0801253-08	57SB8AB	Toxaphene

Qualification: The RPD between the detected values from the primary and confirmation analyses exceeded 40%. The higher concentration result has been reported.

Analysis: USEPA-8081A

Sample/Analyte:			
	0801213-10	57SB6A	Endosulfan II [2C]
	0801213-12	57SB6B	Dieldrin [2C]
	0801253-01	57SB5A	Heptachlor Epoxide [2C]
	0801253-02	57SB5AB	Heptachlor Epoxide [2C]
	0801253-06	DUP-6	Dieldrin [2C]
	0801253-07	57SB8A	Dieldrin [2C]
	0801253-08	57SB8AB	Dieldrin [2C]
	0801253-09	57SB8B	Dieldrin [2C]

Qualification: The LCS/LCSD RPD exceeded the control limit. A positive result for this analyte in any sample from the associated QC batch is considered estimated. Non-detectable results are not qualified.

Analysis: USEPA-8081A

Sample/Analyte:		
	0800928-BSD	Toxaphene
	0800928-BSD	Toxaphene [2C]

Qualification: The LCS recovery exceeded the control limit but it was within the marginal exceedance for a compound that is not a project-specific analyte of concern. The result for this analyte in any sample from the associated QC batch is not considered qualified.

Analysis: USEPA-8081A

Sample/Analyte:		
	0800928-BS1	alpha-Chlordane [2C]
	0800928-BSD	4,4'-DDE [2C]
	0800928-BSD	alpha-Chlordane [2C]

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SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Organochlorine Pesticides by EPA Method 8081A

Qualification: The LCS recovery exceeded both the control limit and the marginal exceedance for a compound that is not a project-specific analyte of concern. The result for this analyte in any sample from the associated QC batch is considered qualified.

Analysis: USEPA-8081A

Sample/Analyte:	
0800928-BS2	Toxaphene
0800928-BS2	Toxaphene [2C]
0800928-BSD	Toxaphene
0800928-BSD	Toxaphene [2C]

Qualification: Concentration exceeds calibration range

Analysis: USEPA-8081A

Sample/Analyte:	
0800815-MS2	Toxaphene
0800815-MS2	Toxaphene [2C]
0800928-BS2	Toxaphene
0800928-BS2	Toxaphene [2C]

Qualification: The LCSD for this sample had a surrogate recovery for TCMX outside of the control limit on the confirmation column. All spiked analytes were in control or are already qualified on the confirmation column. No additional qualification is necessary.

Analysis: USEPA-8081A

Sample/Analyte: 0800928-BSD

Qualification: The matrix spike for this sample had a surrogate recovery for TCMX outside of the control limit on the confirmation column. All spiked analytes were in control on the confirmation column. No qualification is necessary.

Analysis: USEPA-8081A

Sample/Analyte: 0800815-MS1

Qualification: The Toxaphene LCS for this sample had surrogate recoveries outside of the control limit on both columns. The Toxaphene recoveries were high on both columns and are qualified. No additional qualification is needed.

Analysis: USEPA-8081A

Sample/Analyte: 0800928-BS2

Qualification: The Toxaphene matrix spike duplicate for this sample had a surrogate recovery for TCMX outside of the control limit on the confirmation column. The Toxaphene recoveries were high on both columns and are qualified. No additional qualification is needed.

Analysis: USEPA-8081A

Sample/Analyte: 0800815-MSD

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SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Organochlorine Pesticides by EPA Method 8081A

Qualification: The Toxaphene matrix spike for this sample had a surrogate recovery for DCB outside of the control limit on the primary column. The Toxaphene recoveries were high on both columns and are qualified. No additional qualification is needed.

Analysis: USEPA-8081A

Sample/Analyte: 0800815-MS2

Qualification: One or more surrogate recoveries for the sample exceeded the upper control limit. Positive results are considered estimated. Non-detect results are not qualified.

Analysis: USEPA-8081A

Sample/Analyte:
0801253-06 DUP-6
0801253-07 57SB8A
0801253-08 57SB8AB
0801253-09 57SB8B

Qualification: One or more of the surrogate recoveries were outside of the laboratory control limits on the confirmation column. However, since there were no positive results on the primary column, no qualification is necessary.

Analysis: USEPA-8081A

Sample/Analyte:
0801253-03 57SB5B
0801253-04 57SB5C
0801253-10 57SB8C

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SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Polychlorinated Biphenyls (PCBs) by EPA Method 8082

Qualification:	The RPD between the detected values from the primary and confirmation analyses exceeded 40%. The higher concentration result has been reported.		
Analysis:	USEPA-8082		
Sample/Analyte:	0801253-01	57SB5A	PCB-1260
	0801253-09	57SB8B	PCB-1254 [2C]

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SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 57SB5A LAB SAMPLE # 0801253-01

	COLUMN 1	COLUMN 2
Inst.ID:	144	144
Column:	RTX CLP2	RTX CLP
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/Kg)	RPD
Aroclor 1254	1	9.54			202	0.5%
	2	11.32			201	
Aroclor 1260	1	10.38			72.7	62.2%
	2	12.75			38.2	

00946

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 57SB8B LAB SAMPLE # 0801253-09

	COLUMN 1	COLUMN 2
Inst.ID:	144	144
Column:	RTX CLP2	RTX CLP
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/Kg)	RPD
Aroclor 1254	1	9.55			44.1	56.2%
	2	11.68			78.6	
Aroclor 1260	1	11.62			59.9	1.7%
	2	13.94			58.9	

00952

DATA VALIDATION WORKSHEET

Explosives

Reviewer: RA
Date: 2/19/08
DV Level: II III IV

Review Document:

_X__ Region III Modified for National Functional Guidelines
_X__ SW-846
_X__ Project QAPP/SAP

All QC OK√

Project Name: Radford
Project Number: 1165 6421
Laboratory: TriMatrix
SDG No.: 36410-47
Test Name: Explosives
Method No.: 8330/8332

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	√		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	√		
1.3	Do sample preservation, collection and storage condition meet method requirement?	√		
	If samples were received with the cooler temperature exceeding 20 ^{O}C, then flag L(+)/UL(-).			
1.4	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		√	

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		√	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		√	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	√		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		√	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		√	

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within	✓		
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

5.0 Laboratory Control Sample (LCS)		Yes	No	NA
5.1	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.2	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
5.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.		✓	

Notes:

6.0 Surrogate Recovery				Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?			✓		
6.2	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?					✓
6.3	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)					✓
		<10%	low	high		
	Positives	L	L	K		
	Non-detects	R	UL	No action		

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.2	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.3	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	Action: No action is required based on MS/MSd failure alone. Note in the report and use professional judgement.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes:

All NDs ✓

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are any target compounds detected in the field samples? If Yes, is all positive identifications were confirmed in second column? Apply J flag if RPD >40% between first and second columns.		✓	
9.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes:

10.0 Data Completeness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 95%$_{aq}$ and 90%$_{so}$)	✓		
10.1.1	Number of samples:_____			
10.1.2	Number of target compounds in each analysis: 14			
10.1.3	Number of results rejected or not reported:_____			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100%			

Notes:

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Chain of Custody Record

COC No. 122294

Page 1 of 2

For Lab Use Only
Cart: 4
VOA Rack/Tray: 149B
Receipt Log No.: 32
Project Chemist: WAR
Laboratory Project No.: E 0801213

Client Name: URS Corp.
Address: 5540 Falmouth St. Suite 201
Richmond, VA 23230
Phone: (804) 965-9681
Fax:

Project Name: RFA1AP Sumvey RFI
Client Project No./P.O. No.: 11656421
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: Tina Dennie

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals	VOCs 8260B	% Solids	Metals	VOCs	Total	Sample Comments
			Container Type (corresponds to Container Packing List)							16	21	20	6	1P		
			Number of Containers Submitted													
23	SO	01	1 57SB14A/MS/MSD	TM1347	1/10/08	0810		X	S	✓	8	1			~~5~~ 10	
19	SO	02	2 57SB14B		1/10/08	0825		X	S	✓	B	1			5	
19	SO	03	3 57SB14C		1/10/08	0907		X	S	✓	B	1			5	
19	SO	04	4 57SB1AB		1/10/08	1055		X	S	✓	B	1			5	
~~21~~ 19	SO	05	5 DUP-4		1/10/08			X	S	✓	B	1			5	Sample time = 1200 hrs per client
19	SO	06	6 57SB9A		1/10/08	1255		X	S	✓	B	1			5	WM
19	SO	07	7 57SB9AB		1/10/08	1330		X	S	✓	B	1			5	
			~~8 57SB9C~~ MS		~~1/10/08~~											
20	SO	08	9 EQBK-3		1/10/08	1410		X	W				✓	2	3	
05	SO	09	10 Trip Blank	↓	1/10/08	1410		X	W					2	2	

Preservatives: A NONE pH~7; B HNO_3 pH<2; C H_2SO_4 pH<2; D 1+1 HCl pH<2; E NaOH pH>12; F ZnAc/NaOH pH>9; G MeOH; H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature:
Company: URS

How Shipped? Hand Carrier FedEx
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	1-10-08	1800						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
							1.11.08	0830

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Chain of Custody Record

COC No. 122296

Page 2 of 2

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Cart: 4
VOA Rack/Tray: 1493
Receipt Log No.: 3-2
Project Chemist: WSR
Laboratory Project No: E 0801213

Client Name: URS Corp
Address: 5540 Falmouth St., Suite 201
Richmond, VA 23230
Phone: (804) 965-9000
Fax: (804) 965-9764

Project Name: RMAP SWMU 57 RFI
Client Project No./P.O. No.: 11656421
Invoice No.: ☒ Client ☐ Other (comments)
Contact/Report To: Tina Levine

Analyses Requested

PRESERVATIVES: A NONE pH~7; B HNO_3 pH<2; C H_2SO_4 pH<2; D 1+1 HCl pH<2; E NaOH pH>12; F ZnAc/NaOH pH>9; G MeOH; H Other (note below)

Container Type (corresponds to Container Packing List): 2 1 6 1 7 1 7 2 6

Number of Containers Submitted: VOCs 8260 | Metals | SVOC 8270 Pesticides PCB 8330 8332 | % Solids | Total | Sample Comments

	Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	VOCs 8260	Metals	SVOC 8270 Pesticides PCB 8330 8332	% Solids	Total	Sample Comments
1	01	SO	10	57SB6A	TM13474-10-08	1-10-08	1540		✓	S	B	✓	✓	✓ 1	7	
2	01	SO	11	57SB6AB	TM13475	1-10-08	1540		✓	S	B	✓	✓	✓ 1	7	
3	01	SO	12	57SB6B	TM13477	1-10-08			✓	S	B	✓	✓	✓ 1	7	1700 hrs. per client (WR)
4																
5																
6																
7																
8																
9																
10																

Sampled By (print): Jim Carter
Sampler's Signature: [signature]
Company: URS Corp

How Shipped? Hand Carrier: Fed Ex
Tracking No.:

Comments:

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
[signature]	01-10-08	1800						

1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						[signature]	1-11-08	0830

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COC No. 122299

Page 1 of 1

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Cart:
VOA Rack/Tray: 653G
Receipt Log No.: 55
Project Chemist: WAR
Laboratory Project No.: Q0801230

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 201 Richmond, VA. 23230
Phone: (804) 965-9000
Fax: (804) 965-9764

Project Name: RFAAP Sumo 57 RFI
Client Project No./P.O. No.: 11657421
Invoice No.: ☑ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Container Type (corresponds to Container Packing List)	Number of Containers Submitted										Total	Sample Comments
											B	D										
											Metals	VOCs 8260B	PCB/Pest	SVOCs	Explosives 8330 8332							
04	WG	01	1 EQBK-4	TM1911	1/11/08	1340		X	W		✓	✓	✓	✓	✓						9	
05	WG	02	2 Trip Blank	↓	1/11/08	1340		X	W			✓									2	
			3																			
			4																			
			5																			
			6																			
			7																			
			8																			
			9																			
			10																			

A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Mark Fisher
Sampler's Signature:
Company: URS Corp.

How Shipped? Hand Carrier: FedEx
Tracking No.:

Comments:

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	1/11/08	1500						

1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
							1/12/08	0845

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Chain of Custody Record

COC No. 122297

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Cart: 4/
VOA Rack/Tray:
Receipt Log No.: 5-1
Project Chemist: WJR
Laboratory Project No.: E0801233

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 201
Richmond, Va. 23230
Phone: (804) 965-9000
Fax: (804) 965-9764

Project Name: RFAAP Summer 57 RFI
Client Project No./P.O. No.: 11656421
Invoice No.: ☑ Client ☐ Other (comments)
Contact/Report To: Tina Perrine

Analyses Requested

Container Type (corresponds to Container Packing List)

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals	VOCs 8260B	% Solids	PCB/Pest 8330 8332	SVOCs 8270	TOC					Total	Sample Comments
			Number of Containers Submitted																		
01	SO	01	1 57SB6C	TM1852	1/11/08	0815		X	S	✓	B	1	✓	✓						7	
01	SO	02	2 57SB7A		1/11/08	0905		X	S	✓	B	1	✓	✓						7	
01	SO	03	3 57SB7AB		1/11/08	0905		X	S	✓	B	1	✓	✓						7	
01	SO	04	4 57SB7B		1/11/08	0910		X	S	✓	B	1	✓	✓						7	
01	SO	06	5 57SB4AB		1/11/08	1205		X	S	✓	B	1	✓	✓						7	
01	SO	07	6 57SB4B		1/11/08	1240		X	S	✓	B	1	✓	✓						7	
01	SO	08	7 57SB4C		1/11/08	1360		X	S	✓	B	1	✓	✓						7	
02	SO	09	8 DUP-5		1/11/08	—		X	S	✓	B	1	✓	✓						7	
06	SO	10	9 57SB4A Physical Sample		1/11/08	1205		X	S						1 ✓					1	
01	SO	05	10 57SB7C		1/11/08	1005		X	S	1	B	1	✓	✓						7	added by TriMatrix

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp.

How Shipped? Hand Carrier FedEx
Tracking No.

Comments: 57SB7C to be logged in following 57SB7B but before 57SB4ABD (WR)

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	01.11.08	1500						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received for Lab By	Date	Time
						[signature]	1.12.08	0845

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Chain of Custody Record

COC No. 122289

Page 1 of 1

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Cart:
VOA Rack/Tray: 470W
Receipt Log No.: 9.11
Project Chemist: WBR
Laboratory Project No.: 0801250

Client Name: URS Corporation
Address: 5540 Falmouth St., Suite 201
Richmond VA 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFAAP SWMU 57 RFI
Client Project No./P.O. No.: 11657421
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals	VOCs 8260	SVOCs 8270 Pest. Cl. des PCB	8330 8332	Total	Sample Comments
			Container Type (corresponds to Container Packing List)							b	p	2	2	2	
			Number of Containers Submitted												
04	WQ	01	1 EQBK-5	1628	1-14-08	1430	✓		W	✓	✓	✓	✓	✓	9	
05	WQ	02	2 Trip Blank	↓	1-14-08	(1430)			W	-	✓	-	-	-	2	
			3													
			4			change to 1430										
			5							(WR)						
			6													
			7													
			8													
			9													
			10													

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS

How Shipped? Hand Carrier: Fed Ex
Tracking No.:

Comments:

1. Relinquished By	Date	Time
Jim Carter	1-14-08	1830

2. Relinquished By	Date	Time

3. Relinquished By	Date	Time

1. Received By	Date	Time

2. Received By	Date	Time

3. Received For Lab By	Date	Time
[signature]	1-15-08	0845

(1)

TriMatrix Laboratories, Inc.

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Phone (616) 975-4500 Fax (616) 942-7463
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Chain of Custody Record

COC No. 122288

For Lab Use Only
Cart: VOA Soil 10
VOA Rack/Tray:
Receipt Log No. 93
Project Chemist: LMR
Laboratory Project No. E 0801253

Client Name: URS Corporation
Address: 5540 Falmouth St., Ste 201
Richmond, VA 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFAAP SWMU 57 RFI
Client Project No./P.O. No. 11656421
Invoice No. ☒ Client ☐ Other (comments)
Contact/Report To: Tina Deuse

Page 1 of 1

Analyses Requested

Container Type (corresponds to Container Packing List)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Number of Containers Submitted										Total	Sample Comments
											2	1	1	0	2	0	1	1				
											VOCs 8260	SVOCs 8270	Metals	% Solids	Pesticides PCBs 8330, 8332		TOC					
01	SO	01	1	57SB 5A	TM1386	1-14-08	1255		✓	S	✓	✓	✓	1	✓	—					7	
01	SO	02	2	57SB 5AB		1-14-08	1255		✓	S	✓	✓	✓	1	✓	—					7	
01	SO	03	3	57SB 5B		1-14-08	1400		✓	S	✓	✓	✓	1	✓	—					7	
01	SO	04	4	57SB 5C		1-14-08	1410		✓	S	✓	✓	✓	1	✓	—					7	
06	SO	05	5	57SB 5AB Physical Sample		1-14-08	1255		✓	S	—	✓	—	—	—	✓					1	
02	SO	06	6	Dup-6		1-14-08	—		✓	S	✓	✓	✓	1	✓	—					7	
			7																			
			8																			
			9																			
			10																			

Preservatives
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp

How Shipped? Hand Carrier: Fed Ex
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	01-14-08	1814						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						[illegible]	1-15-08	0815

TriMatrixCOC -- COC WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

(2)

TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 122290

Page 1 of 1

For Lab Use Only

Cart: Vol Soil, 6
VOA Rack/Tray:
Receipt Log No. 93
Project Chemist: WOR
Laboratory Project No. E 0801253

Client Name: URS Corporation
Address: 5540 Falmouth St., Ste 201
Richmond, VA 23230
Phone (804)965-9000
Fax (804)965-9764

Project Name: RFAAP Sum 57 RFI
Client Project No./P.O. No. 11656421
Invoice No. ☒ Client ☐ Other (comments)
Contact/Report To: Tim DeRose

Analyses Requested

Container Type (corresponds to Container Packing List)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	VOCs 8260	SVOCs 8270	Metals	% Solids	Pesticides PCBs 8330 8332	TCLP (Lead)	pH	Total	Sample Comments
				Number of Containers Submitted							2	1	6	2	1	1	1		
01	SO		07	1 57SB8A	1708	1-14-08	1510		✓	S	B/✓	✓	✓	1	✓	–	–	7	
03	SO		08	2 57SB8AB/MS/MSD		1-14-08	1510		✓	S	B/✓	✓	✓	1	✓	–	–	14	
01	SO		09	3 57SB8B		1-14-08	1530		✓	S	B/✓	✓	✓	1	✓	–	–	7	
01	SO		10	4 57SB8C		1-14-08	1535		✓	S	B/✓	✓	✓	1	✓	–	–	7	
				5 57Comp		1-14-08	1540	✓		S		–	–	–	–	1	1	2	log into Sequoia Workorder
				6															
				7															
				8															
				9															
				10															

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS

How Shipped? Hand Carrier FedEx
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	01-14-08	1822						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
							1/15/08	0845

TriMatrixCOC -- COC WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCS/LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	g	Laboratory duplicate imprecision
g	Tuning failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	h	Holding time violation
h	Holding time violation	h	Holding time violation	k	Cooler receipt temperature exceeds limits
i	Internal standard failure	i	Internal standard failure	l	LCS recovery failure
k	Cooler receipt temperature exceeds limits	k	Cooler receipt temperature exceeds limits	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination	n	Failed Signal to noise ratio		

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-51 **Fraction:** VOCs, SVOCs, Pest, PCBs, Explosives, & Metals

Lab: TriMatrix **Project Name** Radford SWMU 57

Reviewer: RA **Date:** March 21, 2008

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the Region III Modifications to the USEPA National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical method employed and provisions of the approved project-specific QAPP.

