ANNUAL GROUNDWATER MONITORING REPORT

HAZARDOUS WASTE MANAGEMENT UNITS 5,7,10, AND 16 CALENDAR YEAR 2008

RADFORD ARMY AMMUNITION PLANT RADFORD, VIRGINIA

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February 2009

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DAA Project Number: B03204-06

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1.0 INTRODUCTION

This document presents the Annual Groundwater Monitoring Report for calendar year 2008 for Hazardous Waste Management Units (HWMUs) 5, 7, 10, and 16 located at the Radford Army Ammunition Plant (Radford AAP) in Radford, Virginia. The Annual Groundwater Monitoring Report was compiled in accordance with the requirements specified in the Final Hazardous Waste Post-Closure Care Permit dated October 4, 2002, for HWMUs 5, 7, 10, and 16.

The Annual Groundwater Monitoring Report presents the following set of information for each Unit: basic information and unit identification, a description of the groundwater monitoring plan, a discussion of groundwater movement, potentiometric surface maps, a table of groundwater elevations, and detailed statistical evaluations of the analytical data.

Please note that the sampling frequency for HWMUs 5, 7, 10, and 16 was changed from quarterly to semiannual in the VDEQ-approved Class 1 Permit Modification dated June 14, 2007. Therefore, this Annual Groundwater Monitoring Report evaluates the analytical data from Second Quarter 2008 and Fourth Quarter 2008 for each Unit.

1.1 HWMU-5

HWMU-5 is a closed lined neutralization pond. The Unit received certification for closure in 1989. As stated in Permit Condition I.K.1 of the Final Post-Closure Care Permit, the Compliance Period during which the Groundwater Protection Standard applies to HWMU-5 is 19 years, beginning on the effective date of the original Post-Closure Care Permit for HWMU-5 (October 28, 2001) and continuing until October 28, 2020. This report is the seventh complete Annual Groundwater Monitoring Report submitted to the Virginia Department of Environmental Quality (VDEQ) for this Unit during the Compliance Period.

1.2 HWMU-7

HWMU-7 is a closed unlined holding and neutralization basin. The Unit received certification for closure in 1990. As stated in Permit Condition I.K.2, the Compliance Period during which the Groundwater Protection Standard applies to HWMU-7 is 18 years, beginning on the effective date of the original Post-Closure Care Permit for HWMU-7 (October 30, 1999) and continuing until October 30, 2017. This report is the ninth complete Annual Groundwater Monitoring Report submitted to the VDEQ for this Unit during the Compliance Period.

1.3 HWMU-10

HWMU-10 is a closed equalization basin for the biological treatment system. The Unit received certification for closure in 1998. As stated in Permit Condition I.K.3, the Compliance Period during which the Groundwater Protection Standard applies to HWMU-10 is 18 years, beginning on the effective date of the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Management Units 5, 7, 10, and 16 (October 4, 2002) and continuing until October 4, 2020. This report is the seventh Annual Groundwater Monitoring Report submitted to the VDEQ for this Unit during the Compliance Period.

1.4 HWMU-16

HWMU-16 is a closed hazardous waste landfill. The Unit received certification for closure in 1993. As stated in Permit Condition I.K.4, the Compliance Period during which the Groundwater Protection Standard applies to HWMU-16 is 13 years, beginning on the effective date of the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Management Units 5, 7, 10, and 16 (October 4, 2002) and continuing until October 4, 2015. This report is the seventh Annual Groundwater Monitoring Report submitted to the VDEQ for this Unit during the Compliance Period.

2.0 HWMU-5 ANNUAL GROUNDWATER MONITORING REPORT

2.1 Waste Management Unit Information

Unit Name: Hazardous Waste Management Unit 5 (HWMU-5)
Owner/Operator: United States Army/Alliant Techsystems Inc.

Unit Location: Radford AAP Main Plant Area, Radford, Virginia

Class: Hazardous Waste Management Unit
Type: Closed Lined Neutralization Pond

2.2 Groundwater Monitoring Plan

Monitoring Network:

Upgradient Well:	5W8B
Point of Compliance Wells:	5W5B, 5W7B, 5WC21, 5WC22, 5WC23
Plume Monitoring Wells:	S5W5, S5W7, 5W9A, 5W10A, 5W11A
Observation Wells:	5WCA, S5W6, S5W8, 5WC11, 5WC22

Monitoring Status: Compliance Monitoring Program

CY 2008 Monitoring Events:

Second Quarter 2008:	April 28-30, 2008
Fourth Quarter 2008:	October 27-29, 2008

2.3 Groundwater Movement

The monitoring wells at HWMU-5 are screened entirely within either weathered carbonate bedrock residuum or alluvium or across the weathered residuum/carbonate bedrock interface. The static water level measurements gathered during the 2008 semiannual monitoring events are summarized in **Table 1**. Groundwater fluctuations ranged from 1.95 to 5.5 feet during the 2008 groundwater monitoring events. As shown on the HWMU-5 Potentiometric Surface Maps (**Appendix A-1**), groundwater movement beneath the site is generally to the northeast.

Darcian flow conditions were assumed for the alluvium, residuum, and carbonate bedrock beneath HWMU-5. As a result, the groundwater velocities were calculated by multiplying the hydraulic conductivity (determined from previously conducted slug tests) by the average hydraulic gradient across the site and dividing by an assumed effective porosity for the aquifer. The average hydraulic gradient was determined by superimposing three evenly spaced flow line vectors over the potentiometric surface map, measuring their lengths, calculating the head differential over the distances measured, and dividing the head differential by the length of the flow line vectors. The three calculated gradients were then averaged to a single value. Using this method, the average groundwater hydraulic gradient across the site based on Fourth Quarter 2008 groundwater elevations was calculated to be 0.031 ft/ft. Historical slug test data for the site yielded an average hydraulic conductivity of 5.25×10^{-5} ft/second. This value is consistent with

literature values for carbonate rock and for clayey, silty sand and gravel alluvium and residuum (Domenico and Schwartz, 1990).

The estimated groundwater velocity across the site was calculated to be approximately 0.35 ft/day or 128 ft/year based on the following:

- Average hydraulic conductivity of 5.25 x 10^{-5} ft/second.
- Average hydraulic gradient of 0.031 ft/ft.
- Assumed effective porosity of 0.40, based on a representative range of porosities for carbonate rock, weathered residuum, and clayey, silty sand and gravel alluvium (Domenico and Schwartz, 1990).

The actual groundwater flow velocities in the carbonate bedrock may vary as much as one to two orders of magnitude from the velocity presented above depending on water level conditions and the distribution of solution features.

2.4 Groundwater Analytical Data Evaluation

The groundwater samples collected from the compliance monitoring network during the 2008 semiannual monitoring events were analyzed for the constituents listed in Appendix E to Attachment 2 of the Final Post-Closure Care Permit, plus chromium, diethyl ether, 2-nitroaniline, 4-nitroaniline, and nitrobenzene (which were added to the constituent list for HWMU-5 following Fourth Quarter 2003) and dichlorodifluoromethane (which was added to the constituent list following Third Quarter 2006). In addition, groundwater samples were collected from the upgradient well and the point of compliance wells for the annual monitoring for the constituents listed in Appendix IX of 40 CFR Part 264. The laboratory analytical results for the 2008 monitoring events are included in **Appendix A-2** (point of compliance wells) and in **Appendix A-3** (plume monitoring wells). The laboratory analytical results for the 2008 monitoring events are included on CD-ROM in **Appendix E**. The analytical data were validated in accordance with SW-846, *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. Data validation reports are included in **Appendix E**. Copies of field notes recorded during sample collection are included in **Appendix F**.

2.4.1 Comparison to Groundwater Protection Standards

As specified in Permit Condition V.J.1.i, the 2008 groundwater analytical data for the upgradient well and the point of compliance wells were compared to the Groundwater Protection Standards (GPSs) for HWMU-5 listed in Appendix G of Permit Attachment 2. In accordance with Permit Condition V.I.2, Radford AAP performed a simple empirical comparison of the upgradient well and the point of compliance well data to GPSs (**Appendix A-2**).

As shown in **Appendix A-2**, no inorganic constituents were detected at concentrations greater than their respective GPSs.

As also shown in **Appendix A-2**, concentrations of trichloroethene (TCE) greater than the GPS of 5 µg/l were detected in point of compliance well 5W5B during each semiannual monitoring event in 2008. These data are consistent with previous monitoring events for HWMU-5. No other organic constituents were detected at concentrations greater than their GPSs during the 2008 semiannual monitoring events.

Radford AAP has concluded investigations for TCE in and around HWMU-5 and a corrective action program has been developed to address TCE at HWMU-5. A permit modification request for corrective action that includes the proposed corrective action plan was submitted by letter dated December 17, 2008. The permit modification fee was submitted by letter dated December 8, 2008.

2.4.2 Comparison to Background Concentrations

As specified in Permit Condition V.O, the 2008 groundwater analytical data for the plume monitoring wells were compared to the background concentrations for HWMU-5 listed in Appendix F of Permit Attachment 2. In accordance with Permit Condition V.I.2, Radford AAP performed a simple empirical comparison of the plume monitoring well data to the background concentrations (**Appendix A-3**).

During Second Quarter 2008, dichlorodifluoromethane initially was detected in plume monitoring well S5W7 at a concentration of 1.2 µg/l, which was greater than the site-specific background concentration of 1 µg/l. On July 17, 2008, Radford AAP collected a verification sample from well S5W7 in order to confirm or refute the detected dichlorodifluoromethane concentration. Dichlorodifluoromethane was not detected in the verification sample at a concentration greater than the site-specific background concentration.

No other constituent concentrations detected in the plume monitoring wells were greater than their respective background concentrations. In accordance with the requirements of Permit Condition V.K.3, the established background values and the computations used to determine the background values are included in **Appendix A-4**. The background values and associated computations are taken from the Groundwater Quality Assessment Report for HWMU-5 dated August 1999.

2.4.3 Annual Monitoring for Constituents Listed in Appendix IX of 40 CFR Part 264

During Second Quarter 2008, the groundwater samples collected from the upgradient well and the point of compliance wells were analyzed for the constituents listed in Appendix IX to 40 CFR Part 264 in accordance with Permit Condition V.J.1.e. No additional Appendix IX constituents, which are not listed in Appendix E of Permit Attachment 2 (Unit 5 – Groundwater Compliance Monitoring Constituent List), were detected during the Second Quarter 2008 groundwater monitoring event. Therefore, no changes to the Groundwater Monitoring List for the Unit are required.

2.5 Recommendations

Based on an evaluation of the groundwater analytical data and additional information for HWMU-5, no inorganic constituents and no organic constituents other than TCE were detected at concentrations greater than their respective GPSs during calendar year 2008. TCE was detected in point of compliance well 5W5B during each semiannual monitoring event in 2008 at concentrations greater than the established GPS for TCE of 5 µg/l but within the range of historical detections. Radford AAP has concluded investigations for TCE in and around HWMU-5 and a corrective action program has been developed to address TCE at HWMU-5. A permit modification request for corrective action that includes the proposed corrective action plan was submitted in December 2008. The permit modification fee was submitted by letter dated December 8, 2008.

3.0 HWMU-7 ANNUAL GROUNDWATER MONITORING REPORT

3.1 Waste Management Unit Information

Unit Name: Hazardous Waste Management Unit 7 (HWMU-7)
Owner/Operator: United States Army/Alliant Techsystems Inc.

Unit Location: Radford AAP Main Plant Area, Radford, Virginia

Class: Hazardous Waste Management Unit
Type: Closed Unlined Holding and Neutralization Basin

3.2 Groundwater Monitoring Plan

Monitoring Network:

Upgradient Well:	7W12B
Point of Compliance Wells:	7WCA, 7MW6, 7W11B
Plume Monitoring Wells:	7W9C, 7W10B, 7W10C, 7W13
Observation Wells:	7MW5, 7W9B, 7W11

Monitoring Status: Compliance Monitoring Program

CY 2008 Monitoring Events:

Second Quarter 2008:	April 22-23, 2008
Fourth Quarter 2008:	October 22-23, 2008

3.3 Groundwater Movement

The monitoring wells at HWMU-7 are screened entirely within alluvium, weathered carbonate bedrock residuum, or carbonate bedrock or across the interfaces between two of the listed strata. The static water level measurements gathered during the 2008 semiannual monitoring events are summarized in **Table 2**. Groundwater fluctuations ranged from 0 to 2.3 feet annually. As shown on the HWMU-7 Potentiometric Surface Maps (**Appendix B-1**), groundwater movement beneath the site is generally to the west towards the New River and to the northeast and southwest toward the unnamed intermittent drainages that flow into the New River north and south of the site.

Darcian flow conditions were assumed for the alluvium, residuum, and carbonate bedrock beneath HWMU-7. As a result, the groundwater velocities were calculated by multiplying the hydraulic conductivity (determined from previously conducted slug tests) by the average hydraulic gradient across the site, and dividing by an assumed effective porosity for the aquifer materials. The average hydraulic gradient was determined by superimposing three evenly spaced flow line vectors over the potentiometric surface map, measuring their lengths, calculating the head differential over the distances measured, and dividing the head differential by the length of the flow line vectors. The three calculated gradients were then averaged to a single value. Using this method, the average groundwater hydraulic gradient across the site

based on the Fourth Quarter 2008 groundwater elevations was calculated to be 0.009 ft/ft. Historical slug test data for the site yielded an average hydraulic conductivity of 5.1 x 10^{-6} ft/second. This value is consistent with literature values for carbonate rock and for clayey, silty sand and gravel alluvium and residuum (Domenico and Schwartz, 1990).

The estimated groundwater velocity across the site was calculated to be approximately 9.91 x 10^{-3} ft/day or 3.6 ft/year, based on the following:

- Average hydraulic conductivity of 5.1 x 10^{-6} ft/second.
- Average hydraulic gradient of 0.009 ft/ft.
- Assumed effective porosity of 0.40, based on a representative range of porosities for carbonate rock, weathered residuum, and clayey, silty sand and gravel alluvium (Domenico and Schwartz, 1990).

The actual groundwater flow velocities in the carbonate bedrock may vary as much as one to two orders of magnitude from the velocity presented above depending on water level conditions and the distribution of solution features.

3.4 Groundwater Analytical Data Evaluation

The groundwater samples collected from the compliance monitoring network during the 2008 semiannual monitoring events were analyzed for the constituents listed in Appendix E to Attachment 3 of the Final Post-Closure Care Permit, plus copper (which was added to the constituent list for HWMU-7 following Third Quarter 2003) and zinc (which was added to the constituent list for HWMU-7 following Second Quarter 2004). In addition, groundwater samples were collected from the upgradient well and the point of compliance wells for the annual monitoring for the constituents listed in Appendix IX of 40 CFR Part 264. The laboratory analytical results for the 2008 monitoring events are included in **Appendix B-2** (point of compliance wells) and in **Appendix B-3** (plume monitoring wells). The laboratory analytical results for the 2008 monitoring events also are included in electronic format in **Appendix E**. The analytical data were validated in accordance with SW-846, *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. Data validation reports are included in **Appendix E**. Copies of field notes recorded during sample collection are included in **Appendix F**.

3.4.1 Comparison to Groundwater Protection Standards

As specified in Permit Condition V.J.2.i, the 2008 groundwater analytical data for the upgradient well and the point of compliance wells were compared to the GPSs for HWMU-7 listed in Appendix G of Permit Attachment 3. In accordance with Permit Condition V.I.2, Radford AAP performed a simple empirical comparison of the upgradient well and the point of compliance well data to the GPSs (**Appendix B-2**).

As shown in **Appendix B-2**, no constituents were detected at concentrations greater than their respective GPSs.

3.4.2 Comparison to Background Concentrations

As specified in Permit Condition V.O, the 2008 groundwater analytical data for the plume monitoring wells were compared to the background concentrations for HWMU-7. The original background concentrations as presented in the Groundwater Quality Assessment Report for HWMU-7 dated August 1998 are listed in Appendix F of Permit Attachment 3. However, in correspondence dated October 31, 2007, the VDEQ indicated that Radford AAP should statistically recalculate the background concentration values for HWMU-7 as part of the clean closure evaluation for the Unit. In December 2007, Draper Aden Associates recalculated background values for all plume monitoring well constituents at HWMU-7. For the calendar year 2008 semiannual monitoring events, Radford AAP performed a simple empirical comparison of the plume monitoring well data to the recalculated background concentrations (**Appendix B-3**). The recalculated background values and the computations used to determine the background values are included in **Appendix B-4**.

During Second Quarter 2008, total arsenic initially was detected in plume monitoring well 7W13 at a concentration of 10.5 µg/l, which was greater than the site-specific background concentration of 10 µg/l. On July 17, 2008, Radford AAP collected verification samples from well 7W13 in order to confirm or refute the detected arsenic concentration. Total arsenic was not detected in the verification samples at concentrations greater than the site-specific background concentration.

As shown in **Appendix B-3**, total barium concentrations detected in plume monitoring wells 7W10B and 7W10C during each 2008 semiannual monitoring event were greater than the background concentration of 41 µg/l. However, all of the total barium concentrations detected in wells 7W10B and 7W10C were more than an order of magnitude below the USEPA MCL for barium of 2,000 µg/l. Higher total barium concentrations in downgradient plume monitoring wells relative to background at HWMU-7 may be the result of natural variations in trace element distribution in groundwater. In addition, these concentrations are consistent with previous barium concentrations detected these wells.

During Second Quarter 2008, total cobalt was detected in plume monitoring wells 7W9C and 7W13 at concentrations greater than the site-specific background concentration of 5 µg/l. On July 17, 2008, Radford AAP collected verification samples from wells 7W9C and 7W13 in order to confirm or refute the detected cobalt concentrations. Total cobalt was not detected in the verification sample collected from well 7W9C. The July 2008 verification sample for well 7W13 confirmed the Second Quarter 2008 total cobalt concentration of 5.8 µg/l. Similarly, total cobalt was detected in plume monitoring well 7W13 during Fourth Quarter 2008 at a concentration greater than the site-specific background concentration. On December 17, 2008, Radford AAP collected a verification sample from well 7W13, which confirmed the Fourth Quarter 2008 total cobalt concentration of 12 µg/l. However, the total cobalt concentrations detected in well 7W13 are more than an order of magnitude below the permit-specified GPS for cobalt of 313 µg/l. A higher total cobalt concentration in downgradient plume monitoring well 7W13 relative to background at HWMU-7 may be the result of natural variations in trace

element distribution in groundwater. In addition, the total cobalt concentrations detected in well 7W13 are consistent with previous cobalt concentrations detected in this well.

No other constituent concentrations detected in the plume monitoring wells were greater than their respective background concentrations.

3.4.3 Annual Monitoring for Constituents Listed in Appendix IX of 40 CFR Part 264

During Second Quarter 2008, the groundwater samples collected from the upgradient well and the point of compliance wells were analyzed for the constituents listed in Appendix IX to 40 CFR Part 264 in accordance with Permit Condition V.J.2.e. Upon receipt of the Second Quarter 2008 analytical data, Radford AAP notified the VDEQ of the detection in point of compliance well 7MW6 of an additional Appendix IX constituent (chloroform) which was not listed in Appendix E of Permit Attachment 3 (Unit 7 – Groundwater Compliance Monitoring Constituent List). However, Radford AAP did not verify the chloroform concentration detected in well 7MW6 based on the June 14, 2007 concurrence by the VDEQ with the Alternate Source Demonstration (ASD) for chloroform at HWMU-7 submitted on January 31, 2007, which identified an upgradient off-site source for chloroform in groundwater. Therefore, chloroform will not be added to the Groundwater Monitoring List for the Unit.

No additional Appendix IX constituents were detected during Second Quarter 2008 Therefore, no changes to the Groundwater Monitoring List for the Unit are required.

3.5 Recommendations

Based on an evaluation of the groundwater analytical data and additional information for HWMU-7, no constituents were detected at concentrations greater than their respective GPSs during calendar year 2008. Therefore, no further action is recommended at this time.

The Appendix IX constituent chloroform was detected in point of compliance well 7MW6 during Second Quarter 2008. Chloroform will not be added to the Compliance Monitoring Constituent List for HWMU-7 based on the June 14, 2007 concurrence by the VDEQ with the ASD for chloroform at HWMU-7 submitted on January 31, 2007. No additional Appendix IX constituents were detected during Second Quarter 2008; therefore, no changes to the Groundwater Monitoring List for the Unit are required.

An evaluation of the plume monitoring well data indicates that the concentrations of total barium in plume monitoring wells 7W10B and 7W10C were greater than the site-specific background concentration. As stated previously, higher total barium concentrations in downgradient plume monitoring wells relative to background at HWMU-7 may be the result of natural variations in trace element distribution in groundwater. In addition, these concentrations are consistent with previous barium concentrations detected these wells. Therefore, no further action regarding the total barium concentrations detected in plume monitoring wells 7W10B and 7W10C is recommended at this time.

An evaluation of the plume monitoring well data indicates that the concentrations of total cobalt in plume monitoring well 7W13 were greater than the site-specific background

concentration. As stated previously, a higher total cobalt concentration in downgradient plume monitoring well 7W13 relative to background at HWMU-7 may be the result of natural variations in trace element distribution in groundwater. In addition, the total cobalt concentrations detected in well 7W13 are consistent with previous cobalt concentrations detected in this well. Therefore, no further action regarding the total cobalt concentrations detected in plume monitoring well 7W13 is recommended at this time.

In correspondence to the VDEQ dated August 9, 2007, Radford AAP submitted a Class 3 permit modification for the Post-Closure Care Permit for HWMUs 5, 7, 10, and 16. The permit modification included an amended closure plan for HMWU-7. Upon incorporation of the Class 3 permit modification into the Permit, Radford AAP will finalize the closure report for HWMU-7. The closure report will include a clean closure evaluation for soil and groundwater at the Unit. Upon VDEQ approval of the closure report, HWMU-7 will be clean closed.