Major Anomalies: None.

Minor Anomalies: For the VOCs analyses, the method blank displayed a positive detection for acetone at 3.2 ug/L. Positive associated field sample results less than ten times the method blank concentration were qualified "B,z". The trip blank displayed a positive detection for toluene at 0.3 ug/L. Positive associated field sample results less than five times the trip blank concentration were qualified "B,y".

The continuing calibration analyzed for sequence 8022707 displayed percent differences (%Ds) greater than the control limit (i.e., 20%) with a positive bias for bromomethane at 41.2%, carbon tetrachloride at 21.9%, cyclohexane at 21.3%, methylcyclohexane at 26.8%, 2-butanone at 20.4%, and 4-methyl-2-pentanone at 22.1%. The associated field sample results were non-detects while the continuing calibrations displayed a positive bias, and no data qualifying action was required.

The matrix spike pair analyzed for sample 57MW2 displayed percent recoveries (%Rs) greater than the upper control limits for cyclohexane at 128%, methylcyclohexane at 131%, and bromomethane at 148%. The associated parent sample results were non-detects and no data qualifying action was required.

For the SVOCs analyses, the method blank displayed positive detections for acenaphthene at 0.02 ug/L, and isophorone at 0.05 ug/L. Positive associated field sample results less than five times the method blank concentrations were qualified "B,z". Equipment blank, EQBK6 displayed positive detections for acetophenone at 0.057 ug/L, benzaldehyde at 0.066 ug/L, butyl benzyl phthalate at 0.075 ug/L, di-n-butyl phthalate at 2.3 ug/L, diethyl phthalate at 0.038 ug/L, bis (2-ethylhexyl) phthalate at 0.41 ug/L, and naphthalene at 0.1 ug/L. Positive associated field sample results less than ten times the equipment blank concentrations for the phthalates, and less than five

times the equipment blank concentrations for the other compounds were qualified "B,x".

The matrix spike pair analyzed for sample 57MW2 displayed %Rs and/or RPDs greater than the upper control limits for carbazole (119%, 117%), di-n-butyl phthalate (126%), and 3,3'-dichlorobenzidine (58%). The associated parent sample results were non-detects for these compounds and no data qualifying action was required. This matrix spike pair also displayed a %R less than the lower control limit for caprolactam (22%). The associated parent sample result was a non-detect and was qualified "UJ,m".

For the explosives analyses by method 8332, the matrix spike pair analyzed for sample 57MW2 displayed %Rs greater than the upper control limit of 120% for pentaerythritol tetranitrate (128%, 128%). The associated parent sample result was a non-detect and no data qualifying action was required.

For the metals analyses by method 6010, the equipment blank, EQBK6 displayed a positive detection for total iron at 6.2 ug/L. The associated field sample results were greater than five times the equipment blank concentration and no data qualifying action was required.

The field duplicate pair (57MW2/DUP-7) displayed results outside the control limits for dissolved and total iron and total aluminum. These results were qualified "J,f" in these two samples.

For the metals analyses by method 6020, the method blanks displayed positive detections for total and dissolved zinc, and total and dissolved chromium. Positive associated field sample results less than five times the method blank concentrations were qualified "B,p". The initial calibration blank displayed a positive detection for antimony. The associated positive field sample results less than five times the initial calibration blank concentration were qualified "B,o". The equipment blank, EQBK6 displayed a positive detection for total zinc at 6.5 ug/L. The associated positive field sample results less than five times the equipment blank concentration were qualified "B,x".

The matrix spike pair analyzed for sample 57MW2 displayed %Rs less than the lower control limit of 75% for total manganese (69%), and total zinc (64%/61%). The post digestion spike also displayed a %R less than the lower control limit for total manganese (71%). Positive associated field sample results were qualified "L,m", and non-detects were qualified "UL,m", unless previously qualified "B,x".

The field duplicate pair (57MW2/DUP-7) displayed results outside the control limits for total copper. These results were qualified "J,f" in these two samples.

Correctable Anomalies: None.

Comments: On the basis of this evaluation, the laboratory appears to have followed the specified method. All data are usable, as qualified, for their intended purpose based on the data reviewed. Please note that if a fraction is not discussed in this report, all quality control criteria are met for that fraction.

Signed: Rayan

SAMPLE ID SUMMARY

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57MW2	0802294-01
DUP-7	0802294-02
Trip Blank	0802294-03
57MW3	0802294-04
EQBK6	0802294-05

00782

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-01 File ID: 29401.D

Sampled: 02/13/08 13:00 Prepared: 02/26/08 07:00 Analyzed: 02/26/08 12:13

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802240 Sequence: 8022707 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	0.40	1.0	0.061	J
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

00003

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-01 File ID: 29401.D

Sampled: 02/13/08 13:00 Prepared: 02/26/08 07:00 Analyzed: 02/26/08 12:13

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802240 Sequence: 8022707 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.14	1.0	0.072	J B7
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.3	101	85 - 115	
1,2-Dichloroethane-d4	40.0	42.8	107	70 - 120	
Toluene-d8	40.0	40.5	101	85 - 120	
4-Bromofluorobenzene	40.0	39.6	99	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	775744	5.15	848096	5.15	
Chlorobenzene-d5	605624	8.08	668623	8.08	
1,4-Dichlorobenzene-d4	297955	10.38	358721	10.38	

* Values outside of QC limits

00684

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-02 File ID: 29402.D

Sampled: 02/13/08 12:00 Prepared: 02/26/08 07:00 Analyzed: 02/26/08 12:51

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802240 Sequence: 8022707 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	0.38	1.0	0.061	J
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-02 File ID: 29402.D

Sampled: 02/13/08 12:00 Prepared: 02/26/08 07:00 Analyzed: 02/26/08 12:51

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802240 Sequence: 8022707 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.38	1.0	0.072	J B, Y
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.9	102	85 - 115	
1,2-Dichloroethane-d4	40.0	43.3	108	70 - 120	
Toluene-d8	40.0	40.7	102	85 - 120	
4-Bromofluorobenzene	40.0	40.6	101	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	778521	5.15	848096	5.15	
Chlorobenzene-d5	599772	8.08	668623	8.08	
1,4-Dichlorobenzene-d4	300961	10.38	358721	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0802294-03 File ID: 29403.D

Sampled: 02/13/08 18:00 Prepared: 02/26/08 07:00 Analyzed: 02/26/08 10:22

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802240 Sequence: 8022707 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

00815

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0802294-03 File ID: 29403.D

Sampled: 02/13/08 18:00 Prepared: 02/26/08 07:00 Analyzed: 02/26/08 10:22

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802240 Sequence: 8022707 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.30	1.0	0.072	J
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.8	102	85 - 115	
1,2-Dichloroethane-d4	40.0	42.9	107	70 - 120	
Toluene-d8	40.0	41.0	102	85 - 120	
4-Bromofluorobenzene	40.0	40.1	100	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	803506	5.15	848096	5.15	
Chlorobenzene-d5	627465	8.08	668623	8.08	
1,4-Dichlorobenzene-d4	307815	10.38	358721	10.38	

* Values outside of QC limits

: 00016

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-04 File ID: 29404.D

Sampled: 02/13/08 18:15 Prepared: 02/26/08 07:00 Analyzed: 02/26/08 11:36

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802240 Sequence: 8022707 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	9.1	20	1.2	J B2 Z
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	57	1.0	0.061	
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	0.18	1.0	0.12	J
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

57MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-04 File ID: 29404.D

Sampled: 02/13/08 18:15 Prepared: 02/26/08 07:00 Analyzed: 02/26/08 11:36

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802240 Sequence: 8022707 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.64	1.0	0.072	J B,G
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.5	104	85 - 115	
1,2-Dichloroethane-d4	40.0	42.8	107	70 - 120	
Toluene-d8	40.0	41.1	103	85 - 120	
4-Bromofluorobenzene	40.0	39.9	100	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	803520	5.15	848096	5.15	
Chlorobenzene-d5	632677	8.08	668623	8.08	
1,4-Dichlorobenzene-d4	315292	10.38	358721	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0802294-05 File ID: 29405.D

Sampled: 02/14/08 11:00 Prepared: 02/26/08 07:00 Analyzed: 02/26/08 10:59

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802240 Sequence: 8022707 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	4.8	20	1.2	J B, Z
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0802294-05 File ID: 29405.D

Sampled: 02/14/08 11:00 Prepared: 02/26/08 07:00 Analyzed: 02/26/08 10:59

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802240 Sequence: 8022707 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.13	1.0	0.072	J B7
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.8	102	85 - 115	
1,2-Dichloroethane-d4	40.0	42.3	106	70 - 120	
Toluene-d8	40.0	41.0	102	85 - 120	
4-Bromofluorobenzene	40.0	39.6	99	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	798769	5.15	848096	5.15	
Chlorobenzene-d5	627215	8.08	668623	8.08	
1,4-Dichlorobenzene-d4	307227	10.38	358721	10.38	

* Values outside of QC limits

SAMPLE ID SUMMARY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-51
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57MW2	0802294-01
DUP-7	0802294-02
57MW3	0802294-04
EQBK6	0802294-05

00915

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-01 File ID: 80229401.D

Sampled: 02/13/08 13:00 Prepared: 02/20/08 08:45 Analyzed: 02/26/08 16:29

Solids: Preparation: 3510C Liquid-Liquid Extr Initial/Final: 1050 mL / 1 mL

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	5.0	5.0	0.043	U
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	5.0	5.0	0.051	U
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	0.029	5.0	0.029	J B,X
105-60-2	Caprolactam	1	5.0	5.0	0.14	U UJ, M
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	5.0	5.0	0.38	U
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	0.038	5.0	0.034	J B,X
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

: 00943

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-01 File ID: 80229401.D

Sampled: 02/13/08 13:00 Prepared: 02/20/08 08:45 Analyzed: 02/26/08 16:29

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1050 mL / 1 mL

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	5.0	5.0	0.41	U
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	0.086	5.0	0.031	J B7 E
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.50	0.50	0.023	U
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.50	0.50	0.015	U
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.2	9.89	52	20 - 110	
Phenol-d6	19.0	6.46	34	10 - 115	
Nitrobenzene-d5	9.90	8.41	85	40 - 110	
2-Fluorobiphenyl	9.52	7.88	83	50 - 110	
2,4,6-Tribromophenol	19.1	14.4	75	40 - 125	
o-Terphenyl	9.52	10.2	107	50 - 135	

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-01 File ID: 80229401.D

Sampled: 02/13/08 13:00 Prepared: 02/20/08 08:45 Analyzed: 02/26/08 16:29

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1050 mL / 1 mL

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	640981	7.78	649877	7.78	
Naphthalene-d8	1961931	10.51	1985360	10.52	
Acenaphthene-d10	1039979	14.63	1079508	14.64	
Phenanthrene-d10	1615220	18.04	1769503	18.04	
Chrysene-d12	1434265	21.63	1456557	21.63	
Perylene-d12	1304238	23.37	1410647	23.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-02 File ID: 80229402.D

Sampled: 02/13/08 12:00 Prepared: 02/20/08 08:45 Analyzed: 02/26/08 17:05

Solids: Preparation: 3510C Liquid-Liquid Extr Initial/Final: 1060 mL / 1 mL

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	5.0	5.0	0.043	U
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	0.057	5.0	0.051	J B,X
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	0.15	5.0	0.029	J B,X
105-60-2	Caprolactam	1	5.0	5.0	0.14	U
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	2.9	5.0	0.38	J B,X
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	0.038	5.0	0.034	J B,X
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

: 00954

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-02 File ID: 80229402.D

Sampled: 02/13/08 12:00 Prepared: 02/20/08 08:45 Analyzed: 02/26/08 17:05

Solids: Preparation: 3510C Liquid-Liquid Extr Initial/Final: 1060 mL / 1 mL

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	5.0	5.0	0.41	U
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	0.057	5.0	0.031	J B,Z
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.038	0.50	0.023	J B,X
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.50	0.50	0.015	U
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.1	11.3	59	20 - 110	
Phenol-d6	18.9	7.06	37	10 - 115	
Nitrobenzene-d5	9.81	8.67	88	40 - 110	
2-Fluorobiphenyl	9.43	7.82	83	50 - 110	
2,4,6-Tribromophenol	19.0	17.5	92	40 - 125	
o-Terphenyl	9.43	10.1	107	50 - 135	

: 0955

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-02 File ID: 80229402.D

Sampled: 02/13/08 12:00 Prepared: 02/20/08 08:45 Analyzed: 02/26/08 17:05

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	648808	7.78	649877	7.78	
Naphthalene-d8	2008252	10.51	1985360	10.52	
Acenaphthene-d10	1052798	14.63	1079508	14.64	
Phenanthrene-d10	1649641	18.04	1769503	18.04	
Chrysene-d12	1366449	21.63	1456557	21.63	
Perylene-d12	1325176	23.37	1410647	23.38	

* Values outside of QC limits

2056

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-04 File ID: 80229404.D

Sampled: 02/13/08 18:15 Prepared: 02/20/08 08:45 Analyzed: 02/26/08 17:40

Solids: Preparation: 3510C Liquid-Liquid Extr Initial/Final: 1060 mL / 1 mL

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	0.057	5.0	0.043	J B2X
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	0.085	5.0	0.051	J B2X
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	5.0	5.0	0.029	U
105-60-2	Caprolactam	1	5.0	5.0	0.14	U
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	2.1	5.0	0.38	J B2X
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	0.085	5.0	0.034	J B2X
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-04 File ID: 80229404.D

Sampled: 02/13/08 18:15 Prepared: 02/20/08 08:45 Analyzed: 02/26/08 17:40

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	5.0	5.0	0.41	U
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	0.075	5.0	0.031	J B,Z
91-57-6	2-Methylnaphthalene	1	0.019	5.0	0.015	J
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.038	0.50	0.023	J B,X
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.50	0.50	0.015	U
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.1	10.2	53	20 - 110	
Phenol-d6	18.9	6.75	36	10 - 115	
Nitrobenzene-d5	9.81	8.69	89	40 - 110	
2-Fluorobiphenyl	9.43	7.93	84	50 - 110	
2,4,6-Tribromophenol	19.0	17.2	91	40 - 125	
o-Terphenyl	9.43	10.6	112	50 - 135	

: 00969

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

57MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-04 File ID: 80229404.D

Sampled: 02/13/08 18:15 Prepared: 02/20/08 08:45 Analyzed: 02/26/08 17:40

Solids: Preparation: 3510C Liquid-Liquid Extr Initial/Final: 1060 mL / 1 mL

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	621613	7.77	649877	7.78	
Naphthalene-d8	1903275	10.51	1985360	10.52	
Acenaphthene-d10	1004168	14.63	1079508	14.64	
Phenanthrene-d10	1551447	18.04	1769503	18.04	
Chrysene-d12	1342852	21.63	1456557	21.63	
Perylene-d12	1277298	23.37	1410647	23.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0802294-05 File ID: 80229405.D

Sampled: 02/14/08 11:00 Prepared: 02/20/08 08:45 Analyzed: 02/26/08 18:15

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	0.057	5.0	0.043	J
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	0.066	5.0	0.051	J
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	0.075	5.0	0.029	J
105-60-2	Caprolactam	1	5.0	5.0	0.14	U
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	2.3	5.0	0.38	J
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	0.038	5.0	0.034	J
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0802294-05 File ID: 80229405.D

Sampled: 02/14/08 11:00 Prepared: 02/20/08 08:45 Analyzed: 02/26/08 18:15

Solids: Preparation: 3510C Liquid-Liquid Extr Initial/Final: 1060 mL / 1 mL

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	0.41	5.0	0.41	J
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	0.075	5.0	0.031	J B,Z
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.10	0.50	0.023	J
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.50	0.50	0.015	U
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.1	11.3	59	20 - 110	
Phenol-d6	18.9	6.81	36	10 - 115	
Nitrobenzene-d5	9.81	8.90	91	40 - 110	
2-Fluorobiphenyl	9.43	8.33	88	50 - 110	
2,4,6-Tribromophenol	19.0	16.5	87	40 - 125	
o-Terphenyl	9.43	10.3	109	50 - 135	