4.0 HWMU-10 ANNUAL GROUNDWATER MONITORING REPORT

4.1 Waste Management Unit Information

Unit Name: Hazardous Waste Management Unit 10 (HWMU-10)
Owner/Operator: United States Army/Alliant Techsystems Inc.

Unit Location: Radford AAP Main Plant Area, Radford, Virginia

Class: Hazardous Waste Management Unit
Type: Closed Equalization Basin for the Biological Treatment System

4.2 Groundwater Monitoring Plan

Monitoring Network:

Upgradient Well:	10D4
Point of Compliance Wells:	10MW1, 10DDH2R, 10D3, 10D3D
Plume Monitoring Wells:	none
Observation Wells:	none

Monitoring Status: Compliance Monitoring Program

CY 2008 Monitoring Events:

Second Quarter 2008:	April 17, 2008
Fourth Quarter 2008:	October 30, 2008

4.3 Groundwater Movement

The monitoring wells at HWMU-10 are screened either across the alluvium/limestone bedrock interface or entirely within bedrock. The static water level measurements gathered during the 2008 semiannual monitoring events are summarized in **Table 3**. Groundwater fluctuations ranged from 0.03 to 1.2 feet annually. As shown on the HWMU-10 Potentiometric Surface Maps (**Appendix C-1**), groundwater movement beneath the site is generally to the north towards the New River.

Darcian flow conditions were assumed for the alluvium and limestone bedrock beneath HWMU-10. As a result, the groundwater velocities were calculated by multiplying the hydraulic conductivity (determined from previously conducted slug tests) by the average hydraulic gradient across the site and dividing by an assumed effective porosity for the aquifer materials. The average hydraulic gradient was determined by superimposing three evenly spaced flow line vectors over the potentiometric surface map, measuring their lengths, calculating the head differential over the distances measured, and dividing the head differential by the length of the flow line vectors. The three calculated gradients were then averaged to a single value. Using this method, the average groundwater hydraulic gradient across the site based on Fourth Quarter 2008 groundwater elevations was calculated to be 0.017 ft/ft. Historical slug test data for the site yielded an average hydraulic conductivity of 4.9×10^{-4} ft/second. This value is consistent with

literature values for limestone and for clayey, silty sand and gravel alluvium (Domenico and Schwartz, 1990).

The estimated groundwater velocity across the site was calculated to be approximately 1.8 ft/day or 657 ft/year, based on the following:

- Average hydraulic conductivity of 4.9×10^{-4} ft/second.
- Average hydraulic gradient of 0.017 ft/ft.
- Assumed effective porosity of 0.40, based on a representative range of porosities for limestone and for clayey, silty sand and gravel alluvium (Domenico and Schwartz, 1990).

The actual groundwater flow velocities in the carbonate bedrock may vary as much as one to two orders of magnitude from the velocity presented above depending on water level conditions and the distribution of solution features.

4.4 Groundwater Analytical Data Evaluation

The groundwater samples collected from the compliance monitoring network during the 2008 semiannual monitoring events were analyzed for the constituents listed in Appendix E to Attachment 4 of the Final Post-Closure Care Permit, plus cobalt and vanadium (which were added to the constituent list for HWMU-10 following Second Quarter 2004) and acetone and 2-propanol (which were added to the constituent list for HMWU-10 following Second Quarter 2005). In addition, groundwater samples were collected from the upgradient well and the point of compliance wells for the annual monitoring for the constituents listed in Appendix IX of 40 CFR Part 264. The laboratory analytical results for the 2008 monitoring events are included in **Appendix C-2**. The laboratory analytical results for the 2008 monitoring events also are included in electronic format in **Appendix E**. The analytical data were validated in accordance with SW-846, *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. Data validation reports are included in **Appendix E**. Copies of field notes recorded during sample collection are included in **Appendix F**.

4.4.1 Comparison to Groundwater Protection Standards

As specified in Permit Condition V.J.3.i, the 2008 groundwater analytical data for the upgradient well and the point of compliance wells were compared to GPSs for HWMU-10 listed in Appendix G of Permit Attachment 4. In accordance with Permit Condition V.I.2, Radford AAP performed a simple empirical comparison of the upgradient well and the point of compliance well data to the GPSs (**Appendix C-2**). As shown in **Appendix C-2**, none of the constituent concentrations detected in the upgradient well and in the point of compliance wells were greater than their respective GPSs.

4.4.2 Comparison to Background Concentrations

Only the analytical data from plume monitoring wells are compared to background concentrations. However, the compliance monitoring network at HWMU-10 is composed entirely of point of compliance wells. Therefore, the analytical data from HWMU-10 is not compared to background concentrations.

4.4.3 Annual Monitoring for Constituents Listed in Appendix IX of 40 CFR Part 264

During Second Quarter 2008, the groundwater samples collected from the upgradient well and the point of compliance wells were analyzed for the constituents listed in Appendix IX to 40 CFR Part 264 in accordance with Permit Condition V.J.3.e. Upon receipt of the Second Quarter 2008 analytical data, Radford AAP notified the VDEQ of the detection of two additional Appendix IX constituents (chlordane and diethyl phthalate) that were not listed in Appendix E of Permit Attachment 4 (Unit 10 – Groundwater Compliance Monitoring Constituent List). In accordance with Permit Condition V.J.3.e.(1), Radford AAP resampled the subject well (10MW1) for the detected constituents in order to confirm or refute the additional Appendix IX constituent detections. Chlordane and diethyl phthalate were not confirmed in the subject well at concentrations above their respective detection limits. As a result, chlordane and diethyl phthalate will not be added to the Groundwater Monitoring List for the Unit.

No additional Appendix IX constituents were detected during Second Quarter 2008. Therefore, no changes to the Groundwater Monitoring List for the Unit are required.

4.5 Recommendations

Based on an evaluation of the groundwater analytical data and additional information for HWMU-10, no constituents were detected at concentrations greater than their respective GPSs during calendar year 2008. Therefore, no further action is recommended at this time.

The Appendix IX constituents chlordane and diethyl phthalate were initially detected in compliance well 10MW1 during Second Quarter 2008. In accordance with Permit Condition V.J.3.e.(1), Radford AAP resampled the subject well for the detected constituent in order to confirm or refute the detection of the additional Appendix IX constituents. Chlordane and diethyl phthalate were not confirmed in the subject well at concentrations above their respective detection limits. As a result, chlordane and diethyl phthalate will not be added to the Groundwater Monitoring List for the Unit.

5.0 HWMU-16 ANNUAL GROUNDWATER MONITORING REPORT

5.1 Waste Management Unit Information

Unit Name: Hazardous Waste Management Unit 16 (HWMU-16)
Owner/Operator: United States Army/Alliant Techsystems Inc.

Unit Location: Radford AAP Main Plant Area, Radford, Virginia

Class: Hazardous Waste Management Unit
Type: Closed Hazardous Waste Landfill

5.2 Groundwater Monitoring Plan

Monitoring Network:

Upgradient Well:	16C1
Point of Compliance Wells:	16WC1A, 16WC1B, 16MW8, 16MW9
Plume Monitoring Wells:	16-1, 16-2, 16-3, 16-5, 16WC2B, 16SPRING
Observation Wells:	16WC2A, 16C3, 16CDH3

Monitoring Status: Compliance Monitoring Program

CY 2008 Monitoring Events:

Second Quarter 2008:	April 14-16, 2008
Fourth Quarter 2008:	October 14-16, 2008

5.3 Groundwater Movement

The monitoring wells at HWMU-16 are screened entirely within either carbonate bedrock or weathered carbonate bedrock residuum, or across the residuum/bedrock interface. The static water level measurements gathered during the 2008 semiannual monitoring events are summarized in **Table 4**. Groundwater fluctuations ranged from 0.07 to 6.7 feet annually. As shown on the HWMU-16 Potentiometric Surface Maps (**Appendix D-1**), groundwater movement beneath the site is generally to the northeast.

Darcian flow conditions were assumed for the weathered residuum and carbonate bedrock beneath HWMU-16. As a result, the groundwater velocities were calculated by multiplying the hydraulic conductivity (determined from previously conducted slug tests) by the average hydraulic gradient across the site and dividing by an assumed effective porosity for the aquifer materials. The average hydraulic gradient was determined by superimposing three evenly spaced flow line vectors over the potentiometric surface map, measuring their lengths, calculating the head differential over the distances measured, and dividing the head differential by the length of the flow line vectors. The three calculated gradients were then averaged to a single value. Using this method, the average groundwater hydraulic gradient across the site based on Fourth Quarter 2008 groundwater elevations was calculated to be 0.091 ft/ft. Historical slug test data for the site yielded an average hydraulic conductivity of 7.87×10^{-5} ft/second. This

value is consistent with literature values for carbonate rock and for clay and silt residuum (Domenico and Schwartz, 1990).

The estimated groundwater velocity across the site was calculated to be approximately 1.55 ft/day or 566 ft/year based on the following:

- Average hydraulic conductivity of 7.87 x 10^{-5} ft/second.
- Average hydraulic gradient of 0.091 ft/ft.
- Assumed effective porosity of 0.40, based on a representative range of porosities for carbonate rock and clay and silt residuum (Domenico and Schwartz, 1990).

The actual groundwater flow velocities in the carbonate bedrock may vary as much as one to two orders of magnitude from the velocity presented above depending on water level conditions and the distribution of solution features.

5.4 Groundwater Analytical Data Evaluation

The groundwater samples collected from the compliance monitoring network during the 2008 semiannual monitoring events were analyzed for the constituents listed in Appendix E to Attachment 5 of the Final Post-Closure Care Permit, plus chloroethane, diethyl ether, dimethyl ether, and methylene chloride (which were added to the constituent list for HWMU-16 following Third Quarter 2003), and 1,1,2-trichloro-1,2,2-trifluoroethane (which was added to the constituent list for HWMU-16 following Second Quarter 2004). In addition, groundwater samples were collected from the upgradient well and the point of compliance wells for the annual monitoring for the constituents listed in Appendix IX of 40 CFR Part 264. The laboratory analytical results for the 2008 monitoring events are included in **Appendix D-2** (point of compliance wells) and in **Appendix D-3** (plume monitoring wells). The laboratory analytical results for the 2008 monitoring events also are included in electronic format in **Appendix E**. The analytical data were validated in accordance with SW-846, *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. Data validation reports are included in **Appendix E**. Copies of field notes recorded during sample collection are included in **Appendix F**.

Please note that plume monitoring well 16-1 was dry during Fourth Quarter 2008; therefore, no groundwater samples were collected from plume monitoring well 16-1 during that event.

5.4.1 Comparison to Groundwater Protection Standards

As specified in Permit Condition V.J.4.i, the 2008 groundwater analytical data for the upgradient well and the point of compliance wells were compared to GPSs for HWMU-16 listed in Appendix G of Permit Attachment 5. In accordance with Permit Condition V.I.2, Radford AAP performed a simple empirical comparison of the upgradient well and the point of compliance well data to the GPSs (**Appendix D-2**).

As shown in **Appendix D-2**, no constituents were detected at concentrations greater than their respective GPSs.

5.4.2 Comparison to Background Concentrations

As specified in Permit Condition V.O, the 2008 groundwater analytical data for the plume monitoring wells were compared to the background concentrations for HWMU-16 listed in Appendix F of Permit Attachment 5. In accordance with Permit Condition V.I.2, Radford AAP performed a simple empirical comparison of the plume monitoring well data to the background concentrations (**Appendix D-3**).

As shown in **Appendix D-3**, total barium concentrations detected in plume monitoring wells 16-2, 16-3, and 16-5 and in spring sampling location 16SPRING during each 2008 semiannual monitoring event were greater than the background concentration of 175.4 µg/l. In addition, the total barium concentration detected in plume monitoring well 16-1 during Second Quarter 2008 was greater than the background concentration of 175.4 µg/l. However, all of the total barium concentrations detected in the plume monitoring wells were well below the USEPA MCL for barium of 2,000 µg/l. Furthermore, higher barium concentrations in downgradient plume monitoring wells relative to background may be the result of natural variations in trace element distribution in groundwater. As illustrated in the boring logs for the compliance network monitoring wells (Appendix H of Permit Attachment 5), upgradient well 16C1 is screened in limestone while downgradient plume monitoring wells 16-1, 16-2, 16-3, and 16-5 are screened in shale and fault breccia. Such differing lithologic formations would be expected to contain very different trace element distributions.

No other constituent concentrations detected in the plume monitoring wells were greater than their respective background concentrations. In accordance with the requirements of Permit Condition V.K.3, the established background values and the computations used to determine the background values are included in **Appendix D-4**. The background values and associated computations are taken from the Groundwater Quality Assessment Report for HWMU-16 dated August 1999.

5.4.3 Annual Monitoring for Constituents Listed in Appendix IX of 40 CFR Part 264

During Second Quarter 2008, the groundwater samples collected from the upgradient well and the point of compliance wells were analyzed for the constituents listed in Appendix IX to 40 CFR Part 264 in accordance with Permit Condition V.J.4.e. No additional Appendix IX constituents, which are not listed in Appendix E of Permit Attachment 5 (Unit 16 – Groundwater Compliance Monitoring Constituent List), were detected during the Second Quarter 2008 groundwater monitoring event. Therefore, no changes to the Groundwater Monitoring List for the Unit are required.

5.5 Recommendations

Based on an evaluation of the groundwater analytical data and additional information for HWMU-16, no constituents were detected at concentrations greater than their respective GPSs during calendar year 2008. Therefore, no further action is recommended at this time.

The evaluation of the plume monitoring well data indicated that the concentrations of total barium in plume monitoring wells 16-1, 16-2, 16-3, 16-5, and 16SPRING were greater than the site-specific background concentration. As stated previously, higher total barium concentrations in downgradient plume monitoring wells relative to background are likely due to natural variations in trace element distribution in groundwater. Upgradient well 16C1 is screened in limestone while downgradient plume monitoring wells 16-1, 16-2, 16-3, and 16-5 are screened in shale and fault breccia. Such differing lithologic formations would be expected to contain very different trace element distributions. Therefore, no further action regarding the 2008 total barium concentrations detected in plume monitoring wells 16-1, 16-2, 16-3, and 16-5 and in spring sampling location 16SPRING is recommended at this time.

SIGNATURE/CERTIFICATION

Prepared by:

Name: Ross G. Miller, Senior Project Geologist

Signature:

Company: Draper Aden Associates
Address: 2206 South Main Street
City/State/Zip: Blacksburg, Virginia 24060-6600

Virginia Professional Certification:

I certify that I have prepared or supervised preparation of the attached report, that it has been prepared in accordance with industry standards and practices, and that the information contained herein is truthful and accurate to the best of my knowledge.

Name: Michael D. Lawless, Environmental Program Manager

Signature:

Virginia Professional Certification Type and Number: PG 832
Company: Draper Aden Associates
Address: 2206 South Main Street
City/State/Zip: Blacksburg, Virginia 24060-6600

TABLES

TABLE 1
HWMU-5
GROUNDWATER ELEVATIONS - 2008
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

MONITORING WELL ID	ELEVATION TOP OF WELL	SECOND QUARTER 2008		FOURTH QUARTER 2008	
		DTW	GW ELEV	DTW	GW ELEV
5W8B	1789.58	14.46	1775.12	16.96	1772.62
5W5B	1775.13	8.81	1766.32	12.83	1762.30
5W7B	1774.78	8.93	1765.85	12.46	1762.32
5WC21	1774.43	8.89	1765.54	12.77	1761.66
5WC22	1774.45	8.87	1765.58	12.79	1761.66
5WC23	1773.84	8.35	1765.49	12.27	1761.57
S5W5	1772.31	7.36	1764.95	11.61	1760.70
S5W7	1776.08	10.85	1765.23	13.61	1762.47
5W9A	1762.20	2.12	1760.08	5.39	1756.81
5W10A	1771.40	14.58	1756.82	17.27	1754.13
5W11A	1766.20	11.09	1755.11	15.77	1750.43
5WC11	1788.92	15.93	1772.99	17.88	1771.04
5WC12	1788.96	15.63	1773.33	17.70	1771.26
5WCA	1779.05	12.92	1766.13	16.34	1762.71
S5W6	1771.43	5.55	1765.88	11.03	1760.40
S5W8	1783.68	11.68	1772.00	14.02	1769.66

NOTES:
DTW: Depth to water from top of casing.
GW ELEV: Groundwater elevation.
All elevations in feet above mean sea level.

TABLE 2
HWMU-7
GROUNDWATER ELEVATIONS - 2008
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

MONITORING WELL ID	ELEVATION TOP OF WELL	SECOND QUARTER 2008		FOURTH QUARTER 2008	
		DTW	GW ELEV	DTW	GW ELEV
7W12B	1717.31	24.86	1692.45	24.86	1692.45
7WCA	1715.40	24.85	1690.55	25.04	1690.36
7MW6	1715.30	26.05	1689.25	26.91	1688.39
7W11B	1715.90	24.97	1690.93	25.23	1690.67
7W9C	1704.45	13.79	1690.66	15.12	1689.33
7W10B	1706.65	15.30	1691.35	15.75	1690.90
7W10C	1709.30	18.88	1690.42	21.20	1688.10
7W13	1705.42	18.43	1686.99	19.45	1685.97
7W9B	1712.49	23.27	1689.22	22.75	1689.74
7MW5	1716.20	24.02	1692.18	25.05	1691.15
7W11	1714.82	24.81	1690.01	24.34	1690.48

NOTES:
DTW: Depth to water from top of casing.
GW ELEV: Groundwater elevation.
All elevations in feet above mean sea level.

TABLE 3
HWMU-10
GROUNDWATER ELEVATIONS - 2008
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

MONITORING WELL ID	ELEVATION TOP OF WELL	SECOND QUARTER 2008		FOURTH QUARTER 2008	
		DTW	GW ELEV	DTW	GW ELEV
10D4	1714.38	22.90	1691.48	22.93	1691.45
10DDH2R	1704.38	20.34	1684.04	21.28	1683.10
10D3	1702.95	18.85	1684.10	20.08	1682.87
10D3D	1702.64	18.72	1683.92	19.86	1682.78
10MW1	1703.62	18.94	1684.68	19.73	1683.89

NOTES:
DTW: Depth to water from top of casing.
GW ELEV: Groundwater elevation.
All elevations in feet above mean sea level.

TABLE 4
HWMU-16
GROUNDWATER ELEVATIONS - 2008
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

MONITORING WELL ID	ELEVATION TOP OF WELL	SECOND QUARTER 2008		FOURTH QUARTER 2008	
		DTW	GW ELEV	DTW	GW ELEV
16C1	1840.14	51.37	1788.77	50.56	1789.58
16MW8	1815.82	73.71	1742.11	74.16	1741.66
16MW9	1808.88	65.48	1743.40	67.25	1741.63
16WC1A	1812.61	68.93	1743.68	70.66	1741.95
16WC1B	1812.95	69.17	1743.78	71.16	1741.79
16-1	1815.82	53.32	1762.50	60.00	1755.82
16-2	1810.99	55.78	1755.21	55.17	1755.82
16-3	1824.77	58.58	1766.19	58.51	1766.26
16-5	1742.60	3.43	1739.17	5.43	1737.17
16WC2B	1818.71	55.77	1762.94	55.42	1763.29
16WC2A	1820.05	DRY	DRY	DRY	DRY
16C3	1822.22	DRY	DRY	DRY	DRY
16CDH3	1825.60	DRY	DRY	DRY	DRY
SPRING	na	na	na	na	na

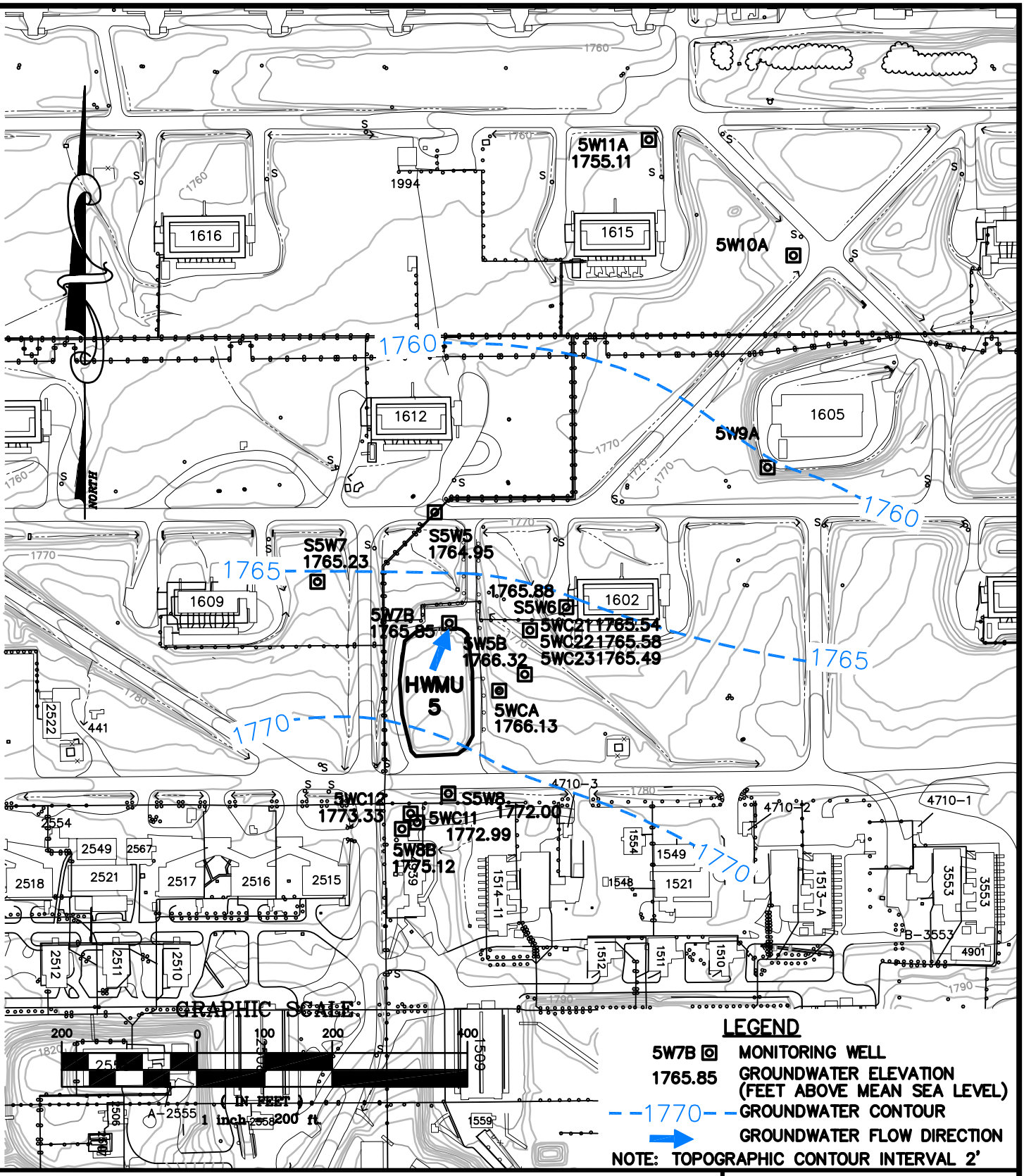
NOTES:
DTW: Depth to water from top of casing.
GW ELEV: Groundwater elevation.
All elevations in feet above mean sea level.
na: Not applicable.