: 8894

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0802294-05 File ID: 80229405.D

Sampled: 02/14/08 11:00 Prepared: 02/20/08 08:45 Analyzed: 02/26/08 18:15

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	616481	7.78	649877	7.78	
Naphthalene-d8	1900590	10.51	1985360	10.52	
Acenaphthene-d10	1003662	14.63	1079508	14.64	
Phenanthrene-d10	1580993	18.04	1769503	18.04	
Chrysene-d12	1333673	21.63	1456557	21.63	
Perylene-d12	1262692	23.37	1410647	23.38	

* Values outside of QC limits

SAMPLE ID SUMMARY

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57MW2	0802294-01
DUP-7	0802294-02
57MW3	0802294-04
EQBK6	0802294-05

: 00535

ANALYSIS DATA SHEET

57MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Ground Water Laboratory ID: 0802294-01 File ID: A66_433-0

Sampled: 02/13/08 13:00 Prepared: 02/19/08 17:08 Analyzed: 02/29/08 07:36

Solids: Preparation: 3510C Liquid-Liquid Ex Initial/Final: 1060 mL / 2 mL

QC Batch: 0801825 Sequence: 8030318 Calibration: 8C03004 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.144	76	25 - 140	
Decachlorobiphenyl	0.189	0.191	101	30 - 135	

* Values outside of QC limits

: 20558

ANALYSIS DATA SHEET

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Ground Water Laboratory ID: 0802294-02 File ID: A66_434-0

Sampled: 02/13/08 12:00 Prepared: 02/19/08 17:08 Analyzed: 02/29/08 08:12

Solids: Preparation: 3510C Liquid-Liquid Ex Initial/Final: 1060 mL / 2 mL

QC Batch: 0801825 Sequence: 8030318 Calibration: 8C03004 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.0028	0.10	0.0018	J
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Tetrachloro-m-xylene		0.189	0.131	70	25 - 140	
Decachlorobiphenyl		0.189	0.205	109	30 - 135	

* Values outside of QC limits

: 00567

ANALYSIS DATA SHEET

57MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Ground Water Laboratory ID: 0802294-04 File ID: A66_435-0

Sampled: 02/13/08 18:15 Prepared: 02/19/08 17:08 Analyzed: 02/29/08 08:47

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801825 Sequence: 8030318 Calibration: 8C03004 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.136	72	25 - 140	
Decachlorobiphenyl	0.189	0.198	105	30 - 135	

* Values outside of QC limits

00576

ANALYSIS DATA SHEET

EQBK6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Water Laboratory ID: 0802294-05 File ID: A66_436-0

Sampled: 02/14/08 11:00 Prepared: 02/19/08 17:08 Analyzed: 02/29/08 09:22

Solids: Preparation: 3510C Liquid-Liquid Ex Initial/Final: 1060 mL / 2 mL

QC Batch: 0801825 Sequence: 8030318 Calibration: 8C03004 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.135	71	25 - 140	
Decachlorobiphenyl	0.189	0.222	118	30 - 135	

* Values outside of QC limits

: 08585

SAMPLE ID SUMMARY

USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-51

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57MW2	0802294-01
DUP-7	0802294-02
57MW3	0802294-04
EQBK6	0802294-05

00062

ANALYSIS DATA SHEET

57MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Ground Water Laboratory ID: 0802294-01 File ID: A196153-0

Sampled: 02/13/08 13:00 Prepared: 02/19/08 17:06 Analyzed: 02/26/08 20:43

Solids: Preparation: 3510C Liquid-Liquid Ex Initial/Final: 1060 mL / 2 mL

QC Batch: 0801824 Sequence: 8022706 Calibration: 8B27001 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.189	0.202	107	40 - 135	
Tetrachloro-m-xylene		0.189	0.150	79	36 - 114	

* Values outside of QC limits

ANALYSIS DATA SHEET

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Ground Water Laboratory ID: 0802294-02 File ID: A196154-0

Sampled: 02/13/08 12:00 Prepared: 02/19/08 17:06 Analyzed: 02/26/08 21:08

Solids: Preparation: 3510C Liquid-Liquid Ex Initial/Final: 1060 mL / 2 mL

QC Batch: 0801824 Sequence: 8022706 Calibration: 8B27001 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.189	0.211	112	40 - 135	
Tetrachloro-m-xylene		0.189	0.165	87	36 - 114	

* Values outside of QC limits

: 00089

ANALYSIS DATA SHEET

57MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Ground Water Laboratory ID: 0802294-04 File ID: A196155-0

Sampled: 02/13/08 18:15 Prepared: 02/19/08 17:06 Analyzed: 02/26/08 21:33

Solids: Preparation: 3510C Liquid-Liquid Ex Initial/Final: 1060 mL / 2 mL

QC Batch: 0801824 Sequence: 8022706 Calibration: 8B27001 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.189	0.205	109	40 - 135	
Tetrachloro-m-xylene		0.189	0.152	81	36 - 114	

* Values outside of QC limits

: 00098

ANALYSIS DATA SHEET

EQBK6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, W(

Matrix: Water Laboratory ID: 0802294-05 File ID: A196156-0

Sampled: 02/14/08 11:00 Prepared: 02/19/08 17:06 Analyzed: 02/26/08 21:58

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801824 Sequence: 8022706 Calibration: 8B27001 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Decachlorobiphenyl	0.189	0.228	121	40 - 135	
Tetrachloro-m-xylene	0.189	0.189	100	36 - 114	

* Values outside of QC limits

: 00187

SAMPLE ID SUMMARY

USEPA-8330

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57MW2	0802294-01
DUP-7	0802294-02
57MW3	0802294-04
EQBK6	0802294-05

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-01 File ID: EXa006-0

Sampled: 02/13/08 13:00 Prepared: 02/20/08 08:01 Analyzed: 02/20/08 21:31

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801906 Sequence: 8022302 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.41	74	29 - 138	

* Values outside of QC limits

01193

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-02 File ID: EXa007-0

Sampled: 02/13/08 12:00 Prepared: 02/20/08 08:01 Analyzed: 02/20/08 22:08

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801906 Sequence: 8022302 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.26	69	29 - 138	

* Values outside of QC limits

0195

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

57MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-04 File ID: EXa008-0

Sampled: 02/13/08 18:15 Prepared: 02/20/08 08:01 Analyzed: 02/20/08 22:45

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801906 Sequence: 8022302 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	1.88	58	29 - 138	

* Values outside of QC limits

01199

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

EQBK6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0802294-05 File ID: EXa009-0

Sampled: 02/14/08 11:00 Prepared: 02/20/08 08:01 Analyzed: 02/20/08 23:22

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801906 Sequence: 8022302 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	1.59	49	29 - 138	

* Values outside of QC limits

: 01282

SAMPLE ID SUMMARY

USEPA-8332

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57MW2	0802294-01
DUP-7	0802294-02
57MW3	0802294-04
EQBK6	0802294-05

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-01 File ID: data006-0

Sampled: 02/13/08 13:00 Prepared: 02/19/08 11:33 Analyzed: 02/21/08 14:14

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801848 Sequence: 8022286 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.42	106	50 - 150	

* Values outside of QC limits

01275

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-02 File ID: data007-0

Sampled: 02/13/08 12:00 Prepared: 02/19/08 11:33 Analyzed: 02/21/08 14:56

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801848 Sequence: 8022286 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.24	101	50 - 150	

* Values outside of QC limits

01278

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

57MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Ground Water Laboratory ID: 0802294-04 File ID: data008-0

Sampled: 02/13/08 18:15 Prepared: 02/19/08 11:33 Analyzed: 02/21/08 15:38

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801848 Sequence: 8022286 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.44	107	50 - 150	

* Values outside of QC limits

01291

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

EQBK6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51 4MD

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0802294-05 File ID: data009-0

Sampled: 02/14/08 11:00 Prepared: 02/19/08 11:33 Analyzed: 02/21/08 16:20

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801848 Sequence: 8022286 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	2.88	90	50 - 150	

* Values outside of QC limits

: 01284

SAMPLE ID SUMMARY

USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57MW2	0802294-01
DUP-7	0802294-02
57MW3	0802294-04
EQBK6	0802294-05

: 01342

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 13:00
Solids: 0.00
Laboratory ID: 0802294-01

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: General Metals Prep
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 25 mL
QC Batch: 0801822

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 20:19
7440-70-2	Calcium, Dissolved	30000	ug/L	1	500	40		02/26/08 20:19
7439-89-6	Iron, Dissolved	8.8	ug/L	1	20	5.7	J	02/26/08 20:19
7439-95-4	Magnesium, Dissolved	11000	ug/L	1	500	38		02/26/08 20:19
7440-23-5	Sodium, Dissolved	19000	ug/L	1	500	84		02/26/08 20:19

J,F

: 81344

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 13:00
Solids: 0.00
Laboratory ID: 0802294-01

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3010A Digestion
Prepared: 02/20/08 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0801931

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	73	ug/L	1	200	44	J	02/26/08 12:35
7440-70-2	Calcium, Total	31000	ug/L	1	500	40		02/26/08 12:35
7439-89-6	Iron, Total	150	ug/L	1	20	5.7		02/26/08 12:35
7439-95-4	Magnesium, Total	12000	ug/L	1	500	38		02/26/08 12:35
7440-09-7	Potassium, Total	2400	ug/L	1	200	54		02/28/08 02:48
7440-23-5	Sodium, Total	19000	ug/L	1	500	84		02/26/08 17:45

JF

JF

: 01345

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 13:00
Solids: 0.00
Laboratory ID: 0802294-01

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: General Metals Prep
Prepared: 02/28/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0802282

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-09-7	Potassium, Dissolved	2300	ug/L	1	200	54		02/28/08 17:38

: 01346

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 12:00
Solids: 0.00
Laboratory ID: 0802294-02

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: General Metals Prep
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 25 mL
QC Batch: 0801822

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 20:53
7440-70-2	Calcium, Dissolved	30000	ug/L	1	500	40		02/26/08 20:53
7439-89-6	Iron, Dissolved	74	ug/L	1	20	5.7		02/26/08 20:53 JF
7439-95-4	Magnesium, Dissolved	11000	ug/L	1	500	38		02/26/08 20:53
7440-09-7	Potassium, Dissolved	2200	ug/L	1	200	54		02/28/08 00:46
7440-23-5	Sodium, Dissolved	19000	ug/L	1	500	84		02/26/08 20:53

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 12:00
Solids: 0.00
Laboratory ID: 0802294-02

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3010A Digestion
Prepared: 02/20/08 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0801931

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	460	ug/L	1	200	44		02/26/08 12:52 JF
7440-70-2	Calcium, Total	36000	ug/L	1	500	40		02/26/08 12:52
7439-89-6	Iron, Total	630	ug/L	1	20	5.7		02/26/08 12:52 JF
7439-95-4	Magnesium, Total	14000	ug/L	1	500	38		02/26/08 12:52
7440-09-7	Potassium, Total	2700	ug/L	1	200	54		02/28/08 03:12
7440-23-5	Sodium, Total	19000	ug/L	1	500	84		02/26/08 18:09

01348

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 18:15
Solids: 0.00
Laboratory ID: 0802294-04

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: General Metals Prep
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 25 mL
QC Batch: 0801822

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 20:57
7440-70-2	Calcium, Dissolved	25000	ug/L	1	500	40		02/26/08 20:57
7439-89-6	Iron, Dissolved	10	ug/L	1	20	5.7	J	02/26/08 20:58
7439-95-4	Magnesium, Dissolved	12000	ug/L	1	500	38		02/26/08 20:57
7440-09-7	Potassium, Dissolved	2400	ug/L	1	200	54		02/28/08 00:50
7440-23-5	Sodium, Dissolved	21000	ug/L	1	500	84		02/26/08 20:57

: 01349

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

57MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 18:15
Solids: 0.00
Laboratory ID: 0802294-04

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3010A Digestion
Prepared: 02/20/08 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0801931

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	1400	ug/L	1	200	44		02/26/08 12:55
7440-70-2	Calcium, Total	44000	ug/L	1	500	40		02/26/08 12:55
7439-89-6	Iron, Total	2200	ug/L	1	20	5.7		02/26/08 12:55
7439-95-4	Magnesium, Total	23000	ug/L	1	500	38		02/26/08 12:55
7440-09-7	Potassium, Total	3000	ug/L	1	200	54		02/28/08 03:16
7440-23-5	Sodium, Total	22000	ug/L	1	500	84		02/26/08 18:14

01358

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

EQBK6

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 02/14/08 11:00
Solids: 0.00
Laboratory ID: 0802294-05

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3010A Digestion
Prepared: 02/20/08 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0801931

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	02/26/08 12:59
7440-70-2	Calcium, Total	500	ug/L	1	500	40	U	02/26/08 12:59
7439-89-6	Iron, Total	6.2	ug/L	1	20	5.7	J	02/26/08 12:59
7439-95-4	Magnesium, Total	500	ug/L	1	500	38	U	02/26/08 12:59
7440-09-7	Potassium, Total	200	ug/L	1	200	54	U	02/28/08 03:31
7440-23-5	Sodium, Total	500	ug/L	1	500	84	U	02/26/08 18:19

: 01351

SAMPLE ID SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57MW2	0802294-01
DUP-7	0802294-02
57MW3	0802294-04
EQBK6	0802294-05

: 21874

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 13:00
Solids: 0.00
Laboratory ID: 0802294-01

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: General Metals Prep
Prepared: 02/18/08 16:50
Initial/Final: 25 mL / 125 mL
QC Batch: 0801823

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Dissolved	5.5	ug/L	1	3.0	0.44		02/21/08 19:55
7440-38-2	Arsenic, Dissolved	2.3	ug/L	1	3.0	0.74	J	02/21/08 19:55
7440-39-3	Barium, Dissolved	8.1	ug/L	1	2.0	0.52		02/22/08 14:39
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/21/08 19:55
7440-43-9	Cadmium, Dissolved	0.15	ug/L	1	0.20	0.062	J	02/21/08 19:55
7440-47-3	Chromium, Dissolved	2.9	ug/L	1	2.0	0.31		02/22/08 20:45
7440-48-4	Cobalt, Dissolved	0.97	ug/L	1	1.0	0.096	J	02/21/08 19:55
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/22/08 14:39
7439-96-5	Manganese, Dissolved	190	ug/L	1	3.0	0.43		02/21/08 19:55
7440-02-0	Nickel, Dissolved	5.7	ug/L	1	2.0	0.28		02/21/08 19:55
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 19:55
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 19:55
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/22/08 14:39
7440-62-2	Vanadium, Dissolved	2.5	ug/L	1	5.0	0.83	J	02/22/08 14:39

01675

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 13:00
Solids: 0.00
Laboratory ID: 0802294-01

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 02/20/08 07:05
Initial/Final: 25 mL / 125 mL
QC Batch: 0801933

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Total	4.8	ug/L	1	3.0	0.44		02/22/08 13:13	
7440-38-2	Arsenic, Total	2.6	ug/L	1	3.0	0.74	J	02/21/08 18:15	
7440-39-3	Barium, Total	8.5	ug/L	1	2.0	0.52		02/21/08 18:15	
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/22/08 13:13	
7440-43-9	Cadmium, Total	0.18	ug/L	1	0.20	0.062	J	02/21/08 18:15	
7440-47-3	Chromium, Total	3.7	ug/L	1	2.0	0.31		02/22/08 20:18	
7440-48-4	Cobalt, Total	0.98	ug/L	1	1.0	0.096	J	02/21/08 18:15	
7440-50-8	Copper, Total	1.5	ug/L	1	1.0	0.33		02/21/08 18:15	J,F
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	02/22/08 13:13	
7439-96-5	Manganese, Total	210	ug/L	1	3.0	0.43		02/21/08 18:15	L,M
7440-02-0	Nickel, Total	5.7	ug/L	1	2.0	0.28		02/21/08 18:15	
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 18:15	
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 18:15	
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/22/08 13:13	
7440-62-2	Vanadium, Total	3.1	ug/L	1	5.0	0.83	J	02/22/08 13:13	
7440-66-6	Zinc, Total	25	ug/L	1	10	0.84		02/27/08 11:46	B,X

01876

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 13:00
Solids: 0.00
Laboratory ID: 0802294-01

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: General Metals Prep
Prepared: 02/25/08 16:43
Initial/Final: 25 mL / 125 mL
QC Batch: 0802170

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-50-8	Copper, Dissolved	4.1	ug/L	1	1.0	0.33		02/27/08 10:39
7440-66-6	Zinc, Dissolved	6.4	ug/L	1	10	0.84	J	02/27/08 11:48 B,P

01877

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 12:00
Solids: 0.00
Laboratory ID: 0802294-02

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: General Metals Prep
Prepared: 02/18/08 16:50
Initial/Final: 25 mL / 125 mL
QC Batch: 0801823

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Dissolved	5.1	ug/L	1	3.0	0.44		02/21/08 20:57
7440-38-2	Arsenic, Dissolved	2.0	ug/L	1	3.0	0.74	J	02/21/08 20:57
7440-39-3	Barium, Dissolved	7.8	ug/L	1	2.0	0.52		02/22/08 15:14
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/21/08 20:57
7440-43-9	Cadmium, Dissolved	0.13	ug/L	1	0.20	0.062	J	02/21/08 20:57
7440-47-3	Chromium, Dissolved	2.5	ug/L	1	2.0	0.31		02/22/08 21:02 B,P
7440-48-4	Cobalt, Dissolved	0.87	ug/L	1	1.0	0.096	J	02/21/08 20:57
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/22/08 15:14
7439-96-5	Manganese, Dissolved	160	ug/L	1	3.0	0.43		02/21/08 20:57
7440-02-0	Nickel, Dissolved	4.8	ug/L	1	2.0	0.28		02/21/08 20:57
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 20:57
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 20:57
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/22/08 15:14
7440-62-2	Vanadium, Dissolved	2.5	ug/L	1	5.0	0.83	J	02/22/08 15:14

01878

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 12:00
Solids: 0.00
Laboratory ID: 0802294-02

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 02/20/08 07:05
Initial/Final: 25 mL / 125 mL
QC Batch: 0801933

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	4.1	ug/L	1	3.0	0.44		02/22/08 14:12
7440-38-2	Arsenic, Total	2.7	ug/L	1	3.0	0.74	J	02/21/08 19:18
7440-39-3	Barium, Total	12	ug/L	1	2.0	0.52		02/21/08 19:18
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/22/08 14:12
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	J	02/21/08 19:18
7440-47-3	Chromium, Total	5.2	ug/L	1	2.0	0.31		02/22/08 20:34
7440-48-4	Cobalt, Total	1.5	ug/L	1	1.0	0.096		02/21/08 19:18
7440-50-8	Copper, Total	8.1	ug/L	1	1.0	0.33		02/21/08 19:18 J,F
7439-92-1	Lead, Total	0.71	ug/L	1	1.0	0.33	J	02/22/08 14:12
7439-96-5	Manganese, Total	250	ug/L	1	3.0	0.43		02/21/08 19:18 L,M
7440-02-0	Nickel, Total	6.6	ug/L	1	2.0	0.28		02/21/08 19:18
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 19:18
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 19:18
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/22/08 14:12
7440-62-2	Vanadium, Total	3.7	ug/L	1	5.0	0.83	J	02/22/08 14:12
7440-66-6	Zinc, Total	10	ug/L	1	10	0.84		02/22/08 14:12 B,X

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 12:00
Solids: 0.00
Laboratory ID: 0802294-02

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: General Metals Prep
Prepared: 02/25/08 16:43
Initial/Final: 25 mL / 125 mL
QC Batch: 0802170

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-50-8	Copper, Dissolved	1.9	ug/L	1	1.0	0.33		02/27/08 10:54
7440-66-6	Zinc, Dissolved	4.2	ug/L	1	10	0.84	J	02/27/08 10:54

B7P

01888

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 18:15
Solids: 0.00
Laboratory ID: 0802294-04

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: General Metals Prep
Prepared: 02/18/08 16:50
Initial/Final: 25 mL / 125 mL
QC Batch: 0801823

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Dissolved	0.48	ug/L	1	3.0	0.44	J	02/21/08 21:10 B,O
7440-38-2	Arsenic, Dissolved	0.94	ug/L	1	3.0	0.74	J	02/21/08 21:10
7440-39-3	Barium, Dissolved	11	ug/L	1	2.0	0.52		02/22/08 15:18
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/21/08 21:10
7440-43-9	Cadmium, Dissolved	0.20	ug/L	1	0.20	0.062	U	02/21/08 21:10
7440-47-3	Chromium, Dissolved	6.6	ug/L	1	2.0	0.31		02/22/08 21:05
7440-48-4	Cobalt, Dissolved	1.6	ug/L	1	1.0	0.096		02/21/08 21:10
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/22/08 15:18
7439-96-5	Manganese, Dissolved	8.6	ug/L	1	3.0	0.43		02/21/08 21:10
7440-02-0	Nickel, Dissolved	6.7	ug/L	1	2.0	0.28		02/21/08 21:10
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 21:10
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 21:10
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/22/08 15:18
7440-62-2	Vanadium, Dissolved	0.89	ug/L	1	5.0	0.83	J	02/22/08 15:18

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 18:15
Solids: 0.00
Laboratory ID: 0802294-04

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 02/20/08 07:05
Initial/Final: 25 mL / 125 mL
QC Batch: 0801933

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	02/22/08 14:24
7440-38-2	Arsenic, Total	1.1	ug/L	1	3.0	0.74	J	02/21/08 19:30
7440-39-3	Barium, Total	17	ug/L	1	2.0	0.52		02/21/08 19:30
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/22/08 14:24
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	02/21/08 19:30
7440-47-3	Chromium, Total	17	ug/L	1	2.0	0.31		02/22/08 20:36
7440-48-4	Cobalt, Total	2.2	ug/L	1	1.0	0.096		02/21/08 19:30
7440-50-8	Copper, Total	3.1	ug/L	1	1.0	0.33		02/21/08 19:30
7439-92-1	Lead, Total	0.71	ug/L	1	1.0	0.33	J	02/22/08 14:24
7439-96-5	Manganese, Total	37	ug/L	1	3.0	0.43		02/21/08 19:30 L 3M
7440-02-0	Nickel, Total	10	ug/L	1	2.0	0.28		02/21/08 19:30
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 19:30
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 19:30
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/22/08 14:24
7440-62-2	Vanadium, Total	3.3	ug/L	1	5.0	0.83	J	02/22/08 14:24
7440-66-6	Zinc, Total	10	ug/L	1	10	0.84		02/22/08 14:24 B7 X

: 01882

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

57MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 18:15
Solids: 0.00
Laboratory ID: 0802294-04

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: General Metals Prep
Prepared: 02/25/08 16:43
Initial/Final: 25 mL / 125 mL
QC Batch: 0802170

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-50-8	Copper, Dissolved	2.2	ug/L	1	1.0	0.33		02/27/08 10:56
7440-66-6	Zinc, Dissolved	5.1	ug/L	1	10	0.84	J	02/27/08 10:56 B, P

01683

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK6

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 02/14/08 11:00
Solids: 0.00
Laboratory ID: 0802294-05

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Prepared: 02/20/08 07:05
Initial/Final: 25 mL / 125 mL
QC Batch: 0801933

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	02/22/08 14:28	
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	02/21/08 19:34	
7440-39-3	Barium, Total	2.0	ug/L	1	2.0	0.52	U	02/21/08 19:34	
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/22/08 14:28	
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	02/21/08 19:34	
7440-47-3	Chromium, Total	0.81	ug/L	1	2.0	0.31	J	02/22/08 20:38	B,P
7440-48-4	Cobalt, Total	1.0	ug/L	1	1.0	0.096	U	02/21/08 19:34	
7440-50-8	Copper, Total	1.0	ug/L	1	1.0	0.33	U	02/21/08 19:34	
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	02/22/08 14:28	
7439-96-5	Manganese, Total	3.0	ug/L	1	3.0	0.43	U	02/21/08 19:34	ULim
7440-02-0	Nickel, Total	2.0	ug/L	1	2.0	0.28	U	02/21/08 19:34	
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 19:34	
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 19:34	
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/22/08 14:28	
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	02/22/08 14:28	
7440-66-6	Zinc, Total	6.5	ug/L	1	10	0.84	J	02/22/08 14:28	Lim

SAMPLE ID SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-51

Client: URS Corporation

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Client Sample Id:	Lab Sample Id:
57MW2	0802294-01
DUP-7	0802294-02
57MW3	0802294-04
EQBK6	0802294-05

02522

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

57MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 13:00
Solids: 0.00
Laboratory ID: 0802294-01

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A Digestion - Total
Prepared: 02/25/08 15:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0802162

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/26/08 14:13

: 02523

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

57MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 13:00
Solids: 0.00
Laboratory ID: 0802294-01

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A Digestion - Dissolved
Prepared: 02/25/08 15:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0802163

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/26/08 15:09

025214

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 12:00
Solids: 0.00
Laboratory ID: 0802294-02

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A Digestion - Total
Prepared: 02/25/08 15:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0802162

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/26/08 14:38

02525

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 12:00
Solids: 0.00
Laboratory ID: 0802294-02

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A Digestion - Dissolved
Prepared: 02/25/08 15:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0802163

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/26/08 15:24

02525

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

57MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 18:15
Solids: 0.00
Laboratory ID: 0802294-04

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A Digestion - Total
Prepared: 02/25/08 15:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0802162

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/26/08 14:43

: 02527

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

57MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 18:15
Solids: 0.00
Laboratory ID: 0802294-04

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A Digestion - Dissolved
Prepared: 02/25/08 15:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0802163

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/26/08 15:40

02528

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

EQBK6

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 02/14/08 11:00
Solids: 0.00
Laboratory ID: 0802294-05

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 7470A Digestion - Total
Prepared: 02/25/08 15:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0802162

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/26/08 14:49

02529

DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: RA
Date: 3/20/08
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: SWM057
Project Number: 116564z1.30000
Laboratory: TriMatrix
SDG No.: 30440-51
Test Name: VOC
Method No.: 8260B

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.			✓

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Were samples preserved on ice for soils and on ice with HCL for aqueous samples?	✓		
2.2	Have any technical holding times (14 days), determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (every 12 hour period per GCMS, matrix, and level)?	✓		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample]≤ 5X[associated blank]. (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone)	✓		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	✓		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	✓		

Notes: MB → acetone 3.2 ug/L <10x → B,Z
Trip Blank → toluene 0.34 ug/L <5x → B,y

URS

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve?Are at least five standards included in the calibration curve?	✓		
4.2	Was an initial calibration analyzed at the beginning of each analysis?	✓		
4.3	Was a second source calibration verification analyzed for each calibration curve?	✓		
4.4	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	✓		
4.5	Are all calibration standard %RSDs, correlation coefficient, or % drift within the control limits (%RSD <15%, r>0.995 or r^2>0.99; for 2° source: %D<+20%; and for CCC, %D < 20%)?		✓	
For initial calibration: %RSD > 15%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>20% J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				
4.6	Are any CCCs (chloroform, 1,1-DCE, 1,2-DCPA, ethylbenzene, toluene, and vinyl chloride) displaying an RSD greater than 30%? If yes, L(+)/R(-) all associated results.		✓	
4.7	Do any SPCC have an RRF low? (<0.10 for chloromethane, 1,1-dichloroethane, and bromoform or <0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane) If yes, L(+)/R(-) all associated results.		✓	

Notes:

CC Sequence 8022707 several >20%. Pos bias

See attached

all NDs, NO action

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	✓		
5.2	Have all samples been analyzed within twelve hours of the BFB tune? If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".	✓		
5.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag "R".	✓		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			✓
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm			
6.3	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/			✓
	1 or more <10% 1 high/low 2 or 3 high/low 2 or 3 all low 2 or 3 all high Positives L J J L K Non-detects R UJ UJ UJ NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

MS/MSD for 57MW2
Cyclohexane > 125%. at 128%.
Methylcyclohexane > 130%. at 131%.
Bromomethane > 145%. at 148%.
Parent all NDs, No action

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are %R for LCS/LCSD recoveries outside the QC limits? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).		✓	✓
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.			✓

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within +100% or -50% of the mid point calibration standard? If not, J(+)/UJ(-).	✓		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	✓		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	✓		
	For sample results > 5 x RL, use 50% RPD. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 x RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV	✓		

Notes: 57MW2 & DUP-7 RL
Chloroform 0.4J 0.38J 1 OKV

11.0 Detection Limit Verification		Yes	No	NA
11.1	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	✓		
11.2	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated			✓

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 95%$_{aq}$ and 90%$_{so}$)	✓		
12.1.1	Number of samples:			
12.1.2	Number of target compounds in each analysis:			
12.1.3	Number of results rejected and not reported:			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100%			

Notes:

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Volatile Organic Compounds by EPA Method 8260B

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8260B

Sample/Analyte:			
	0802294-01	57MW2	Bromomethane
	0802294-01	57MW2	Cyclohexane
	0802294-01	57MW2	Methylcyclohexane

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Individual sample results relate only to the sample tested.
5560 Corporate Exchange Court SE • Grand Rapids, MI 49512 • (616) 975-4500 • Fax (616) 942-7465

QC BATCH SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-51
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
QC Batch: 0802240
QC Batch Matrix: Water
Preparation: 5030B Aqueous Purge & Trap

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	0802240-BLK1	02/26/08 07:00	
LCS	0802240-BS1	02/26/08 07:00	
57MW2	0802240-MS1	02/26/08 07:00	
57MW2	0802240-MSD1	02/26/08 07:00	
57MW2	0802294-01	02/26/08 07:00	
DUP-7	0802294-02	02/26/08 07:00	
Trip Blank	0802294-03	02/26/08 07:00	
57MW3	0802294-04	02/26/08 07:00	
EQBK6	0802294-05	02/26/08 07:00	

: 20794

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-51
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0802240-BLK1
File ID: BLK0226A.D
Prepared: 02/26/08 07:00
Preparation: 5030B Aqueous Purge &
Initial/Final: 5 mL / 5 mL
Analyzed: 02/26/08 09:45
Instrument: 224
QC Batch: 0802240
Sequence: 8022707
Calibration: 8B22006

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
67-64-1	Acetone	1.2	20	3.20	ug/L	J
71-43-2	Benzene	0.12	1.0	1.0	ug/L	U
74-97-5	Bromochloromethane	0.20	1.0	1.0	ug/L	U
75-27-4	Bromodichloromethane	0.19	1.0	1.0	ug/L	U
75-25-2	Bromoform	0.23	1.0	1.0	ug/L	U
74-83-9	Bromomethane	0.19	1.0	1.0	ug/L	U
75-15-0	Carbon Disulfide	0.28	5.0	5.0	ug/L	U
56-23-5	Carbon Tetrachloride	0.15	1.0	1.0	ug/L	U
108-90-7	Chlorobenzene	0.12	1.0	1.0	ug/L	U
75-00-3	Chloroethane	0.20	1.0	1.0	ug/L	U
67-66-3	Chloroform	0.061	1.0	1.0	ug/L	U
74-87-3	Chloromethane	0.060	1.0	1.0	ug/L	U
110-82-7	Cyclohexane	0.14	5.0	5.0	ug/L	U
96-12-8	1,2-Dibromo-3-chloropropane	0.29	5.0	5.0	ug/L	U
124-48-1	Dibromochloromethane	0.14	1.0	1.0	ug/L	U
106-93-4	1,2-Dibromoethane	0.22	1.0	1.0	ug/L	U
95-50-1	1,2-Dichlorobenzene	0.065	1.0	1.0	ug/L	U
541-73-1	1,3-Dichlorobenzene	0.12	1.0	1.0	ug/L	U
106-46-7	1,4-Dichlorobenzene	0.13	1.0	1.0	ug/L	U
75-71-8	Dichlorodifluoromethane	0.17	1.0	1.0	ug/L	U
75-34-3	1,1-Dichloroethane	0.076	1.0	1.0	ug/L	U
107-06-2	1,2-Dichloroethane	0.15	1.0	1.0	ug/L	U
75-35-4	1,1-Dichloroethene	0.14	1.0	1.0	ug/L	U
156-59-2	cis-1,2-Dichloroethene	0.17	1.0	1.0	ug/L	U
156-60-5	trans-1,2-Dichloroethene	0.16	1.0	1.0	ug/L	U
78-87-5	1,2-Dichloropropane	0.10	1.0	1.0	ug/L	U
10061-01-5	cis-1,3-Dichloropropene	0.14	1.0	1.0	ug/L	U
10061-02-6	trans-1,3-Dichloropropene	0.16	1.0	1.0	ug/L	U
100-41-4	Ethylbenzene	0.13	1.0	1.0	ug/L	U
591-78-6	2-Hexanone	0.42	10	10	ug/L	U

: 00792

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 224
Lab File ID: CCV0226A.D
Sequence: 8022707
Lab Sample ID: 8022707-CCV1

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Calibration: 8B22006
Calibration Date: 02/19/08 00:00
Injection Date: 02/26/08
Injection Time: 08:34

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	L	40.0	47.2	7.925503E-02	0.0869135		17.9	40
Benzene	A	40.0	41.4	1.146377	1.18609		3.5	25
Bromochloromethane	A	40.0	41.3	0.21081	0.217602		3.2	25
Bromodichloromethane	A	40.0	44.6	0.3042467	0.33934		11.5	25
Bromoform	L	40.0	39.8	0.1755171	0.218563	0.1	-0.6	25
Bromomethane	A	40.0	56.5	5.012513E-02	0.0707951		41.2	25 *
Carbon Disulfide	L	40.0	34.9	0.4630764	0.475242		-12.8	25
Carbon Tetrachloride	A	40.0	48.8	0.2841941	0.346497		21.9	25
Chlorobenzene	A	40.0	39.5	1.069136	1.05478	0.3	-1.3	25
Chloroethane	A	40.0	39.1	0.1959358	0.192089		-2.0	25
Chloroform	A	40.0	41.8	0.4373145	0.457343		4.6	20
Chloromethane	A	40.0	36.8	0.3838116	0.353183	0.1	-8.0	25
Cyclohexane	A	40.0	48.5	0.402865	0.488814		21.3	25
1,2-Dibromo-3-chloropropane	L	40.0	43.2	0.1210742	0.157211		8.0	25
Dibromochloromethane	L	40.0	39.6	0.301591	0.34541		-1.1	25
1,2-Dibromoethane	A	40.0	43.5	0.2827329	0.30767		8.8	25
1,2-Dichlorobenzene	A	40.0	39.1	1.440202	1.408		-2.2	25
1,3-Dichlorobenzene	A	40.0	39.2	1.453111	1.4256		-1.9	25
1,4-Dichlorobenzene	A	40.0	38.4	1.55449	1.49355		-3.9	25
Dichlorodifluoromethane	A	40.0	34.9	0.2424014	0.211234		-12.9	25
1,1-Dichloroethane	A	40.0	41.4	0.4635147	0.480278	0.1	3.6	25
1,2-Dichloroethane	A	40.0	42.8	0.3388555	0.362959		7.1	25
1,1-Dichloroethene	A	40.0	42.5	0.2417472	0.256927		6.3	20
cis-1,2-Dichloroethene	A	40.0	41.1	0.2942643	0.30211		2.7	25
trans-1,2-Dichloroethene	A	40.0	41.9	0.2622882	0.274843		4.8	25
1,2-Dichloropropane	A	40.0	41.1	0.2687877	0.276373		2.8	20
cis-1,3-Dichloropropene	L	40.0	40.3	0.3692269	0.423482		0.6	25
trans-1,3-Dichloropropene	L	40.0	39.9	0.2998708	0.358444		-0.2	25
Ethylbenzene	A	40.0	41.3	1.66019	1.71288		3.2	20