APPENDIX A

HWMU-5

APPENDIX A-1

HWMU-5 POTENTIOMETRIC SURFACE MAPS
SECOND QUARTER 2008
FOURTH QUARTER 2008



HWMU-5 POTENTIOMETRIC SURFACE MAP (2ND QUARTER 2008)

RADFORD ARMY AMMUNITION PLANT

RADFORD, VIRGINIA

SCALE: 1"=200'

PLAN NO. B03204-06

Draper Aden Associates

Engineering ✦ Surveying ✦ Environmental Services

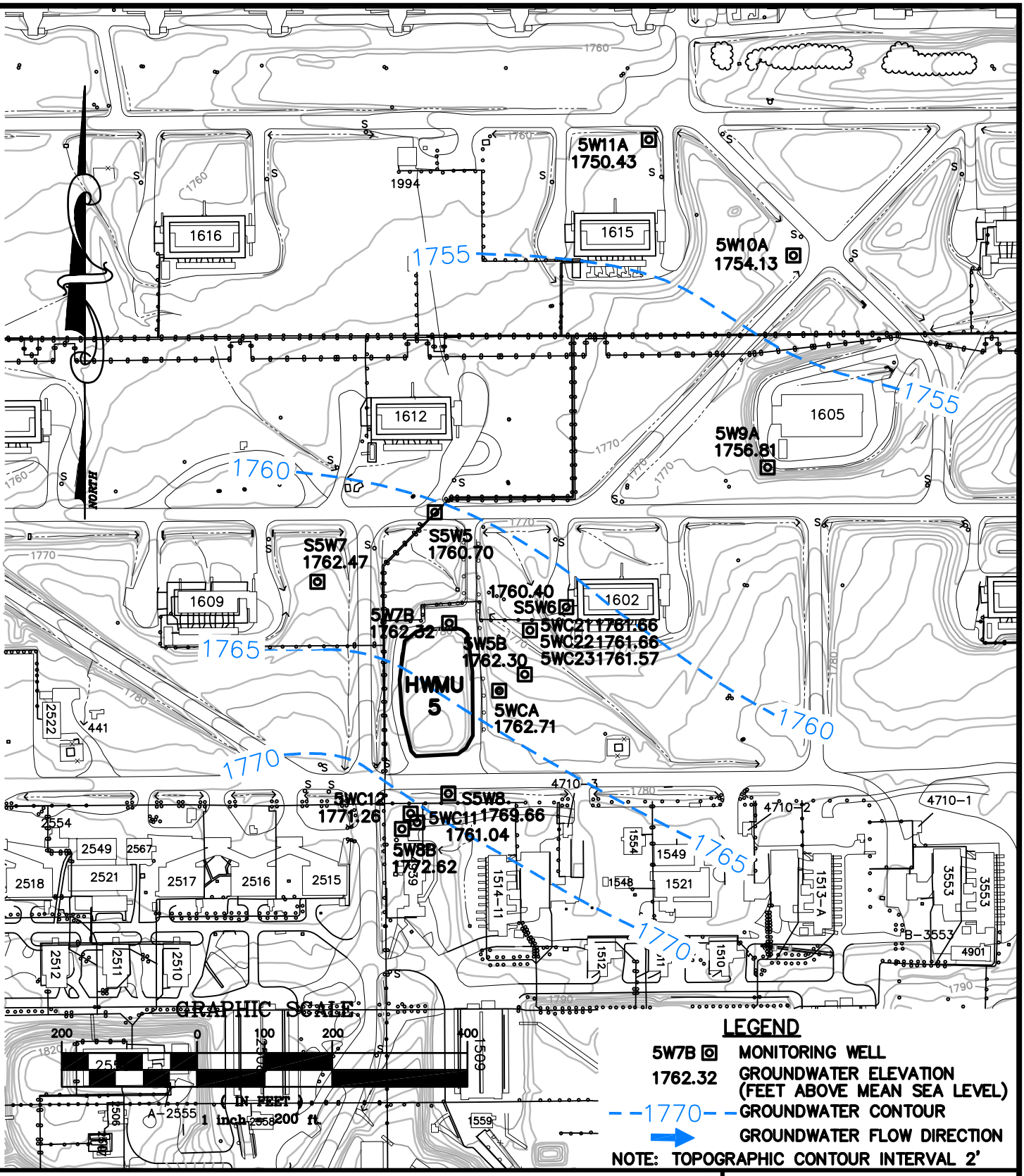
2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291

Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED	RGM
DRAWN	KKD
CHECKED	MDL
DATE	7/29/2008

FIGURE 1

P:\B03200\B03204\B03204-05\CAD\B03204-05ENV\dwg\B03204-05_HWMU-5.dwg Jan 29, 2009 9:33am



HWMU-5 POTENTIOMETRIC SURFACE MAP (4TH QUARTER 2008)

RADFORD ARMY AMMUNITION PLANT

RADFORD, VIRGINIA

SCALE: 1"=200'

PLAN NO. B03204-06

Draper Aden Associates

Engineering ✦ Surveying ✦ Environmental Services

2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291

Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED	RGM
DRAWN	KKD
CHECKED	MDL
DATE	01/07/09

FIGURE 1

P:\B03200\B03204\B03204-05\CAD\B03204-05ENV\dwg\B03204-05_HWMU-5.dwg Jan 29, 2009 10:50am

APPENDIX A-2

HWMU-5 2008 LABORATORY ANALYTICAL RESULTS
POINT OF COMPLIANCE WELLS

Target Analyte Monitoring Results - HWMU-5 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 5W8B

All Results in ug/L.

Analyte/Quarter	*5W8B Q*	*5W5B Q*	*5W7B Q*	*5WC21 Q*	*5WC22 Q*	*5WC23 Q*	*QL*	*GPS*	*Method*
Antimony						*CAS #* 7440-36-0			
Second Quarter 2008	U	U	0.79 J	U	U	U	1	6	6020
Fourth Quarter 2008	U	U	U	U	U	U	1	6	6020
Arsenic						*CAS #* 7440-38-2			
Second Quarter 2008	U	U	U	U	U	U	10	50	6020
Fourth Quarter 2008	U	U	U	U	U	U	10	50	6020
Barium						*CAS #* 7440-39-3			
Second Quarter 2008	115	39.7	37.3	14.2	34.6	25.4	10	2000	6020
Fourth Quarter 2008	112	54.8	53.3	15.6	30.3	27.2	10	2000	6020
Beryllium						*CAS #* 7440-41-7			
Second Quarter 2008	U	U	0.63 J	1.9	U	U	1	4	6020
Fourth Quarter 2008	U	U	U	2.1	U	U	1	4	6020
Cadmium						*CAS #* 7440-43-9			
Second Quarter 2008	U	U	U	0.56 J	0.37 J	0.23 J	1	5	6020
Fourth Quarter 2008	U	U	U	U	U	U	1	5	6020
Chromium						*CAS #* 7440-47-3			
Second Quarter 2008	U	U	3 J	7.4	U	U	5	100	6020
Fourth Quarter 2008	U	U	U	8.6	U	U	5	100	6020
Cobalt						*CAS #* 7440-48-4			
Second Quarter 2008	1.3 J	U J	11 J	62.7 J	16.9 J	3 J	5	313	6020
Fourth Quarter 2008	U	U	12.4	71.2	U	U	5	313	6020
Copper						*CAS #* 7440-50-8			
Second Quarter 2008	U	1.2 J	4.9 J	6.1	U	U	5	1300	6020
Fourth Quarter 2008	U	U	6.3	5.9	U	U	5	1300	6020
Lead						*CAS #* 7439-92-1			
Second Quarter 2008	U	U	1.7	U	U	U	1	15	6020
Fourth Quarter 2008	U	U	2.9 J	U	U	U	1	15	6020
Mercury						*CAS #* 7439-97-6			
Second Quarter 2008	U	U	U	U	U	U	2	2	7470A
Fourth Quarter 2008	U	U	U	U	U	U	2	2	7470A
Nickel						*CAS #* 7440-02-0			
Second Quarter 2008	U	U	11.6	39.5	10.5	4.4 J	10	313	6020
Fourth Quarter 2008	U	U	12.5	36.2	U	U	10	313	6020
Selenium						*CAS #* 7782-49-2			
Second Quarter 2008	U	11.2	U	U	U	U	10	50	6020
Fourth Quarter 2008	U	U	U	U	U	U	10	50	6020
Silver						*CAS #* 7440-22-4			
Second Quarter 2008	U	U	U	U	U	U	2	78.25	6020
Fourth Quarter 2008	U	U	U	U	U	U	2	78.25	6020
Thallium						*CAS #* 7440-28-0			
Second Quarter 2008	U	U	U	U	U	U	1	2	6020
Fourth Quarter 2008	U	U	U	U	U	U	1	2	6020
Tin						*CAS #* 7440-31-5			
Second Quarter 2008	U	U	U	U	U	U	5	-	6020
Vanadium						*CAS #* 7440-62-2			
Second Quarter 2008	U	U	U	U	U	U	10	109.55	6020
Fourth Quarter 2008	U	U	U	U	U	U	10	109.55	6020
Zinc						*CAS #* 7440-66-6			
Second Quarter 2008	5 J	8.6 J	30.1	43.9	U	3.5 J	10	4695	6020
Fourth Quarter 2008	U	10.5	30	33.8	U	U	10	4695	6020

See last page of this report for definitions.

Target Analyte Monitoring Results - HWMU-5 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 5W8B

All Results in ug/L.

Analyte/Quarter	*5W8B Q*	*5W5B Q*	*5W7B Q*	*5WC21 Q*	*5WC22 Q*	*5WC23 Q*	*QL*	*GPS*	*Method*
Sulfide						*CAS #* 18496-25-8			
Second Quarter 2008	U	U	U	U	U	U	1000	-	9034
Cyanide						*CAS #* 57-12-5			
Second Quarter 2008	U	U	U	U	U	U	20	-	9014
Acenaphthene						*CAS #* 83-32-9			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Acenaphthylene						*CAS #* 208-96-8			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Acetone						*CAS #* 67-64-1			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	10	223.57	8260B
Fourth Quarter 2008	U	U	U	U	U	U	10	223.57	8260B
Acetonitrile						*CAS #* 75-05-8			
Second Quarter 2008	U	U	U	U	U	U	100	-	8260B
Acetophenone						*CAS #* 98-86-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
2-Acetylaminofluorene						*CAS #* 53-96-3			
Second Quarter 2008	U	U	U	U	U	U	30	-	8270C
Acrolein						*CAS #* 107-02-8			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	10	-	8260B
Acrylonitrile						*CAS #* 107-13-1			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	1	-	8260B
Aldrin						*CAS #* 309-00-2			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	0.025	-	8081A
Allyl chloride						*CAS #* 107-05-1			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	1	-	8260B
4-Aminobiphenyl						*CAS #* 92-67-1			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Aniline						*CAS #* 62-53-3			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Anthracene						*CAS #* 120-12-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Aramite						*CAS #* 140-57-8			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Benzene						*CAS #* 71-43-2			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Benzo[a]anthracene						*CAS #* 56-55-3			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Benzo[b]fluoranthene						*CAS #* 205-99-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Benzo[k]fluoranthene						*CAS #* 207-08-9			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Benzo[ghi]perylene						*CAS #* 191-24-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Benzo(a)pyrene						*CAS #* 50-32-8			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
1,4-Benzenediamine						*CAS #* 106-50-3			
Second Quarter 2008	U	U	U	U	U	U	50	-	8270C
Benzyl alcohol						*CAS #* 100-51-6			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C

Target Analyte Monitoring Results - HWMU-5 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 5W8B

All Results in ug/L.

Analyte/Quarter	*5W8B Q*	*5W5B Q*	*5W7B Q*	*5WC21 Q*	*5WC22 Q*	*5WC23 Q*	*QL*	*GPS*	*Method*
alpha-BHC						*CAS # 319-84-6*			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
beta-BHC						*CAS # 319-85-7*			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
delta-BHC						*CAS # 319-86-8*			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
gamma-BHC						*CAS # 58-89-9*			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
bis(2-Chloroethoxy)methane						*CAS # 111-91-1*			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
bis(2-Chloroethyl)ether						*CAS # 111-44-4*			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
bis(2-Chloro-1-methylethyl)ether						*CAS # 108-60-1*			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
bis(2-Ethylhexyl)phthalate						*CAS # 117-81-7*			
Second Quarter 2008	U	U	U	U	U	U	6	10	8270C
Fourth Quarter 2008	U	U	U	U	U	U	6	10	8270C
Bromobenzene						*CAS # 108-86-1*			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Bromochloromethane						*CAS # 74-97-5*			
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
Bromodichloromethane						*CAS # 75-27-4*			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Bromoform						*CAS # 75-25-2*			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
4-Bromophenyl phenyl ether						*CAS # 101-55-3*			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
2-Butanone						*CAS # 78-93-3*			
Second Quarter 2008	U	U	U	U	U	U	10	691.08	8260B
Fourth Quarter 2008	U	U	U	U	U	U	10	691.08	8260B
n-Butyl alcohol						*CAS # 71-36-3*			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	200	-	8260B
tert-Butyl alcohol						*CAS # 75-65-0*			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	20	-	8260B
n-Butylbenzene						*CAS # 104-51-8*			
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
sec-Butylbenzene						*CAS # 135-98-8*			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
tert-Butylbenzene						*CAS # 98-06-6*			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Butyl benzyl phthalate						*CAS # 85-68-7*			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Carbon disulfide						*CAS # 75-15-0*			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Carbon tetrachloride						*CAS # 56-23-5*			
Second Quarter 2008	U	U	U	U	U	U	1	5	8260B
Chlordane						*CAS # 57-74-9*			
Second Quarter 2008	U	U	U	U	U	U	0.25	-	8081A

Target Analyte Monitoring Results - HWMU-5 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 5W8B

All Results in ug/L.

Analyte/Quarter	5W8B Q	5W5B Q	5W7B Q	5WC21 Q	5WC22 Q	5WC23 Q	QL	GPS	Method
p-Chloroaniline						CAS # 106-47-8			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Chlorobenzene						CAS # 108-90-7			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Chlorobenzilate						CAS # 510-15-6			
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
p-Chloro-m-cresol						CAS # 59-50-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Chloroethane						CAS # 75-00-3			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
2-Chloroethyl vinyl ether						CAS # 110-75-8			
Second Quarter 2008	U	U	U	U	U	U	5	-	8260B
Chloroform						CAS # 67-66-3			
Second Quarter 2008	U	U	U	U	U	U	1	80	8260B
Fourth Quarter 2008	U	U	1.1	U	U	U	1	80	8260B
Chloromethane						CAS # 74-87-3			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
2-Chloronaphthalene						CAS # 91-58-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
2-Chlorophenol						CAS # 95-57-8			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
4-Chlorophenyl phenyl ether						CAS # 7005-72-3			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Chloroprene						CAS # 126-99-8			
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
2-Chlorotoluene						CAS # 95-49-8			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
4-Chlorotoluene						CAS # 106-43-4			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Chrysene						CAS # 218-01-9			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Cyclohexane						CAS # 110-82-7			
Second Quarter 2008	U	U	U	U	U	U	2	-	8260B
2,4-Dichlorophenoxyacetic acid						CAS # 94-75-7			
Second Quarter 2008	U	U	U	U	U	U	5	-	8151A
4,4'-DDD						CAS # 72-54-8			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
4,4'-DDE						CAS # 72-55-9			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
4,4'-DDT						CAS # 50-29-3			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
Diallate						CAS # 2303-16-4			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Dibenz(a,h)anthracene						CAS # 53-70-3			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Dibenzofuran						CAS # 132-64-9			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Dibromochloromethane						CAS # 124-48-1			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B

Target Analyte Monitoring Results - HWMU-5 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 5W8B

All Results in ug/L.

Analyte/Quarter	*5W8B Q*	*5W5B Q*	*5W7B Q*	*5WC21 Q*	*5WC22 Q*	*5WC23 Q*	*QL*	*GPS*	*Method*
1,2-Dibromo-3-chloropropane						*CAS #* 96-12-8			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
1,2-Dibromoethane						*CAS #* 106-93-4			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Di-n-butyl phthalate						*CAS #* 84-74-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
1,2-Dichlorobenzene						*CAS #* 95-50-1			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
1,3-Dichlorobenzene						*CAS #* 541-73-1			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
1,4-Dichlorobenzene						*CAS #* 106-46-7			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
3,3'-Dichlorobenzidine						*CAS #* 91-94-1			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
trans-1,4-Dichloro-2-butene						*CAS #* 110-57-6			
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
Dichlorodifluoromethane						*CAS #* 75-71-8			
Second Quarter 2008	U	U	U	U	U	U	1	125.2	8260B
Fourth Quarter 2008	U J	U J	U J	U J	U J	U J	1	125.2	8260B
1,1-Dichloroethane						*CAS #* 75-34-3			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
1,2-Dichloroethane						*CAS #* 107-06-2			
Second Quarter 2008	U	U	U	U	U	U	1	5	8260B
Fourth Quarter 2008	U	U	U	U	U	U	1	5	8260B
1,1-Dichloroethene						*CAS #* 75-35-4			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
cis-1,2-Dichloroethene						*CAS #* 156-59-2			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
trans-1,2-Dichloroethene						*CAS #* 156-60-5			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
2,4-Dichlorophenol						*CAS #* 120-83-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
2,6-Dichlorophenol						*CAS #* 87-65-0			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
1,2-Dichloropropane						*CAS #* 78-87-5			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
1,3-Dichloropropane						*CAS #* 142-28-9			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
2,2-Dichloropropane						*CAS #* 594-20-7			
Second Quarter 2008	U	U	U	U J	U J	U J	1	-	8260B
1,1-Dichloropropene						*CAS #* 563-58-6			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
cis-1,3-Dichloropropene						*CAS #* 10061-01-5			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
trans-1,3-Dichloropropene						*CAS #* 10061-02-6			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Dieldrin						*CAS #* 60-57-1			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A

Target Analyte Monitoring Results - HWMU-5 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 5W8B

All Results in ug/L.

Analyte/Quarter	*5W8B Q*	*5W5B Q*	*5W7B Q*	*5WC21 Q*	*5WC22 Q*	*5WC23 Q*	*QL*	*GPS*	*Method*
Diethyl ether						*CAS #* 60-29-7			
Second Quarter 2008	U J	U J	U J	U	U	U	12	-	8260B
Fourth Quarter 2008	U	U	U	U	U	U	12	-	8260B
Diethyl phthalate						*CAS #* 84-66-2			
Second Quarter 2008	U	U	U	U	U	U	10	12,520	8270C
Fourth Quarter 2008	U	U	U	U	U	U	10	12,520	8270C
O,O-Diethyl O-2-pyrazinyl						*CAS #* 297-97-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Dimethoate						*CAS #* 60-51-5			
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
Dimethyl ether						*CAS #* 115-10-6			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	2	-	8260B
p-(Dimethylamino)azobenzene						*CAS #* 60-11-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
7,12-Dimethylbenz[a]anthracene						*CAS #* 57-97-6			
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
3,3'-Dimethylbenzidine						*CAS #* 119-93-7			
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
a,a-Dimethylphenethylamine						*CAS #* 122-09-8			
Second Quarter 2008	U	U	U	U	U	U	50	-	8270C
2,4-Dimethylphenol						*CAS #* 105-67-9			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	10	-	8270C
Dimethyl phthalate						*CAS #* 131-11-3			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
m-Dinitrobenzene						*CAS #* 99-65-0			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
4,6-Dinitro-o-cresol						*CAS #* 534-52-1			
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
2,4-Dinitrophenol						*CAS #* 51-28-5			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
2,4-Dinitrotoluene						*CAS #* 121-14-2			
Second Quarter 2008	U	U	U	U	U	U	10	31.3	8270C
Fourth Quarter 2008	U	U	U	U	U	U	10	31.3	8270C
2,6-Dinitrotoluene						*CAS #* 606-20-2			
Second Quarter 2008	U	U	U	U	U	U	10	15.65	8270C
Fourth Quarter 2008	U	U	U	U	U	U	10	15.65	8270C
Dinoseb						*CAS #* 88-85-7			
Second Quarter 2008	U	U	U	U	U	U	2.5	-	8151A
Di-n-octyl phthalate						*CAS #* 117-84-0			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
1,4-Dioxane						*CAS #* 123-91-1			
Second Quarter 2008	U	U	U	U	U	U	200	-	8260B
Diphenylamine						*CAS #* 122-39-4			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Disulfoton						*CAS #* 298-04-4			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Endosulfan I						*CAS #* 959-98-8			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A

Target Analyte Monitoring Results - HWMU-5 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 5W8B

All Results in ug/L.