: 06674

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-51
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Instrument ID: 224
Calibration: 8B22006
Lab File ID: CCV0226A.D
Calibration Date: 02/19/08 00:00
Sequence: 8022707
Injection Date: 02/26/08
Lab Sample ID: 8022707-CCV1
Injection Time: 08:34

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
2-Hexanone	A	40.0	47.5	0.1948484	0.231189		18.7	40
Isopropylbenzene	A	40.0	40.4	2.847469	2.8791		1.1	25
Methyl Acetate	A	40.0	44.6	0.1889727	0.210576		11.4	25
~~Methyl tert-Butyl Ether~~ PDS	A	40.0	43.5	0.7125169	0.77447		8.7	25
Methylcyclohexane	A	40.0	50.7	0.3408784	0.432319		26.8	25 *
Methylene Chloride	L	40.0	40.1	0.3625927	0.334927		0.2	25
2-Butanone (MEK) PDS	A	40.0	48.2	0.1225035	0.147508		20.4	40
4-Methyl-2-pentanone (MIBK)	A	40.0	48.8	0.2156593	0.263272		22.1	40
~~Styrene~~	A	40.0	41.6	1.141255	1.18821		4.1	25
1,1,2,2-Tetrachloroethane	A	40.0	44.4	0.702092	0.77943	0.3	11.0	25
Tetrachloroethene	A	40.0	42.0	0.4206695	0.441256		4.9	25
Toluene	A	40.0	41.6	1.218743	1.26762		4.0	20
1,2,3-Trichlorobenzene	A	40.0	40.3	0.7113872	0.715935		0.6	25
1,2,4-Trichlorobenzene	A	40.0	39.0	0.7687362	0.749504		-2.5	25
1,1,1-Trichloroethane	A	40.0	44.8	0.351133	0.39336		12.0	25
1,1,2-Trichloroethane	A	40.0	44.1	0.1894954	0.208777		10.2	25
Trichloroethene	A	40.0	42.9	0.3098935	0.332203		7.2	25
Trichlorofluoromethane	A	40.0	44.8	0.3550524	0.397917		12.1	25
1,1,2-Trichloro-1,2,2-trifluoroetha	A	40.0	47.7	0.231265	0.275762		19.2	25
Vinyl Chloride	A	40.0	39.8	0.2903163	0.289181		-0.4	20
Xylene (Total)	A	120	125	0.6757676	0.69286		2.5	25

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

00875

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

57MW2

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 5030B Aqueous Purge & Trap

Initial/Final: 5 mL / 5 mL

Laboratory ID: 0802240-MS1

QC Batch: 0802240

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Acetone	40.0	ND	43.9	110	40 - 140	ug/L
Benzene	40.0	ND	42.6	107	80 - 120	ug/L
Bromochloromethane	40.0	ND	42.8	107	65 - 130	ug/L
Bromodichloromethane	40.0	ND	45.8	114	75 - 120	ug/L
Bromoform	40.0	ND	37.8	95	70 - 130	ug/L
Bromomethane	40.0	ND	56.7	142	30 - 145	ug/L
Carbon Disulfide	40.0	ND	38.2	96	35 - 160	ug/L
Carbon Tetrachloride	40.0	ND	51.5	129	65 - 140	ug/L
Chlorobenzene	40.0	ND	40.4	101	80 - 120	ug/L
Chloroethane	40.0	ND	43.2	108	60 - 135	ug/L
Chloroform	40.0	0.400	43.9	109	65 - 135	ug/L
Chloromethane	40.0	ND	41.3	103	40 - 125	ug/L
Cyclohexane	40.0	ND	51.1	128 *	77 - 125	ug/L
1,2-Dibromo-3-chloropropane	40.0	ND	38.2	95	50 - 130	ug/L
Dibromochloromethane	40.0	ND	39.2	98	60 - 135	ug/L
1,2-Dibromoethane	40.0	ND	42.0	105	80 - 120	ug/L
1,2-Dichlorobenzene	40.0	ND	40.1	100	70 - 120	ug/L
1,3-Dichlorobenzene	40.0	ND	40.2	101	75 - 125	ug/L
1,4-Dichlorobenzene	40.0	ND	39.9	100	75 - 125	ug/L
Dichlorodifluoromethane	40.0	ND	46.7	117	30 - 155	ug/L
1,1-Dichloroethane	40.0	ND	43.0	107	70 - 135	ug/L
1,2-Dichloroethane	40.0	ND	44.7	112	70 - 130	ug/L
1,1-Dichloroethene	40.0	ND	45.4	114	70 - 130	ug/L
cis-1,2-Dichloroethene	40.0	ND	43.0	108	70 - 125	ug/L
trans-1,2-Dichloroethene	40.0	ND	43.8	110	60 - 140	ug/L
1,2-Dichloropropane	40.0	ND	41.4	104	75 - 125	ug/L
cis-1,3-Dichloropropene	40.0	ND	40.0	100	70 - 130	ug/L
trans-1,3-Dichloropropene	40.0	ND	39.5	99	55 - 140	ug/L
Ethylbenzene	40.0	ND	42.0	105	75 - 125	ug/L
2-Hexanone	40.0	ND	43.5	109	55 - 130	ug/L
Isopropylbenzene	40.0	ND	42.3	106	75 - 125	ug/L
Methyl Acetate	40.0	ND	41.5	104	70 - 130	ug/L
Methyl tert-Butyl Ether	40.0	ND	42.1	105	65 - 125	ug/L

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MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

57MW2

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 5030B Aqueous Purge & Trap

Initial/Final: 5 mL / 5 mL

Laboratory ID: 0802240-MS1

QC Batch: 0802240

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Methylcyclohexane	40.0	ND	52.3	131 *	70 - 130	ug/L
Methylene Chloride	40.0	ND	39.6	99	55 - 140	ug/L
2-Butanone (MEK)	40.0	ND	46.0	115	30 - 150	ug/L
4-Methyl-2-pentanone (MIBK)	40.0	ND	46.2	116	60 - 135	ug/L
Styrene	40.0	ND	42.7	107	65 - 135	ug/L
1,1,2,2-Tetrachloroethane	40.0	ND	42.3	106	65 - 130	ug/L
Tetrachloroethene	40.0	ND	42.6	106	45 - 150	ug/L
Toluene	40.0	0.140	42.8	107	75 - 120	ug/L
1,2,3-Trichlorobenzene	40.0	ND	40.0	100	55 - 140	ug/L
1,2,4-Trichlorobenzene	40.0	ND	39.8	99	65 - 135	ug/L
1,1,1-Trichloroethane	40.0	ND	46.9	117	65 - 130	ug/L
1,1,2-Trichloroethane	40.0	ND	43.7	109	75 - 125	ug/L
Trichloroethene	40.0	ND	43.2	108	70 - 125	ug/L
Trichlorofluoromethane	40.0	ND	51.0	128	60 - 145	ug/L
1,1,2-Trichloro-1,2,2-trifluoroetha	40.0	ND	51.6	129	50 - 150	ug/L
Vinyl Chloride	40.0	ND	45.9	115	50 - 145	ug/L
Xylene (Total)	120	ND	128	107	75 - 130	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00787

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY
USEPA-8260B

57MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 5030B Aqueous Purge & Trap
Initial/Final: 5 mL / 5 mL

Laboratory ID: 0802240-MSD1
QC Batch: 0802240

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Acetone	40.0	44.9	112	2	30	40 - 140	ug/L
Benzene	40.0	41.0	103	4	30	80 - 120	ug/L
Bromochloromethane	40.0	42.1	105	2	30	65 - 130	ug/L
Bromodichloromethane	40.0	44.9	112	2	30	75 - 120	ug/L
Bromoform	40.0	37.8	94	0.08	30	70 - 130	ug/L
Bromomethane	40.0	59.2	148 *	4	30	30 - 145	ug/L
Carbon Disulfide	40.0	37.4	93	2	30	35 - 160	ug/L
Carbon Tetrachloride	40.0	49.5	124	4	30	65 - 140	ug/L
Chlorobenzene	40.0	39.6	99	2	30	80 - 120	ug/L
Chloroethane	40.0	40.9	102	5	30	60 - 135	ug/L
Chloroform	40.0	42.5	105	3	30	65 - 135	ug/L
Chloromethane	40.0	40.9	102	0.9	30	40 - 125	ug/L
Cyclohexane	40.0	49.3	123	4	30	77 - 125	ug/L
1,2-Dibromo-3-chloropropane	40.0	40.1	100	5	30	50 - 130	ug/L
Dibromochloromethane	40.0	39.0	98	0.5	30	60 - 135	ug/L
1,2-Dibromoethane	40.0	42.2	106	0.5	30	80 - 120	ug/L
1,2-Dichlorobenzene	40.0	39.8	100	0.7	30	70 - 120	ug/L
1,3-Dichlorobenzene	40.0	40.0	100	0.7	30	75 - 125	ug/L
1,4-Dichlorobenzene	40.0	39.2	98	2	30	75 - 125	ug/L
Dichlorodifluoromethane	40.0	44.4	111	5	30	30 - 155	ug/L
1,1-Dichloroethane	40.0	41.5	104	4	30	70 - 135	ug/L
1,2-Dichloroethane	40.0	43.4	109	3	30	70 - 130	ug/L
1,1-Dichloroethene	40.0	44.1	110	3	30	70 - 130	ug/L
cis-1,2-Dichloroethene	40.0	41.3	103	4	30	70 - 125	ug/L
trans-1,2-Dichloroethene	40.0	42.3	106	4	30	60 - 140	ug/L
1,2-Dichloropropane	40.0	40.5	101	2	30	75 - 125	ug/L
cis-1,3-Dichloropropene	40.0	39.1	98	2	30	70 - 130	ug/L
trans-1,3-Dichloropropene	40.0	39.1	98	0.9	30	55 - 140	ug/L
Ethylbenzene	40.0	41.0	102	2	30	75 - 125	ug/L
2-Hexanone	40.0	46.2	116	6	30	55 - 130	ug/L
Isopropylbenzene	40.0	41.3	103	3	30	75 - 125	ug/L
Methyl Acetate	40.0	40.4	101	3	30	70 - 130	ug/L
Methyl tert-Butyl Ether	40.0	41.8	104	0.8	30	65 - 125	ug/L
Methylcyclohexane	40.0	51.0	127	3	30	70 - 130	ug/L

: 00788

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: RA
Date: 3/20/08
DV Level: II III IV
Review Document:
_X_ SW-846
_X_ NFG - Region III Modifications
_X_ Project QAPP/SAP

Project Name: SWMU57
Project Number:
Laboratory: TriMatrix
SDG No.: 36440-51
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 °C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.			✓

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per batch)?	✓		
3.2	Do any blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank] (or 10 times for the common phthalate contaminants).	✓		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	✓		

Notes: MB → acenaphthene 0.02 ug/L, isophorone 0.05 ug/L <5x → B, Z
EQBK6 → acetophenone 0.057, benzaldehyde 0.066, butyl benzyl phthalate 0.075, di-n-butyl phthalate 2.3, diethyl phthalate 0.038, bis(2ethyl) → 0.41,
and naphthalene 0.1 ug/L <10x, <5x → B, X

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve?	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve?	✓		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis?	✓		
4.4	Are all calibration standard %RSD ≤15%, r>0.995, or r^2<0.99), second source ±30% or %D(≤20%) within the control limits?	✓		
For initial calibration: %RSD > 15% but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>30% J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				
4.5	Are any SPCCs RF < 0.05 and/or CCC >30%? If yes reject all associated data.		✓	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	✓		
5.2	Are DFTPP monitored ions within specification? If no, flag R.	✓		
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune? If no, flag R.	✓		
5.4	Have ion abundance criteria for DFTPP been met for each instrument used? If no, flag R.	✓		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			✓
6.3	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			✓
	If No, for 2 or 3 %Rs > UCL, K(+) only; for 2 or 3 %Rs < LCL, but > 10%, L(+)/UL (-); for 2 or 3 %Rs mixed high/low, J(+)/UJ(-); for %R < 10%, L(+)/R(-).			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate outside the QC limits?	✓		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS/MSD results in conjunction with other QC criteria to determine the need for qualification of the data.			

Notes: MS/MSD for 57MW2

%R > QC carbazole (119%/117%) > 115%. ; di-n-butyl phthalate > 115%. at 126% NDs, No action

%R < 25% for caprolactam at 22% Parent ND → UJ/M

RPD > 30% for 3,3'-dichlorobenzidine at 58%. Parent ND, no action

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS outside the QC limits? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).		✓	
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.			✓

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard areas within +100% and -50% of the mid point initail calibration? If No, J(+)/UJ(-).	✓		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration?			
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.	✓		

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Are all analyte duplicate results within control limits (use RPD limits of matrix spikes)? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓	✓	

Notes: 57MW2 & DUP-7

All NDs ✓

11.0 Detection Limit Verification		Yes	No	NA
11.1	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	✓	✓	

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
12.1.1	Number of samples:			
12.1.2	Number of target compounds in each analysis:			
12.1.3	Number of results rejected and not reported:			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100 %			

Notes:

QC BATCH SUMMARY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-51
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
QC Batch: 0801909
QC Batch Matrix: Water
Preparation: 3510C Liquid-Liquid Extraction

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	0801909-BLK2	02/20/08 08:45	
LCS	0801909-BS2	02/20/08 08:45	
57MW2	0801909-MS1	02/20/08 08:45	
57MW2	0801909-MSD1	02/20/08 08:45	
57MW2	0802294-01	02/20/08 08:45	
DUP-7	0802294-02	02/20/08 08:45	
57MW3	0802294-04	02/20/08 08:45	
EQBK6	0802294-05	02/20/08 08:45	

: 88932

METHOD BLANK DATA SHEET
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-51
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0801909-BLK2
File ID: 801909BK.D
Prepared: 02/20/08 08:45
Preparation: 3510C Liquid-Liquid Ext
Initial/Final: 1000 mL / 1 mL
Analyzed: 02/26/08 13:32
Instrument: 195
QC Batch: 0801909
Sequence: 8022735
Calibration: 8B27007

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
83-32-9	Acenaphthene	0.013	0.50	0.0200	ug/L	J
208-96-8	Acenaphthylene	0.012	0.50	0.50	ug/L	U
98-86-2	Acetophenone	0.043	5.0	5.0	ug/L	U
120-12-7	Anthracene	0.014	0.50	0.50	ug/L	U
1912-24-9	Atrazine	0.026	5.0	5.0	ug/L	U
100-52-7	Benzaldehyde	0.051	5.0	5.0	ug/L	U
56-55-3	Benzo(a)anthracene	0.037	0.50	0.50	ug/L	U
50-32-8	Benzo(a)pyrene	0.023	0.50	0.50	ug/L	U
205-99-2	Benzo(b)fluoranthene	0.040	0.50	0.50	ug/L	U
207-08-9	Benzo(k)fluoranthene	0.036	0.50	0.50	ug/L	U
191-24-2	Benzo(g,h,i)perylene	0.022	0.50	0.50	ug/L	U
92-52-4	1,1'-Biphenyl	0.015	5.0	5.0	ug/L	U
101-55-3	4-Bromophenyl Phenyl Ether	0.026	5.0	5.0	ug/L	U
85-68-7	Butyl Benzyl Phthalate	0.029	5.0	5.0	ug/L	U
105-60-2	Caprolactam	0.14	5.0	5.0	ug/L	U
86-74-8	Carbazole	0.018	5.0	5.0	ug/L	U
59-50-7	4-Chloro-3-methylphenol	0.021	5.0	5.0	ug/L	U
106-47-8	4-Chloroaniline	0.021	5.0	5.0	ug/L	U
111-91-1	Bis(2-chloroethoxy)methane	0.016	5.0	5.0	ug/L	U
111-44-4	Bis(2-chloroethyl) Ether	0.016	5.0	5.0	ug/L	U
108-60-1	Bis(2-chloroisopropyl) Ether	0.047	5.0	5.0	ug/L	U
91-58-7	2-Chloronaphthalene	0.012	5.0	5.0	ug/L	U
95-57-8	2-Chlorophenol	0.016	5.0	5.0	ug/L	U
7005-72-3	4-Chlorophenyl Phenyl Ether	0.016	5.0	5.0	ug/L	U
218-01-9	Chrysene	0.020	0.50	0.50	ug/L	U
53-70-3	Dibenz(a,h)anthracene	0.026	0.50	0.50	ug/L	U
132-64-9	Dibenzofuran	0.016	5.0	5.0	ug/L	U
84-74-2	Di-n-butyl Phthalate	0.38	5.0	5.0	ug/L	U
91-94-1	3,3'-Dichlorobenzidine	0.21	5.0	5.0	ug/L	U
120-83-2	2,4-Dichlorophenol	0.015	5.0	5.0	ug/L	U

METHOD BLANK DATA SHEET
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-51

Client: URS Corporation Project: RFAAP SWMU 57 RFI/CMS, WO 003

Matrix: Water Laboratory ID: 0801909-BLK2 File ID: 801909BK.D

Prepared: 02/20/08 08:45 Preparation: 3510C Liquid-Liquid Extr Initial/Final: 1000 mL / 1 mL

Analyzed: 02/26/08 13:32 Instrument: 195

QC Batch: 0801909 Sequence: 8022735 Calibration: 8B27007

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
84-66-2	Diethyl Phthalate	0.034	5.0	5.0	ug/L	U
105-67-9	2,4-Dimethylphenol	0.33	5.0	5.0	ug/L	U
131-11-3	Dimethyl Phthalate	0.016	5.0	5.0	ug/L	U
534-52-1	4,6-Dinitro-2-methylphenol	0.12	5.0	5.0	ug/L	U
51-28-5	2,4-Dinitrophenol	1.5	5.0	5.0	ug/L	U
121-14-2	2,4-Dinitrotoluene	0.21	5.0	5.0	ug/L	U
606-20-2	2,6-Dinitrotoluene	0.050	5.0	5.0	ug/L	U
117-84-0	Di-n-octyl Phthalate	0.34	5.0	5.0	ug/L	U
117-81-7	Bis(2-ethylhexyl) Phthalate	0.41	5.0	5.0	ug/L	U
206-44-0	Fluoranthene	0.016	0.50	0.50	ug/L	U
86-73-7	Fluorene	0.011	0.50	0.50	ug/L	U
118-74-1	Hexachlorobenzene	0.019	5.0	5.0	ug/L	U
87-68-3	Hexachlorobutadiene	0.018	5.0	5.0	ug/L	U
77-47-4	Hexachlorocyclopentadiene	0.13	5.0	5.0	ug/L	U
67-72-1	Hexachloroethane	0.038	5.0	5.0	ug/L	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.014	0.50	0.50	ug/L	U
78-59-1	Isophorone	0.031	5.0	0.0500	ug/L	J
91-57-6	2-Methylnaphthalene	0.015	5.0	5.0	ug/L	U
95-48-7	2-Methylphenol	0.14	5.0	5.0	ug/L	U
106-44-5	4-Methylphenol	0.16	5.0	5.0	ug/L	U
91-20-3	Naphthalene	0.023	0.50	0.50	ug/L	U
88-74-4	2-Nitroaniline	0.12	5.0	5.0	ug/L	U
99-09-2	3-Nitroaniline	0.13	5.0	5.0	ug/L	U
100-01-6	4-Nitroaniline	0.14	5.0	5.0	ug/L	U
98-95-3	Nitrobenzene	0.026	5.0	5.0	ug/L	U
100-02-7	4-Nitrophenol	1.3	5.0	5.0	ug/L	U
88-75-5	2-Nitrophenol	0.026	5.0	5.0	ug/L	U
86-30-6	N-Nitroso-diphenylamine	0.019	5.0	5.0	ug/L	U
621-64-7	N-Nitroso-di-n-propylamine	0.030	5.0	5.0	ug/L	U
87-86-5	Pentachlorophenol	0.19	5.0	5.0	ug/L	U

: 0938

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8270C

57MW2

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3510C Liquid-Liquid Extraction

Initial/Final: 1050 mL / 1 mL

Laboratory ID: 0801909-MS1

QC Batch: 0801909

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Acenaphthene	9.33	ND	7.97	85	45 - 110	ug/L
Acenaphthylene	9.33	ND	8.11	87	50 - 105	ug/L
Acetophenone	9.52	ND	8.50	89	54 - 113	ug/L
Anthracene	9.33	ND	7.89	84	55 - 110	ug/L
Atrazine	9.52	ND	7.90	83	61 - 139	ug/L
Benzaldehyde	9.52	ND	12.2	128	25 - 141	ug/L
Benzo(a)anthracene	9.33	ND	8.29	89	55 - 110	ug/L
Benzo(a)pyrene	9.33	ND	7.76	83	55 - 110	ug/L
Benzo(b)fluoranthene	9.33	ND	8.68	93	45 - 120	ug/L
Benzo(k)fluoranthene	9.33	ND	7.95	85	45 - 125	ug/L
Benzo(g,h,i)perylene	9.33	ND	8.41	90	40 - 125	ug/L
1,1'-Biphenyl	9.52	ND	8.15	86	59 - 114	ug/L
4-Bromophenyl Phenyl Ether	9.52	ND	9.21	97	50 - 115	ug/L
Butyl Benzyl Phthalate	9.52	ND	10.3	108	45 - 115	ug/L
Caprolactam	9.52	ND	2.52	26	25 - 135	ug/L
Carbazole	9.33	ND	11.1	119 *	50 - 115	ug/L
4-Chloro-3-methylphenol	9.52	ND	8.16	86	45 - 110	ug/L
4-Chloroaniline	9.52	ND	5.99	63	15 - 110	ug/L
Bis(2-chloroethoxy)methane	9.52	ND	9.16	96	45 - 105	ug/L
Bis(2-chloroethyl) Ether	9.52	ND	8.29	87	35 - 110	ug/L
Bis(2-chloroisopropyl) Ether	9.52	ND	9.60	101	25 - 130	ug/L
2-Chloronaphthalene	9.52	ND	7.90	83	50 - 105	ug/L
2-Chlorophenol	9.52	ND	9.10	95	35 - 105	ug/L
4-Chlorophenyl Phenyl Ether	9.52	ND	8.13	85	50 - 110	ug/L
Chrysene	9.33	ND	8.70	93	55 - 110	ug/L
Dibenz(a,h)anthracene	9.33	ND	8.85	95	40 - 125	ug/L
Dibenzofuran	9.52	ND	8.36	88	55 - 105	ug/L
Di-n-butyl Phthalate	9.52	ND	10.9	114	55 - 115	ug/L
3,3'-Dichlorobenzidine	19.0	ND	4.95	26	20 - 110	ug/L
2,4-Dichlorophenol	9.52	ND	8.63	91	50 - 105	ug/L
Diethyl Phthalate	9.52	0.0381	9.86	103	40 - 120	ug/L
2,4-Dimethylphenol	9.52	ND	4.12	43	30 - 110	ug/L
Dimethyl Phthalate	9.52	ND	9.56	100	25 - 125	ug/L

000528

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

57MW2

USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3510C Liquid-Liquid Extraction

Initial/Final: 1050 mL / 1 mL

Laboratory ID: 0801909-MSD1

QC Batch: 0801909

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Acenaphthene	9.33	7.44	80	7	30	45 - 110	ug/L
Acenaphthylene	9.33	7.73	83	5	30	50 - 105	ug/L
Acetophenone	9.52	8.29	87	3	30	54 - 113	ug/L
Anthracene	9.33	7.76	83	2	30	55 - 110	ug/L
Atrazine	9.52	7.74	81	2	30	61 - 139	ug/L
Benzaldehyde	9.52	11.7	122	4	30	25 - 141	ug/L
Benzo(a)anthracene	9.33	8.14	87	2	30	55 - 110	ug/L
Benzo(a)pyrene	9.33	7.65	82	1	30	55 - 110	ug/L
Benzo(b)fluoranthene	9.33	7.70	82	12	30	45 - 120	ug/L
Benzo(k)fluoranthene	9.33	8.37	90	5	30	45 - 125	ug/L
Benzo(g,h,i)perylene	9.33	8.24	88	2	30	40 - 125	ug/L
1,1'-Biphenyl	9.52	7.55	79	8	30	59 - 114	ug/L
4-Bromophenyl Phenyl Ether	9.52	8.49	89	8	30	50 - 115	ug/L
Butyl Benzyl Phthalate	9.52	10.3	108	0.3	30	45 - 115	ug/L
Caprolactam	9.52	2.10	22 *	18	30	25 - 135	ug/L
Carbazole	9.33	10.9	117 *	2	30	50 - 115	ug/L
4-Chloro-3-methylphenol	9.52	7.86	82	4	30	45 - 110	ug/L
4-Chloroaniline	9.52	6.45	68	7	30	15 - 110	ug/L
Bis(2-chloroethoxy)methane	9.52	8.74	92	5	30	45 - 105	ug/L
Bis(2-chloroethyl) Ether	9.52	8.01	84	3	30	35 - 110	ug/L
Bis(2-chloroisopropyl) Ether	9.52	9.42	99	2	30	25 - 130	ug/L
2-Chloronaphthalene	9.52	7.39	78	7	30	50 - 105	ug/L
2-Chlorophenol	9.52	8.74	92	4	30	35 - 105	ug/L
4-Chlorophenyl Phenyl Ether	9.52	7.79	82	4	30	50 - 110	ug/L
Chrysene	9.33	8.75	94	0.7	30	55 - 110	ug/L
Dibenz(a,h)anthracene	9.33	8.50	91	4	30	40 - 125	ug/L
Dibenzofuran	9.52	8.04	84	4	30	55 - 105	ug/L
Di-n-butyl Phthalate	9.52	12.0	126 *	9	30	55 - 115	ug/L
3,3'-Dichlorobenzidine	19.0	9.00	47	58 *	30	20 - 110	ug/L
2,4-Dichlorophenol	9.52	7.93	83	8	30	50 - 105	ug/L
Diethyl Phthalate	9.52	9.51	99	4	30	40 - 120	ug/L
2,4-Dimethylphenol	9.52	4.93	52	18	30	30 - 110	ug/L
Dimethyl Phthalate	9.52	9.11	96	5	30	25 - 125	ug/L
4,6-Dinitro-2-methylphenol	9.52	6.42	67	8	30	40 - 130	ug/L

00023

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Semivolatile Organic Compounds by EPA Method 8270C

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8270C

Sample/Analyte:			
	0802294-01	57MW2	Caprolactam
	0802294-01	57MW2	Carbazole
	0802294-01	57MW2	Di-n-butyl Phthalate

Qualification: The RPD between the MS and MSD results exceeded the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8270C

Sample/Analyte:			
	0802294-01	57MW2	3,3′-Dichlorobenzidine

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Individual sample results relate only to the sample tested.
5560 Corporate Exchange Court SE • Grand Rapids, MI 49512 • (616) 975-4500 • Fax (616) 942-7465

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: RA
Date: 3/20/08
DV Level: II III IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
X project QAPP

All QC OK ✓

Project Name: SWMU 57
Project Number: 116S0421.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: Pest/PCBs
Method No.: 8081/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 °C, then flag L(+)/UL(-).			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.			✓

Notes:

2.0 Holding Times		Yes	No	NA
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (one per 20 samples or batch and matrix)?	✓		
3.2	Do any blanks have positive results? If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank].		✓	
3.3	Do any field equipment blanks have positive results? If yes, use same rules above.		✓	

Notes:

URS

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve for 1016, 1260, toxaphene, and technical chlordane; and at least one point for the other arochlors reported? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the control limits?	✓		
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

5.0 GC/ECD Instrument Performance Check		Yes	No	NA
5.1	Has a Performance Evaluation Mixture (PEM) been analyzed at the beginning, every 12 hours, and at the end of every sequence.	✓		
5.2	Is the 4,4'-DDT breakdown </= to 20%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non detect DDT results, DDD/DDE - R(+).	✓		
5.3	Is the endrin breakdown </= to 20%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	✓		
5.4	Is the combined breakdowns less than or equal to 30%? If No, for positive DDT/endrin results, DDT/endrin-L(+), DDD/DD/endrin aldehyde/endrin ketone - NJ(+). For non-detect DDT/endrin results, DDD/DDE/endrin aldehyde/endrin ketone - R(+).	✓		

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	✓		
6.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks? Advisory limit: 60-150%.	✓		
6.3	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?			✓
6.4	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			✓

# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
1 out	high/low	No action	No action
2 out	2 high same column	K	No action
	2 low same column	L, UL	No action
	mixed same column	J, UJ	No action
	2 high diff columns	J	Not applicable
	2 low diff columns	J, UJ	Not applicable
	mixed diff columns	Professional judgement	Not applicable
3 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	2 high, 1 low	K (2 high)	J (1 low 2nd column)
	2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
	other mixed	J, UJ	Not applicable
4 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	Mixed	J, UJ	Not applicable

If any recovery is >0% and <10% then L(+)/R(-).
If any recovery is 0% then R(+/-).

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			

Notes:

9.0 Field Duplicate

		Yes	No	NA
9.2	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: S7MW2, DUP-7
Both NDs

10.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns <40%? If No, J(+).	✓		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		

Notes:

11.0 Data Completeness

		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
11.1.1	Number of samples: Pest PCB			
11.1.2	Number of target compounds in each analysis: PEST PCB			
11.1.3	Number of results rejected and not reported: Pest PCB			
11.1.4	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = Pest 100% PCB 100%			

Notes:

DATA VALIDATION WORKSHEET

Explosives

Reviewer: RA
Date: 3/20/08
DV Level: II III IV

Review Document:

_X__ Region III Modified for National Functional Guidelines
_X__ SW-846
_X__ Project QAPP/SAP

Project Name: SWMU 57
Project Number: 116564 21
Laboratory: TriMatrix
SDG No.: 36440-51
Test Name: explosives
Method No.: 8330

All QC OK ✓

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 ^{O}C, then flag L(+)/UL(-).			
1.4	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within	✓		
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

5.0 Laboratory Control Sample (LCS)		Yes	No	NA
5.1	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.2	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
5.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.			✓

Notes:

6.0 Surrogate Recovery				Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?			✓		
6.2	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?					✓
6.3	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)					✓
		<10%	low	high		
	Positives	L	L	K		
	Non-detects	R	UL	No action		

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.2	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.3	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	Action: No action is required based on MS/MSd failure alone. Note in the report and use professional judgement.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes:

Both NDs

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are any target compounds detected in the field samples? If Yes, is all positive identifications were confirmed in second column? Apply J flag if RPD >40% between first and second columns.		✓	
9.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes:

10.0 Data Completeness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
10.1.1	Number of samples:_____			
10.1.2	Number of target compounds in each analysis: 14			
10.1.3	Number of results rejected or not reported:_____			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100%			

Notes:

DATA VALIDATION WORKSHEET

Nitroglycerin

Reviewer: RA
Date: 3/20/08
DV Level: II (III) IV
Review Document:
_X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
____ Project QAPP/SAP

Project Name: SWMU57
Project Number:
Laboratory: TriMatrix
SDG No.: 360440-51
Test Name: Nitroglycerin, PETN
Method No.: 8332-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. %	✓		
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	✓		

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	✓		
	Action: If the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			✓
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		✓	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		✓	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	✓		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	✓		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	✓		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	✓		
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			✓
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			✓
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	✓		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	✓		
5.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			✓
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			✓
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			✓

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
6.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD for 57MW2 > 120% for PETN at 128%, 128%) Parent ND, No action

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	✓		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits?			✓
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: 57MW2 & DUP-7 Both NDs ✓

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are any target compounds detected in the field samples? If Yes, is all positive identifications were confirmed in second column? Apply J flag if RPD >40% between first and second columns.		✓	
9.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes:

10.0 Data Completeness

		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)	✓		
10.1.1	Number of samples:			
10.1.3	Number of results rejected and not reported:			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100 %			
	% Completeness =			

Notes:

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8332

57MW2

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 8332 Extraction

Initial/Final: 770 mL / 10 mL

Laboratory ID: 0801848-MS1

QC Batch: 0801848

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Nitroglycerin	13.0	ND	14.6	112	30 - 120	ug/L
Pentaerythritol Tetranitrate	13.0	ND	16.6	128 *	30 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

01269

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

57MW2

USEPA-8332

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 8332 Extraction

Initial/Final: 770 mL / 10 mL

Laboratory ID: 0801848-MSD1

QC Batch: 0801848

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Nitroglycerin	13.0	14.4	111	1	200	30 - 120	ug/L
Pentaerythritol Tetranitrate	13.0	16.6	128 *	0.2	200	30 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 01278

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Nitroglycerine by EPA Method 8332

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8332

Sample/Analyte: 0802294-01 57MW2 Pentaerythritol Tetranitrate

This report shall not be reproduced except in full, without written authorization of TriMatrix Laboratories, Inc.
Individual sample results relate only to the sample tested.
5560 Corporate Exchange Court SE • Grand Rapids, MI 49512 • (616) 975-4500 • Fax (616) 942-7465

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-51
Project No.: 11050421

Project Name: SWMU 57
Reviewer: RA
Date: 3/20/08

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓			✓			✓					
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓			✓			✓					
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓			✓			✓				
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C $\pm$ 2 ^{o}C)	✓			✓			✓					
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓			✓			✓					

Note: _____

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		✓			✓			✓				

Note: _____

URS

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	✓			✓			✓					
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	✓			✓			✓					
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.												
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	✓			✓			✓					
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	✓			✓			✓					
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	✓			✓			✓					
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	✓			✓								
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K												

Note: _____

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓			✓			✓					
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	✓			✓			✓					
4.3	Are there reported MB or ICB/CCBs values > MDL?	✓				✓			✓				
	Sample Results > MDL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > MDL?		✓			✓			✓				
	Sample Results Non-detects > MDL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± MDL?	✓			✓				✓				
	Sample Results > MDL												
	< 5X Blank Contamination B												

Note: 6010→ EQBK6 total Fe at 6.2 ug/L and results >5x, No action
6020→MB Diss zinc, total Cr, total zinc, Diss Cr <5x → B,P
ICB → antimony <5x → B,O and sample, EQBK6 total zn at 6.5 ug/L <5x → B,X

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	✓			✓								
5.2	Are the ICS AB recoveries within 80% - 120%?	✓			✓								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	✓			✓								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			✓			✓						
	If not...												
	Action: Not Spiked Analytes: < -MDL L(+)/UL(-); > MDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note:

URS

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	✓			✓			✓					
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		✓			✓			✓				

Action:	Solid		Aqueous		
	< LCL	> UCL	< 50%	50% - 79%	> 120%
	L(+)/UL(-)	K(+)	L(+)/R(-)	L(+)/UL(-)	K(+)

Note:

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	✓			✓			✓					
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.		✓		✓			✓					

Note:

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	✓			✓			✓					
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous matrices or lab limits for soil matrices?		✓		✓			✓					
	%R > 125% / 30%< %R < 74% / < 30%												
	Positive: K / L / L												
	Non-detect: None / UL / R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	✓					✓			✓			

Note: 6020 → MS/MSD for 57MW2 %R<75% for total Mn 69%, PDS 71% for total Mn total Mn → L/UL/M, also total Zn 64%/66% → Lim unless prev. flagged B, X

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	✓			✓			✓					

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	✓			✓								
10.2	Was a five-fold dilution performed?	✓			✓								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	✓			✓								

Note:

11.0 Field Duplicate Samples

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	✓			✓			✓					
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report		✓			✓		✓					

Note: 6010 → 57MW2 & DUP-7 for 6010, Diss Fe, total Al, total Fe out → J, F
Hg → 57MW2, DUP-7 See attached for 6020, total Cu out → J, F
Both NDs ✓

12.0 Result Verification/ Internal Standards/ Tune

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			✓			✓			✓			
12.2	Were all dilution reflected in the positive results and detection limits?	✓			✓			✓					
12.3	Were the Internal Standard recoveries within 30-120%	✓			✓								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	✓											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	✓											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	✓											

Note:

13.0 Completeness Calculation

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	✓			✓			✓					
13.1.1	Number of samples:												
13.1.2	Number of target compounds in each analysis:												
13.1.3	Number of results rejected and not reported:												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2) % Completeness = 100%												

Note:

URS

Page ____ of ____

Job ____ Project No. ____ Sheet ____ of ____

Description ____ Computed by ____ Date ____

____ Checked by ____ Date ____

Reference

Field DUPs for Method 6010

	57MW2	DUP-7	RL	%RPD
Diss Ca	30,000	30,000	500	0% ✓
Diss Fe	8.8 J	74	20	Out → J, F
Diss Mg	11,000	11,000	500	0% ✓
Diss Na	19,000	19,000	500	0% ✓
Diss K	2,300	2200	200	4% ✓

	57MW2	DUP-7	RL	%RPD
total Al	73 J	460	200	Out → J, F
total Ca	31,000	36,000	500	15% ✓
total Fe	150	630	20	Out → J, F 123%
total Mg	12,000	14,000	500	15% ✓
total K	2400	2700	200	11% ✓
total Na	19,000	19,000	500	OK ✓

Field DUPs for Method 6020

	57MW2	DUP-7	RL	%RPD
Diss Sb	5.5	5.1	3	OK ✓
Diss As	2.3J	2J	3	OK ✓
Diss Ba	8.1	7.8	2	OK ✓
Diss Cd	0.15J	0.13J	0.2	OK ✓
Diss Cr	2.9	ND	2	OK ✓
Diss Co	0.97J	0.87J	1	OK ✓
Diss Mn	190	160	3	17% OK ✓
Diss Ni	5.7	4.8	2	OK ✓
Diss V	2.5J	2.5J	5	OK ✓
Diss Cu	4.1	1.9	1	OK ✓

URS

Page ____ of ____

Job ____ Project No. ____ Sheet ____ of ____

Description ____ Computed by ____ Date ____

____ Checked by ____ Date ____

Reference

Field Dups for Method 6020 (cont.)