Analyte/Quarter	*5W8B Q*	*5W5B Q*	*5W7B Q*	*5WC21 Q*	*5WC22 Q*	*5WC23 Q*	*QL*	*GPS*	*Method*
Endosulfan II						*CAS #* 33213-65-9			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
Endosulfan sulfate						*CAS #* 1031-07-8			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
Endrin						*CAS #* 72-20-8			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
Ethyl acetate						*CAS #* 75-25-2			
Second Quarter 2008	U	U	U	U J	U J	U J	2	-	8260B
Endrin aldehyde						*CAS #* 7421-93-4			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
Ethanol						*CAS #* 110-82-7			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	500	-	8260B
Ethylbenzene						*CAS #* 100-41-4			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Ethyl methacrylate						*CAS #* 97-63-2			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Ethyl methanesulfonate						*CAS #* 62-50-0			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Ethylene oxide						*CAS #* 75-21-8			
Second Quarter 2008	U	U	U	U J	U J	U J	20	-	8260B
Famphur						*CAS #* 52-85-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Fluoranthene						*CAS #* 206-44-0			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Fluorene						*CAS #* 86-73-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Heptachlor						*CAS #* 76-44-8			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	0.025	-	8081A
Heptachlor epoxide						*CAS #* 1024-57-3			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
Hexachlorobenzene						*CAS #* 118-74-1			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Hexachlorobutadiene						*CAS #* 87-68-3			
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
Hexachlorocyclopentadiene						*CAS #* 77-47-4			
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
Hexachloroethane						*CAS #* 67-72-1			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Hexachlorophene						*CAS #* 70-30-4			
Second Quarter 2008	U	U	U	U	U	U	500	-	8270C
Hexachloropropene						*CAS #* 1888--71-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
2-Hexanone						*CAS #* 591-78-6			
Second Quarter 2008	U	U	U	U	U	U	5	-	8260B
Indeno[1,2,3-cd]pyrene						*CAS #* 193-39-5			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Isobutyl alcohol						*CAS #* 78-83-1			
Second Quarter 2008	U	U	U	U J	U J	U J	125	-	8260B

Target Analyte Monitoring Results - HWMU-5 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 5W8B

All Results in ug/L.

Analyte/Quarter	*5W8B Q*	*5W5B Q*	*5W7B Q*	*5WC21 Q*	*5WC22 Q*	*5WC23 Q*	*QL*	*GPS*	*Method*
Isodrin						*CAS #* 465-73-6			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Isophorone						*CAS #* 78-59-1			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Isopropylbenzene						*CAS #* 98-82-8			
Second Quarter 2008	U	U	U	U	U	U	200	-	8260B
Isopropylether						*CAS #* 108-20-3			
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
4-Isopropyltoluene						*CAS #* 99-87-6			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Isosafrole						*CAS #* 120-58-1			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Kepone						*CAS #* 143-50-0			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Methacrylonitrile						*CAS #* 126-98-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8260B
Methapyrilene						*CAS #* 91-80-5			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Methoxychlor						*CAS #* 72-43-5			
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
Bromomethane						*CAS #* 74-83-9			
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
3-Methylcholanthrene						*CAS #* 56-49-5			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Iodomethane						*CAS #* 74-88-4			
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
Methyl methacrylate						*CAS #* 80-62-6			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Methyl methane sulfonate						*CAS #* 66-27-3			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
2-Methylnaphthalene						*CAS #* 91-57-6			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Methyl parathion						*CAS #* 298-00-0			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
4-Methyl-2-pentanone						*CAS #* 108-10-1			
Second Quarter 2008	U	U	U	U	U	U	5	-	8260B
2-Methylphenol						*CAS #* 95-48-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
3 & 4-Methylphenol						*CAS #* 106-44-5			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Methyl tert-butyl ether						*CAS #* 1634-04-4			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Dibromomethane						*CAS #* 74-95-3			
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
Methylene chloride						*CAS #* 75-09-2			
Second Quarter 2008	U	U	U	U	U	U	1	5	8260B
Fourth Quarter 2008	U	U	U	U	U	U	1	5	8260B
Naphthalene						*CAS #* 91-20-3			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	1	-	8260B

Target Analyte Monitoring Results - HWMU-5 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 5W8B

All Results in ug/L.

Analyte/Quarter	*5W8B Q*	*5W5B Q*	*5W7B Q*	*5WC21 Q*	*5WC22 Q*	*5WC23 Q*	*QL*	*GPS*	*Method*
1,4-Naphthoquinone						*CAS #* 130-15-4			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
1-Naphthylamine						*CAS #* 134-32-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
2-Naphthylamine						*CAS #* 91-59-8			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
o-Nitroaniline						*CAS #* 88-74-4			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Fourth Quarter 2008	U	U	U	U	U	U	10	-	8270C
m-Nitroaniline						*CAS #* 99-09-2			
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
p-Nitroaniline						*CAS #* 100-01-6			
Second Quarter 2008	U	U	U	U	U	U	20	20	8270C
Fourth Quarter 2008	U	U	U	U	U	U	20	20	8270C
Nitrobenzene						*CAS #* 98-95-3			
Second Quarter 2008	U	U	U	U	U	U	10	10	8270C
Fourth Quarter 2008	U	U	U	U	U	U	10	10	8270C
o-Nitrophenol						*CAS #* 88-75-5			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
p-Nitrophenol						*CAS #* 100-02-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
4-Nitroquinoline-1-oxide						*CAS #* 56-57-5			
Second Quarter 2008	U	U	U	U	U	U	50	-	8270C
N-Nitrosodi-n-butylamine						*CAS #* 924-16-3			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
N-Nitrosodiethylamine						*CAS #* 55-18-5			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
N-Nitrosodimethylamine						*CAS #* 62-75-9			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
N-Nitrosodiphenylamine						*CAS #* 86-30-6			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
N-Nitrosodipropylamine						*CAS #* 621-64-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
N-Nitrosomethylethylamine						*CAS #* 10595-95-6			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
N-Nitrosomorpholine						*CAS #* 59-89-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
N-Nitrosopiperidine						*CAS #* 100-75-4			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
N-Nitrosopyrrolidine						*CAS #* 930-55-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
5-Nitroso-o-toluidine						*CAS #* 99-55-8			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Parathion						*CAS #* 56-38-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Pentachlorobenzene						*CAS #* 608-93-5			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Pentachloroethane						*CAS #* 76-01-7			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	1	-	8260B

Target Analyte Monitoring Results - HWMU-5 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 5W8B

All Results in ug/L.

Analyte/Quarter	5W8B Q	5W5B Q	5W7B Q	5WC21 Q	5WC22 Q	5WC23 Q	QL	GPS	Method
Pentachloronitrobenzene						CAS # 82-68-8			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Pentachlorophenol						CAS # 87-86-5			
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
Phenacetin						CAS # 62-44-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Phenanthrene						CAS # 85-01-8			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Phenol						CAS # 108-95-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Total Recoverable Phenolics						CAS # C-020			
Second Quarter 2008	U	U	U	U	U	U	5	-	9065
Phorate						CAS # 298-02-2			
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
2-Picoline						CAS # 109-06-8			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Pronamide						CAS # 23950-58-5			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
1-Propanol						CAS # 71-23-8			
Second Quarter 2008	U J	U J	U J	U	U	U	1000	-	8260B
2-Propanol						CAS # 67-63-0			
Second Quarter 2008	U	U	U	U	U	U	1000	-	8260B
Propionitrile						CAS # 107-12-0			
Second Quarter 2008	U J	U J	U J	U	U	U	10	-	8260B
n-Propylbenzene						CAS # 103-65-1			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Pyrene						CAS # 129-00-0			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Pyridine						CAS # 110-86-1			
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
Safrole						CAS # 94-59-7			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Silvex						CAS # 93-72-1			
Second Quarter 2008	U	U	U	U	U	U	2.5	-	8151A
Styrene						CAS # 100-42-5			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Sulfotep						CAS # 3689-24-5			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
2,4,5-Trichlorophenoxyacetic acid						CAS # 93-76-5			
Second Quarter 2008	U	U	U	U	U	U	2.5	-	8151A
1,2,4,5-Tetrachlorobenzene						CAS # 95-94-3			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
1,1,1,2-Tetrachloroethane						CAS # 630-20-6			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
1,1,2,2-Tetrachloroethane						CAS # 79-34-5			
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
Tetrachloroethene						CAS # 127-18-4			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	1	5	8260B

Target Analyte Monitoring Results - HWMU-5 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 5W8B

All Results in ug/L.

Analyte/Quarter	5W8B Q	5W5B Q	5W7B Q	5WC21 Q	5WC22 Q	5WC23 Q	QL	GPS	Method
Tetrahydrofuran						CAS # 109-99-9			
Second Quarter 2008	U	U	U	U	U	U	5	-	8260B
2,3,4,6-Tetrachlorophenol						CAS # 58-90-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Toluene						CAS # 108-88-3			
Second Quarter 2008	U J	U J	U J	U	U	U	1	1000	8260B
Fourth Quarter 2008	U	U	U	U	U	U	1	1000	8260B
o-Toluidine						CAS # 95-53-4			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Toxaphene						CAS # 8001-35-2			
Second Quarter 2008	U	U	U	U	U	U	1	-	8081A
1,2,3-Trichlorobenzene						CAS # 87-61-6			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	1	-	8260B
1,2,4-Trichlorobenzene						CAS # 120-82-1			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
1,1,1-Trichloroethane						CAS # 71-55-6			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
1,1,2-Trichloroethane						CAS # 79-00-5			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
Trichloroethene						CAS # 79-01-6			
Second Quarter 2008	U	7.8	U	U	2.7	2.9	1	5	8260B
Fourth Quarter 2008	U	14	U	1.3	3	3	1	5	8260B
Trichlorofluoromethane						CAS # 75-69-4			
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
2,4,5-Trichlorophenol						CAS # 95-95-4			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
2,4,6-Trichlorophenol						CAS # 88-06-2			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
1,2,3-Trichloropropane						CAS # 96-18-4			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
1,1,2-Trichloro-1,2,2-Trifluoroethane						CAS # 76-13-1			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
O,O,O-Triethyl phosphorothioate						CAS # 126-68-1			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
1,2,4-Trimethylbenzene						CAS # 95-63-6			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
1,3,5-Trimethylbenzene						CAS # 108-67-8			
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
sym-Trinitrobenzene						CAS # 99-35-4			
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
Vinyl acetate						CAS # 108-05-4			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	5	-	8260B
Vinyl chloride						CAS # 75-01-4			
Second Quarter 2008	U J	U J	U J	U J	U J	U J	1	-	8260B
Xylenes (Total)						CAS # 1330-20-7			
Second Quarter 2008	U	U	U	U	U	U	3	10,000	8260B
Fourth Quarter 2008	U	U	U	U	U	U	3	10,000	8260B

Target Analyte Monitoring Results - HWMU-5 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 5W8B

All Results in ug/L.