	57MW2	DUP-7	RL	%RPD
total Sb	4.8	4.1	3	OKV
total As	2.6J	2.7J	3	OKV
total Ba	8.5	12	2	OKV
total Cd	0.18J	0.2J	0.2	OKV
total Cr	3.7	5.2	2	OKV
total Co	0.98J	1.5	1	OKV
total Cu	1.5	8.1	1	out → J, F
total Mn	210	250	3	17% OKV
total Ni	5.7	6.6	2	OKV
total V	3.1J	3.7J	5	OKV
total Zn	25	10	10	OKV

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-51
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0802170-BLK1
File ID: 8022720-021
Prepared: 02/25/08 16:43
Preparation: General Metals Prep
Initial/Final: 25 mL / 125 mL
Analyzed: 02/27/08 10:35
Instrument: 114
QC Batch: 0802170
Sequence: 8022720
Calibration: 8B27016

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
7440-50-8	Copper, Dissolved	0.33	1.0	1.0	ug/L	U
7440-66-6	Zinc, Dissolved	0.84	10	3.13	ug/L	J

15.65

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-51
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0801933-BLK3
File ID: 8022299-056
Prepared: 02/20/08 07:05
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL
Analyzed: 02/22/08 20:13
Instrument: 201
QC Batch: 0801933
Sequence: 8022299
Calibration: 8B25007

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
7440-47-3	Chromium, Total	0.31	2.0	0.555	ug/L	J

2.775

01941

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-51
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0801933-BLK2
File ID: 8022229-033
Prepared: 02/20/08 07:05
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL
Analyzed: 02/22/08 12:57
Instrument: 201
QC Batch: 0801933
Sequence: 8022229
Calibration: 8B25003

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
7440-36-0	Antimony, Total	0.44	3.0	3.0	ug/L	U
7440-41-7	Beryllium, Total	0.31	2.0	2.0	ug/L	U
7440-62-2	Vanadium, Total	0.83	5.0	5.0	ug/L	U
7440-66-6	Zinc, Total	0.84	10	1.09	ug/L	J

5.45

: 21948

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-51
Client: URS Corporation
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Matrix: Water
Laboratory ID: 0801823-BLK3
File ID: 8022299-068
Prepared: 02/20/08 12:13
Preparation: General Metals Prep
Initial/Final: 25 mL / 125 mL
Analyzed: 02/22/08 20:41
Instrument: 201
QC Batch: 0801823
Sequence: 8022299
Calibration: 8B25007

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
7440-47-3	Chromium, Dissolved	0.31	2.0	0.510	ug/L	J

2.55

21938

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 8022138

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Instrument ID: 114
Calibration: 8B22016

Lab Sample ID	Analyte	Found	MRL	MDL	Units	C	Analyzed
8022138-ICB1	Antimony	0.170	0.60	0.089	ug/L	J	02/21/08 12:23
	Antimony	0.170	0.60	0.089	ug/L	J	02/21/08 12:23
	Arsenic	0.00205	0.60	0.15	ug/L	U	02/21/08 12:23
	Arsenic	0.00205	0.60	0.15	ug/L	U	02/21/08 12:23
	Barium	0.000135	0.40	0.10	ug/L	U	02/21/08 12:23
	Barium	0.000135	0.40	0.10	ug/L	U	02/21/08 12:23
	Beryllium	-0.00356	0.40	0.061	ug/L	U	02/21/08 12:23
	Beryllium	-0.00356	0.40	0.061	ug/L	U	02/21/08 12:23
	Cadmium	-0.00215	0.040	0.012	ug/L	U	02/21/08 12:23
	Cadmium	-0.00215	0.040	0.012	ug/L	U	02/21/08 12:23
	Cobalt	0.00151	0.20	0.019	ug/L	U	02/21/08 12:23
	Cobalt	0.00151	0.20	0.019	ug/L	U	02/21/08 12:23
	Copper	-0.00117	0.20	0.066	ug/L	U	02/21/08 12:23
	Copper	-0.00117	0.20	0.066	ug/L	U	02/21/08 12:23
	Lead	-0.00121	0.20	0.065	ug/L	U	02/21/08 12:23
	Lead	-0.00121	0.20	0.065	ug/L	U	02/21/08 12:23
	Manganese	0.00268	0.60	0.086	ug/L	U	02/21/08 12:23
	Manganese	0.00268	0.60	0.086	ug/L	U	02/21/08 12:23
	Nickel	0.00490	0.40	0.056	ug/L	U	02/21/08 12:23
	Nickel	0.00490	0.40	0.056	ug/L	U	02/21/08 12:23
	Selenium	0.0433	0.60	0.18	ug/L	U	02/21/08 12:23
	Selenium	0.0433	0.60	0.18	ug/L	U	02/21/08 12:23
	Silver	-0.00119	0.10	0.024	ug/L	U	02/21/08 12:23
	Silver	-0.00119	0.10	0.024	ug/L	U	02/21/08 12:23
	Thallium	-0.00563	0.20	0.034	ug/L	U	02/21/08 12:23
	Thallium	-0.00563	0.20	0.034	ug/L	U	02/21/08 12:23
	Zinc	0.00125	2.0	0.17	ug/L	U	02/21/08 12:23
	Zinc	0.00125	2.0	0.17	ug/L	U	02/21/08 12:23
8022138-CCB1	Antimony	0.146	0.60	0.089	ug/L	J	02/21/08 12:57
	Antimony	0.146	0.60	0.089	ug/L	J	02/21/08 12:57
	Arsenic	-0.00787	0.60	0.15	ug/L	U	02/21/08 12:57
	Arsenic	-0.00787	0.60	0.15	ug/L	U	02/21/08 12:57
	Barium	0.000888	0.40	0.10	ug/L	U	02/21/08 12:57

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

57MW2

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3020A Digestion

Initial/Final: 25 mL / 125 mL

Laboratory ID: 0801933-MSD1

QC Batch: 0801933

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Arsenic, Total	50.0	47.7	90	2	20	80 - 120	ug/L
Barium, Total	50.0	54.7	92	3	20	80 - 120	ug/L
Cadmium, Total	50.0	49.6	99	0.005	20	80 - 120	ug/L
Cobalt, Total	50.0	49.1	96	2	20	80 - 120	ug/L
Copper, Total	50.0	48.5	94	1	20	80 - 120	ug/L
Manganese, Total	50.0	249	69 *	5	20	80 - 120	ug/L
Nickel, Total	50.0	51.6	92	4	20	80 - 120	ug/L
Selenium, Total	50.0	43.5	87	4	20	80 - 120	ug/L
Silver, Total	50.0	51.9	104	3	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

01950

POST DIGEST SPIKE SAMPLE RECOVERY

USEPA-6020A

57MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
% Solids:
Laboratory ID: 0801933-PS1
Lab Source ID: 0802294-01

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Initial/Final: 2 mL / 10 mL
QC Batch: 0801933
Sequence: 8022138

Analyte	Control Limit %R	Spike Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R	Units
Arsenic, Total	75 - 125	17.4	0.516	20.0	84	ug/L
Barium, Total	75 - 125	18.5	1.71	20.0	84	ug/L
Cadmium, Total	75 - 125	18.1	0.0360	20.0	90	ug/L
Cobalt, Total	75 - 125	18.2	0.197	20.0	90	ug/L
Copper, Total	75 - 125	18.1	0.297	20.0	89	ug/L
Manganese, Total	75 - 125	57.1	42.9	20.0	71 *	ug/L
Nickel, Total	75 - 125	19.0	1.14	20.0	89	ug/L
Selenium, Total	75 - 125	16.5	0.00805	20.0	82	ug/L
Silver, Total	75 - 125	18.1	-0.000453	20.0	90	ug/L

* Values outside of QC limits

: 01962

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

57MW2

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-51

Project: RFAAP SWMU 57 RFI/CMS, WO 003

Preparation: 3020A Digestion

Initial/Final: 25 mL / 125 mL

Laboratory ID: 0801933-MS4

QC Batch: 0801933

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Zinc, Total	50.0	24.7	56.8	64 *	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

01955

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY
USEPA-6020A

57MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water

SDG: 36440-51
Project: RFAAP SWMU 57 RFI/CMS, WO 003
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL

Laboratory ID: 0801933-MSD4
QC Batch: 0801933

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Zinc, Total	50.0	55.2	61 *	3	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 01956

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Dissolved Metals by EPA 6000/7000 Series Methods

Qualification: This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.

Analysis: USEPA-6020A

Sample/Analyte:			
	0802294-01	57MW2	Chromium
	0802294-01	57MW2	Copper
	0802294-01	57MW2	Nickel
	0802294-01	57MW2	Zinc

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SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Total Metals by EPA 6000/7000 Series Methods

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-6020A

Sample/Analyte:			
	0802294-01	57MW2	Zinc

Qualification: The post-digestion spike recovery for this sample was outside the control limit. Sample matrix interference is suspected and the reported result must be considered as estimated.

Analysis: USEPA-6020A

Sample/Analyte:			
	0802294-01	57MW2	Manganese

Qualification: This analyte was not present in this sample at a concentration greater than 50 times the MDL, therefore serial dilution is not required.

Analysis: USEPA-6010B

Sample/Analyte:			
	0802294-01	57MW2	Iron
	0802294-01	57MW2	Potassium

Qualification: This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.

Analysis: USEPA-6020A

Sample/Analyte:			
	0802294-01	57MW2	Chromium
	0802294-01	57MW2	Zinc

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was greater than or equal to 4 times the spiked amount; the non-spiked sample result is not qualified.

Analysis: USEPA-6020A

Sample/Analyte:			
	0802294-01	57MW2	Manganese

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SDG CASE NARRATIVE

URS Corporation
RFAAP SWMU 57 RFI/CMS, WO 003

SDG Executive Summary

This case narrative applies to samples received on February 15, 2008. All samples were scheduled for analysis in accordance with parameters outlined on the field chain of custody record, the TriMatrix bid form, and/or oral and written correspondence between URS Corporation and TriMatrix Laboratories, Inc..

Each sample receipt event was assigned a unique TriMatrix work order number. Sample receipt documentation is included in section A of this data package.

Project Technical Issues/Problems

Project-related data qualification designations and reporting conventions are included in Attachment 1 - *Project Technical Narrative.*

QA/QC Data Qualifications/Narrations

Quality assurance issues and/or quality control data qualifications and narrations related to the analysis and reporting of this SDG are presented in Attachment 2 - *Statement of Data Qualifications.* The absence of a statement page for a particular analyte group (*e.g.* Percent Solids) implies that no qualifying statements were generated for that analyte.

Data Review and Approval

All data was peer-reviewed by a second analyst, and then by appropriate data management staff against laboratory quality control requirements and project specifications. It was then reviewed and approved by the group supervisor/manager prior to further review by the project chemist.

Data Deliverables

The data deliverables, both hardcopy and/or electronic (EDD), that comprise this data package are intended to comply with the documents referenced in the introductory section of this narrative. The EDD, if requested, will be issued separately from this hardcopy report. Hold time reports for each test procedure are presented following the CLP-like forms section of this report.

This report relates only to the sample(s) as received. Test results are in compliance with the requirements of the National Environmental Laboratory Accreditation Conference (NELAC). Estimates of analytical uncertainties for the test results contained within the report are available upon request.

Walter J. Roudebush, Project Chemist

3/18/08
Date

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SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 0802294

TriMatrix Laboratories received the cooler(s) for this work order on February 15, 2008, at 09:40am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
57MW2	0802294-01	Ground Water	2/13/2008
DUP-7	0802294-02	Ground Water	2/13/2008
Trip Blank	0802294-03	Water	2/13/2008
57MW3	0802294-04	Ground Water	2/13/2008
EQBK6	0802294-05	Water	2/14/2008

No administrative issues were encountered during the receipt and analysis of this work order.

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SDG CASE NARRATIVE

Attachment 1
Project Technical Narrative

Sample Result Reporting Convention

Sample results are reported as RL 'U' (e.g., 0.001 U) if the target analyte was not detected above the MDL. If a sample for an organic parameter is reanalyzed and also reported, the second analysis includes the suffix 'REn' where n = the first, second, etc. reanalysis. If a sample is reanalyzed for confirmation purposes, is confirmed and also reported, the second analysis includes the suffix 'RE1'. If the confirmation was not performed simultaneously, the second set of sample results is reported on a second Form 1 since that confirmation analysis did not occur at the same time and/or date.

Method Detection Limits, Target Analytes, and Reporting Limits

All method detection limits (MDL) for analytes in this report are compliant with the DoD QSM specification that each reporting limit (RL) employed is to be at least three times the MDL. In addition, no RL is less than the equivalent concentration of the lowest instrument calibration standard.

Quality Control Limits

Quality control limits specified in the DoD QSM were employed. For cases in which the analyte is not listed in the QSM, internal laboratory control limits were used.

Data Qualifier Designation

If applicable, a sample result is qualified with:

- a "U" flag if the analyte was not detected at a concentration greater than the MDL,
- a "B", "J", and/or an "E" flag as defined in the Variance section,
- a LIMS-generated statement of qualification. Qualifying statements, if any, will be found in Attachment 2 to this narrative.

QC Batch and Analytical Batch Designation

A Quality Control (QC) Batch is a seven digit number that associates all samples that have been prepared together (or analyzed together if there is no preparation). Quality Control batches are limited to no more than twenty samples, excluding batch QC (method blanks, control spikes, etc.). Some batches may contain multiple sets of method blanks (BLK) and laboratory control samples (BS), where a set of method quality control analyses were prepared in concert with each set of samples on a given day.

An Analytical Batch (or Sequence) is a seven digit number that associates all samples analyzed as a set under one analytical sequence.

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Variances

Data Qualifier Flags

Data qualifier flags other than those listed in the DoD QSM were employed or the definition of an existing flag was modified.

J – Estimated: the analyte was detected at a concentration greater than the limit of detection (i.e., MDL) but less than the reporting limit (i.e., MRL).

B – Blank contamination: The analyte was detected above one-half the reporting limit in an associated method blank. The same analyte in the sample was detected at less than five times the method blank concentration. (If a common laboratory contaminant is present in the method blank at a concentration greater than one-half the reporting limit but less than or equal to that reporting limit, any associated sample results are flagged but corrective action is not necessarily taken. A text qualifier is also associated with such a result.)

E – Exceeds calibration range: The analyte response exceeded the calibrated range of the instrument. (With the exception of metals for which only the final non-qualified result is reported, both the initial E-qualified result and final non-qualified result from reanalysis-at-dilution are reported.)

Text Qualifier

A LIMS-generated text qualifier is substituted for many instances in which the DoD QSM "Q" flag would otherwise apply. The text qualifiers are listed in a summary format by parameter with applicable samples identified.

Methods 6010B and 6020A

The acceptance criterion of < 2 x RL is substituted for < 2 x MDL for interference check solution ICS-A.

Project Correspondence

Any additional correspondence with the Client, and potentially any third parties also involved in the project, regarding sample receipt and/or analysis follows.

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Chain of Custody Record

COC No. 123190

Page 1 of 1

For Lab Use Only
Cart: G
VOA Rack/Tray: 432R
Receipt Log No.: 157
Project Chemist: WAR
Laboratory Project No.: E 0802294

Client Name: URS Corporation
Address: 5540 Falmouth St, Suite 201
Richmond, VA 23230
Phone: (804) 965-9000
Fax: (804) 965-9764

Project Name: SWMU57 RFI
Client Project No./P.O. No.: 11656421.20000
Invoice No.: ☒ Client ☐ Other (comments)
Contact/Report To: Tina DeLuca

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Container Type (corresponds to Container Packing List)										Total	Sample Comments
											D	A	A	A	B	B					
											VOCs 8260 Expanded List 8330, 8332	SVOCs	Pesticides/PCB	Metals Unfiltered	Metals Filtered						
											Number of Containers Submitted											
25	WG		01	1 57MW2	TM1560	2-13-08	1300		✓	GW	B	✓	✓	✓	✓	✓					13	
	WG			2 57MW2 MS/MSD	TM1560	2-13-08	1300		✓	GW	B	–	–	–	–	–					7	Extra vol. For line 1 (WR)
26	WG		02	3 DUP-7	TM1560	2-13-08	—		✓	GW	B	–	–	–	–	–					3	
05	WQ		03	4 Trip Blank	TM1560	2-13-08	—			W	✓	–	–	–	–	–					1	
24	WG		04	5 57MW3	TM1560	2-13-08	1815		✓	GW	B	–	–	–	–	–					3	
27	WQ		05	6 EQBK6	TM1760	2-14-08	1100			W	B	–	–	–	–	–					3	
				7																		
				8																		
				9																		
				10																		

Preservatives
A NONE pH<9
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp.

How Shipped? Hand Carrier FedEx
Tracking No.

Comments: Change Trip Blank 'collection' time to 1800 hrs. (WR)
Change DUP-7 'collection' time to 1200 hrs. (WR)

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	2-14-08	1142						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
							2-15-08	0740

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Chain of Custody Record

COC No. 122849

Page 1 of 1

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Cart: 6
VOA Rack/Tray:
Receipt Log No.: 15-7
Project Chemist: CWSR
Laboratory Project No.: E

Client Name: URS Corporation
Address: 5540 Falmouth Street, Suite 201
Richmond, VA 23230
Phone: (804) 965-9000
Fax: (804) 965-9764

Project Name: SWMU 57 RFI
Client Project No./P.O. No.: 11656421.20000
Invoice No.: ☒ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Number of Containers Submitted: SVOCs	Pest/PCB									Total	Sample Comments
											A	A										
See COC 123190			1	57MW2 MS/MSD	TM1688	2-13-08	1300		G	GW	3	6									9	
			2																			
			3																			
			4																			
			5																			
			6																			
			7																			
			8																			
			9																			
			10																			

Container Type (corresponds to Container Packing List)

PRESERVATIVES
A NONE pH~
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp

How Shipped? Hand Carrier Fed Ex
Tracking No.:

Comments:

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	2-14-08	1138						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
							2/15/08	0900

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Chain of Custody Record

COC No. 122850

Page 1 of 1

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Cart: 6
VOA Rack/Tray:
Receipt Log No.: 157
Project Chemist: WMC
Laboratory Project No.: E

Client Name: URS Corporation
Address: 5540 Falmouth Street, Suite 201
Richmond, VA 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: SWMU 57 RFI
Client Project No./P.O. No.: 11656421.20000
Invoice No.: ☑ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

A	a	B	B							
8330 Explosives	8332 Explosives	Dissolved Metals (Filtered)	Metals (Unfiltered)							

Container Type (corresponds to Container Packing List)

⇦ PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Number of Containers Submitted										Total	Sample Comments
See COC 123190			1	57 MW2 MS/MSD	TM1620	2-13-08	1300		G	W	3	3	1	1							8	
			2																			
			3																			
			4																			
			5																			
			6																			
			7																			
			8																			
			9																			
			10																			

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS CORP.

How Shipped? Hand Carrier Fed Ex
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	2-14-08	1135						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						[illegible]	2/15/08	0910

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Chain of Custody Record

COC No. 123177

Page 1 of 1

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Cart: 6
VOA Rack/Tray:
Receipt Log No.: 157
Project Chemist: WAR
Laboratory Project No.: E

Client Name: URS Corporation
Address: 5540 Fol mouth St, Ste 201
Richmond, VA 23230
Phone: 804-965-9000
Fax: 804-965-9764

Project Name: SWMU 57 RFI
Client Project No./P.O. No.: 11656421
Invoice No.: ☒ Client ☐ Other (comments)
Contact/Report To: Tim Devine

Analyses Requested

Container Type (corresponds to Container Packing List)	A	A	A	B	B						
	SVOCs	Pest/PCB 8330/8332	Meths Unfiltered	Metals Filtered							
Number of Containers Submitted	2	2	2	2	2						

⇦ PRESERVATIVES
A NONE pH~5
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Total	Sample Comments
See COC		123190	1	DUP 7	TM1708	2-13-05	—		✓	GW	10	
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

Sampled By (print): Jim Carter
Sampler's Signature:
Company: URS Corp

How Shipped? Hand Carrier: Fed Ex
Tracking No.:

Comments:

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	2-14-05	1300						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
							2/15/05	0940

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Chain of Custody Record

COC No. 122847

Page 1 of 1

For Lab Use Only
Cart: 4
VOA Rack/Tray:
Receipt Log No.: 157
Project Chemist: WSR
Laboratory Project No.: E

Client Name: URS Corporation
Address: 5540 Falmouth St., Suite 201
Richmond, VA 23230
Phone: (804) 965-9000
Fax: (804) 965-9764

Project Name: SWMU 57 RFI
Client Project No./P.O. No.: 11656421.20000
Invoice No.: ☒ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Container Type (corresponds to Container Packing List)	Number of Containers Submitted	Total	Sample Comments
		See COC 123190	1 57MW3	TM13G	2-13-08	1815		✓	GW	A A A B B	✓ ✓ ✓ ✓ ✓	10	
			2										
			3										
			4										
			5										
			6										
			7										
			8										
			9										
			10										

A = SVOCs 8330/8332 Explosives; A = Pest/PCBs; B = Metals Unfiltered; B = Metals Filtered

⇦ PRESERVATIVES
A NONE pH<2
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp.

How Shipped? Hand Carrier: Fed Ex
Tracking No.:

Comments:

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	2-14-08	1140						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						[signature]	2-15-08	0940

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Chain of Custody Record

COC No. 123175

Page 1 of 1

For Lab Use Only
Cart: 6
VOA Rack/Tray:
Receipt Log No.: 157
Project Chemist: WBR
Laboratory Project No.: E

Client Name: URS Corporation
Address: 5540 Falmouth St, Suite 201
Richmond, VA 23230
Phone: (804) 965-9000
Fax: (804) 965-9764

Project Name: SWMU 57 RFI
Client Project No./P.O. No.: 11656421.20000
Invoice No.: ☒ Client ☐ Other (comments)
Contact/Report To: Tina Perine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	SVOCs	Pest/PCB	8330/8332 Explosives	Metals unfiltered	Total	Sample Comments
		See COC 123390	1 EQ BK 6	TM0169	2-14-08	1100	✓		W	2	2	4	1	9	
			2												
			3												
			4												
			5												
			6												
			7												
			8												
			9												
			10												

Container Type (corresponds to Container Packing List)
Number of Containers Submitted

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp.

How Shipped? Hand Carrier: Fed Ex
Tracking No.:

Comments:

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	2-14-08	1150						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received for Lab By	Date	Time
							2-15-08	0910

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Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCS/LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	g	Laboratory duplicate imprecision
g	Tuning failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	h	Holding time violation
h	Holding time violation	h	Holding time violation	k	Cooler receipt temperature exceeds limits
i	Internal standard failure	i	Internal standard failure	l	LCS recovery failure
k	Cooler receipt temperature exceeds limits	k	Cooler receipt temperature exceeds limits	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination	n	Failed Signal to noise ratio		

DATA VALIDATION REPORT - Level III Review

SDG No.: R2842328 **Fraction:** Perchlorate

Lab: Columbia Analytical Services **Project Name** Radford SWMU 57

Reviewer: RA **Date:** March 4, 2008

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the Region III Modifications to the USEPA National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical method employed and provisions of the approved project-specific QAPP.

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: On the basis of this evaluation, the laboratory appears to have followed the specified method. All data are usable for their intended purpose based on the data reviewed.

Signed: Rayen

SDG #:57MW3
SUBMISSION R2842328
CLIENT: URS Corp.
CLIENT REP: Michael Perry
PROJECT: SWMU 57RFI/CMS

BATCH COMPLETE: __yes_____
DISKETTE REQUESTED: Y_X__ N____
DATE: 2/19/08
CUSTODY SEAL: PRESENT
CHAIN OF CUSTODY: PRESENT

DATE REVISED:
DATE DUE: 3/07/08
PROTOCOL: SW846
SHIPPING No.:

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
1077085	EQBK2P	WATER	6850-Perchlorate	2/14/2008	2/15/08			
1077088	57MW3	WATER	6850-Perchlorate	2/13/2008	2/15/08			
1077091	57MW2 DUPS	WATER	6850-Perchlorate	2/13/2008	2/15/08			
1077093	DUP2P	WATER	6850-Perchlorate	2/13/2008	2/15/08			

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: SWMU 57RFI/CMS
Client Sample ID : EQBK2P

Date Sampled : 02/14/08 11:00 **Order #:** 1077085 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842328 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/21/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	0.20 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: SWMU 57RFI/CMS
Client Sample ID : 57MW3

Date Sampled : 02/13/08 08:15 **Order #:** 1077088 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842328 **Analytical Run** 157414

ANALYTE		MDL	PQL	RESULT	UNITS
DATE EXTRACTED	: 02/21/08				
DATE ANALYZED	: 02/21/08				
ANALYTICAL DILUTION:	1.00				
PERCHLORATE		0.080	0.20	0.16 J	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: SWMU 57RFI/CMS
Client Sample ID : 57MW2

Date Sampled : 02/13/08 13:00 **Order #:** 1077091 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842328 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/21/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	0.20 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: SWMU 57RFI/CMS
Client Sample ID : DUP2P

Date Sampled : 02/13/08 : **Order #:** 1077093 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842328 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/21/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	0.20 U	UG/L

DATA VALIDATION WORKSHEET

Perchlorate

Reviewer: RA
Date: 3/4/08
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: 57RFI
Project Number: 11054421.30000
Laboratory: Columbia Analytical
SDG No.: R28423 28
Test Name: Perchlorate
Method No.: 6850

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC?	✓		

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Do sample collection, preservation, shipping, and storage condition meet the project controlling documents?	✓		
	Action: No chemical preservation required.			✓
2.2	Have any technical holding times (28 days), determined from date of sampling to date of analysis, (including dilution or reanalysis) been exceeded? If yes, J(+)/UJ(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency? If not, note in DV report.	✓		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample]≤ 5X[associated blank].		✓	
3.3	Do any field equipment blanks blanks have positive results? If Yes, use same rules above.		✓	

Notes:

URS

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are five standards included in the calibration curve?If no apply R flags.	✓		
4.2	Are all initial calibration correlation coefficient within the control limits (r>0.99)?If no J(+), R (-)	✓		
4.3	Was an ICV analyzed and are %RSDs < 15%? If no J(+), UJ(-)	✓		
4.4	Has a continuing calibration verification been analyzed prior and after every 10 samples and at the end of the analysis sequence? Are %Ds < 25%. If no, R (-), J (+).	✓		

Notes:

5.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
5.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
5.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?(75-125% for water and soil)		✓	
5.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits (i.e., 15%)?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

6.0 Laboratory Control Sample(LCS)		Yes	No	NA
6.1	Is the LCS recovery form present?	✓		
6.2	Was LCS analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
6.3	Is the %R for LCS outside the QC limits(85-115% for water and soil)? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).		✓	
6.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits(i.e., 15%)? If Yes, J(+) only.		✓	

Notes:

7.0 Field Duplicate		Yes	No	NA
7.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	✓		
	For sample results > 5 x RL, use 50% RPD. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 x RL for soil will be used.			
7.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV	✓		

Notes: 57MW2 and DUP2P

Both NDs ✓

8.0 Laboratory Duplicates		Yes	No	NA
8.1	Was a lab duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	✓		
8.2	Are all analyte duplicate results within control limits (i.e., RPD < 15%)? If no, J(+) only.	✓		

Notes:

9.0 Internal Standards		Yes	No	NA
9.1	Are internal standard areas of every sample and blank within +/-30% of the ICV or CCV? If no, J(+), UJ(-)	✓		
	If the IS area count criteria is not met, corrective action should be taken to resolve the problem and the entire batch should			
	be re-analyzed.			✓

10.0 Detection Limit Verification		Yes	No	NA
10.1	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	✓		
10.2	Were sample concentrations above the highest standard run at a dilution? If not, note in DV report.			✓

Notes:

11.0 Data Completeness		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit 90%)	✓		
11.2	Number of samples:			
11.3	Number of target compounds in each analysis:			
11.4	Number of results rejected and not reported:			
	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = 100 %.			

Notes:

CASE NARRATIVE
COMPANY: URS
PROJECT: SWMU 57RFI/CMS
SUBMISSION #: R2842328

Samples were collected on 2/13/08 and received at CAS/Rochester on 2/15/08 in good condition at a cooler temperature of 2 °C.

PERCHLORATE ANALYSIS

Four water samples were analyzed for Perchlorate by LC/MS method 6850 with DOD modifications from the DOD Perchlorate Handbook. Values detected between the MDL and PQL have been flagged with a "J" as estimated.

All the initial and continuing calibration criteria were met for all analytes.

Site-specific QC was not requested but was done on sample 57MW2. The recoveries were and the RPD were within QC limits. The Blank Spike (LCS) and LODV spike recoveries were within QC limits.

The Laboratory Blank associated with these samples was free of contamination.

No other analytical or QC problems were encountered.

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ORGANIC QUALIFIERS

U - Indicates compound was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture.

J - Indicates an estimated value. The flag is used either when estimating a concentration for tentatively identified compounds, or when the data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit and greater than the MDL. This flag is also used for DoD instead of "P" as indicated below.

N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search.

P - This flag is used for a pesticide/Aroclor target analyte when there is a greater than 40% (25% for CLP) difference for detected concentrations between the two GC columns. The concentration is reported on the Form 1 and flagged with a "P" ("J" for DoD).

Q - for DoD only – indicates a pesticide/Aroclor target is not confirmed. This flag is used when there is ≥ 100% difference for the detected concentrations between the two GC columns.

C - This flag applies to pesticide results where the identification has been confirmed by GC/MS.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

D - This flag identifies all compounds identified in an analysis at a secondary dilution factor. If a sample or extract is re-analyzed at a higher dilution factor, as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and ALL concentration values reported on that Form I are flagged with the "D" flag.

A - This flag indicates that a TIC is a suspected aldol-condensation product.

X - As specified in Case Narrative.

* - This flag identifies compounds associated with a quality control parameter which exceeds laboratory limits.

CAS/Rochester Lab ID # for State Certifications

NELAP Accredited
Delaware Accredited
Connecticut ID # PH0556
Florida ID # E87674
Illinois ID #200047
Maine ID #NY0032
Massachusetts ID # M-NY032
Navy Facilities Engineering Service Center Approved
Nebraska Accredited
New Jersey ID # NY004
New York ID # 10145
New Hampshire ID # 294100 A/B
Pennsylvania ID# 68-786
Rhode Island ID # 158
West Virginia ID # 292

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

Columbia Analytical Services INC.
An Employee - Owned Company
www.caslab.com

One Mustard St., Suite 250 • Rochester, NY 14609-0859 • (585) 288-5380 • 800-695-7222 x11 • FAX (585) 288-8475 PAGE 1 OF 1

SR #

CAS Contact

Project Name ~~57AA~~ SWMU 57 RFI	Project Number 11656421
Project Manager Tina Devine	Report CC
Company/Address URS Corporation 5540 Falmouth St., Suite 201 Richmond, VA 23230	
Phone # 804-965-9000	FAX# 804-965-9764
Sampler's Signature	Sampler's Printed Name Jim Carter

ANALYSIS REQUESTED *(Include Method Number and Container Preservative)*

PRESERVATIVE

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	GC/MS VOA's ☐ 8260 ☐ 624 ☐ CLP	GC/MS SVOA's ☐ 8270 ☐ 625 ☐ CLP	GC VOA's ☐ 8021 ☐ 601/602	PESTICIDES ☐ 8081 ☐ 608 ☐ CLP	PCB's ☐ 8082 ☐ 608 ☐ CLP	METALS, TOTAL (List in comments below)	METALS, DISSOLVED (List in comments below)	Perchlorate							REMARKS/ ALTERNATE DESCRIPTION
EQBK2P		2-14-08	1100	W	1								✓							
~~57MW1~~ 57MW3		2-13-08	~~1035~~ 815	W	1								✓							
57MW2		2-13-08	1300	W	1								✓							
57MW2 MS/MSD		2-13-08	1300	W	1								✓							
DUP2P		2-13-08	—	W	1								✓							
													✓							
													✓							
													✓							
													✓							
													✓							

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

SPECIAL INSTRUCTIONS/COMMENTS
Metals

See QAPP ☐

TURNAROUND REQUIREMENTS
___ RUSH (SURCHARGES APPLY)
___ 24 hr ___ 48 hr ___ 5 day
✓ STANDARD
REQUESTED FAX DATE
REQUESTED REPORT DATE

REPORT REQUIREMENTS
___ I. Results Only Per Contract
___ II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
___ III. Results + QC and Calibration Summaries
___ IV. Data Validation Report with Raw Data
___ V. Specialized Forms / Custom Report
Edata ___ Yes ___ No

INVOICE INFORMATION
PO#
BILL TO:
L2842328
SUBMISSION #:

SAMPLE RECEIPT: CONDITION/COOLER TEMP: 2°C CUSTODY SEALS: Y N

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature Jim Carter	Signature Gregory O. Esmerian	Signature	Signature	Signature	Signature
Printed Name Jim Carter	Printed Name	Printed Name	Printed Name	Printed Name	Printed Name
Firm URS Corp	Firm CAS	Firm	Firm	Firm	Firm
Date/Time 02-14-08 1215	Date/Time 2-15-08 9:35	Date/Time	Date/Time	Date/Time	Date/Time

SCOC-1102-08

Distribution: White - Return to Originator; Yellow - Lab Copy; Pink - Retained by Client