Analyte/Quarter	*5W8B Q*	*5W5B Q*	*5W7B Q*	*5WC21 Q*	*5WC22 Q*	*5WC23 Q*	*QL*	*GPS*	*Method*

Definitions:

The following definitions apply to results reported for Appendix IX monitoring events.
All Appendix IX monitoring results for compliance wells are reported to the detection limit.

Appendix IX Monitoring Events: *Fourth Quarter 2003, Second Quarter 2004, Second Quarter 2005, Third Quarter 2006, Second Quarter 2007, Second Quarter 2008*

QL Denotes permit required quantitation limit.
U denotes not detected at or above the detection limit.
UA denotes not detected at or above the adjusted detection limit.
J Denotes result is estimated. When used with "U" (i.e., "UJ"), denotes analyte not detected at or above the detection limit and detection limit and QL are estimated. When used with "UA" (i.e., "UAJ"), denotes analyte not detected at or above adjusted detection limit and and adjusted detection limit and QL are estimated.
UN Denotes analyte concentration is less than the quantitation limit and/or five times the blank concentration. Not reliably detected due to blank contamination. This qualifier used only for Appendix IX monitoring event when compliance well results are reported to at or above the project detection limit.
R Denotes result rejected.
Q Denotes data validation qualifier. **X** Denotes mass spectral confirmation not obtained-result suspect.
Background Denotes background concentrations listed in Appendix F to Attachment 2 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002), where applicable.
CAS# Denotes Chemical Abstract Services registration number.
GPS Denotes Groundwater Protection Standards listed in Appendix G to Attachment 2 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002).
NS denotes not sampled. **NA** denotes not analyzed.
"–" denotes not detected (pre-2nd Quarter 2003) or not available / not sampled (beginning 2nd Quarter 2003).

The following definitions apply to results reported for non-Appendix IX monitoring events.
All non-Appendix IX monitoring results for compliance wells are reported to at or above the quantitation limit.

QL Denotes permit required quantitation limit.
U Denotes analyte not detected at or above QL.
UA Denotes analyte not detected at or above adjusted sample QL.
J Denotes result is estimated. When used with "U" (i.e., "**UJ**"), denotes analyte not detected at or above QL and QL is estimated. When used with "UA" (i.e., "**UAJ**"), denotes analyte not detected at or above adjusted QL and adjusted QL is estimated.
R Denotes result rejected.
Q Denotes data validation qualifier.
Background Denotes background concentrations listed in Appendix F to Attachment 2 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002), where applicable.
CAS# Denotes Chemical Abstract Services registration number.
GPS Denotes Groundwater Protection Standards listed in Appendix G to Attachment 2 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002).

Verification events:
Verification event 12/12/03 and 6/22/2004, 3/23/05, 08/03/2005, and 9/26/2006 (original results reported). 07/17/2008. Verification results reported except where noted.

APPENDIX A-3

HWMU-5 2008 LABORATORY ANALYTICAL RESULTS
PLUME MONITORING WELLS

Target Analyte Monitoring Results At Or Above Permit Quantitation Limit
HWMU-5 Plume Monitoring Wells
Radford Army Ammunition Plant, Radford, Virginia

All Results in ug/L. ***Upgradient well = 5W8B***

Analyte/Quarter/CAS #	*5W8B Q*	*5W9A Q*	*5W10A Q*	*5W11A Q*	*S5W5 Q*	*S5W7 Q*	*QL*	*Background*	*Method*
Antimony							*CAS # 7440-36-0*		
Second Quarter 2008	U	U	U	U	U	U	1	3	6020
Fourth Quarter 2008	U	U	U	U	U	U	1	3	6020
Arsenic							*CAS # 7440-38-2*		
Second Quarter 2008	U	U	U	U	U	U	10	1	6020
Fourth Quarter 2008	U	U	U	U	U	U	10	1	6020
Barium							*CAS # 7440-39-3*		
Second Quarter 2008	115	61.5	52.5	108	26.6	72.8	10	172.87	6020
Fourth Quarter 2008	112	61.3	49.4	137	39.5	78.6	10	172.87	6020
Beryllium							*CAS # 7440-41-7*		
Second Quarter 2008	U	U	U	U	U	U	1	0.7	6020
Fourth Quarter 2008	U	U	U	U	U	U	1	0.7	6020
Cadmium							*CAS # 7440-43-9*		
Second Quarter 2008	U	U	U	U	U	U	1	1.45	6020
Fourth Quarter 2008	U	U	U	U	U	U	1	1.45	6020
Chromium							*CAS # 7440-47-3*		
Second Quarter 2008	U	U	U	U	U	U	5	5	6020
Fourth Quarter 2008	U	U	U	U	U	U	5	5	6020
Cobalt							*CAS # 7440-48-4*		
Second Quarter 2008	1.3 J	U	U	U	U	U	5	7	6020
Fourth Quarter 2008	U	U	U	U	U	U	5	7	6020
Copper							*CAS # 7440-50-8*		
Second Quarter 2008	U	U	U	U	U	U	5	18	6020
Fourth Quarter 2008	U	U	U	U	U	U	5	18	6020
Lead							*CAS # 7439-92-1*		
Second Quarter 2008	U	U	U	U	U	1.1	1	10	6020
Fourth Quarter 2008	U	U	U	U J	U	U	1	10	6020
Mercury							*CAS # 7439-97-6*		
Second Quarter 2008	U	U	U	U	U	U	2	0.9	7470A
Fourth Quarter 2008	U	U	U	U	U	U	2	0.9	7470A
Nickel							*CAS # 7440-02-0*		
Second Quarter 2008	U	U	U	U	U	U	10	106	6020
Fourth Quarter 2008	U	U	U	U	U	U	10	106	6020
Selenium							*CAS # 7782-49-2*		
Second Quarter 2008	U	U	U	U	U	U	10	1	6020
Fourth Quarter 2008	U	U	U	U	U	U	10	1	6020
Silver							*CAS # 7440-22-4*		
Second Quarter 2008	U	U	U	U	U	U	2	2.3	6020
Fourth Quarter 2008	U	U	U	U	U	U	2	2.3	6020
Thallium							*CAS # 7440-28-0*		
Second Quarter 2008	U	U	U	U	U	U	1	2	6020
Fourth Quarter 2008	U	U	U	U J	U	U	1	2	6020
Vanadium							*CAS # 7440-62-2*		
Second Quarter 2008	U	U	U	U	U	U	10	17	6020
Fourth Quarter 2008	U	U	U	U	U	U	10	17	6020
Zinc							*CAS # 7440-66-6*		
Second Quarter 2008	5 J	U	U	U	U	U	10	75	6020
Fourth Quarter 2008	U	U	U	U	U	U	10	75	6020
Acetone							*CAS # 67-64-1*		
Second Quarter 2008	U J	U J	U J	U J	U J	U J	10	89	8260B
Fourth Quarter 2008	U	U	U	U	U	U	10	89	8260B

See last page of this report for definitions.

Target Analyte Monitoring Results At Or Above Permit Quantitation Limit
HWMU-5 Plume Monitoring Wells
Radford Army Ammunition Plant, Radford, Virginia

All Results in ug/L.

Upgradient well = 5W8B

Analyte/Quarter/CAS #	5W8B	Q	5W9A	Q	5W10A	Q	5W11A	Q	S5W5	Q	S5W7	Q	QL	Background	Method
bis(2-Ethylhexyl)phthalate													CAS # 117-81-7		
Second Quarter 2008	U		U		U		U		U		U		6	10	8270C
Fourth Quarter 2008	U		U		U		U		U		U		6	10	8270C
2-Butanone													CAS # 78-93-3		
Second Quarter 2008	U		U		U	J	U	J	U		U		10	21.3	8260B
Fourth Quarter 2008	U		U		U		U		U		U		10	21.3	8260B
Chloroform													CAS # 67-66-3		
Second Quarter 2008	U		U		U	J	U	J	U		U		1	0.5	8260B
Fourth Quarter 2008	U		U		U		U		U		U		1	0.5	8260B
Dichlorodifluoromethane													CAS # 75-71-8		
Second Quarter 2008	U		U		U	J	U	J	U		U		1	1	8260B
Fourth Quarter 2008	U	J	U	J	U	J	U	J	U	J	U	J	1	1	8260B
1,2-Dichloroethane													CAS # 107-06-2		
Second Quarter 2008	U		U		U		U		U		U		1	0.1	8260B
Fourth Quarter 2008	U		U		U		U		U		U		1	0.1	8260B
Diethyl ether													CAS # 60-29-7		
Second Quarter 2008	U	J	U	J	U		U		U	J	U	J	12	12	8260B
Fourth Quarter 2008	U		U		U		U		U		U		12	12	8260B
Diethyl phthalate													CAS # 84-66-2		
Second Quarter 2008	U		U		U		U		U		U		10	5	8270C
Fourth Quarter 2008	U		U		U		U		U		U		10	5	8270C
2,4-Dinitrotoluene													CAS # 121-14-2		
Second Quarter 2008	U		U		U		U		U		U		10	0.18	8270C
Fourth Quarter 2008	U		U		U		U		U		U		10	0.18	8270C
2,6-Dinitrotoluene													CAS # 606-20-2		
Second Quarter 2008	U		U		U		U		U		U		10	0.08	8270C
Fourth Quarter 2008	U		U		U		U		U		U		10	0.08	8270C
Methylene chloride													CAS # 75-09-2		
Second Quarter 2008	U		U		U		U		U		U		1	0.7	8260B
Fourth Quarter 2008	U		U		U		U		U		U		1	0.7	8260B
o-Nitroaniline													CAS # 88-74-4		
Second Quarter 2008	U		U		U		U		U		U		10	20	8270C
Fourth Quarter 2008	U		U		U		U		U		U		10	20	8270C
p-Nitroaniline													CAS # 100-01-6		
Second Quarter 2008	U		U		U		U		U		U		20	20	8270C
Fourth Quarter 2008	U		U		U		U		U		U		20	20	8270C
Nitrobenzene													CAS # 98-95-3		
Second Quarter 2008	U		U		U		U		U		U		10	10	8270C
Fourth Quarter 2008	U		U		U		U		U		U		10	10	8270C
Toluene													CAS # 108-88-3		
Second Quarter 2008	U	J	U	J	U		U		U	J	U	J	1	0.1	8260B
Fourth Quarter 2008	U		U		U		U		U		U		1	0.1	8260B
Trichloroethene													CAS # 79-01-6		
Second Quarter 2008	U		U		U		U		U		U		1	0.8	8260B
Fourth Quarter 2008	U		U		U		U		U		U		1	0.8	8260B
Xylenes (Total)													CAS # 1330-20-7		
Second Quarter 2008	U		U		U		U		U		U		3	0.1	8260B
Fourth Quarter 2008	U		U		U		U		U		U		3	0.1	8260B

See last page of this report for definitions.

Target Analyte Monitoring Results At Or Above Permit Quantitation Limit
HWMU-5 Plume Monitoring Wells
Radford Army Ammunition Plant, Radford, Virginia

All Results in ug/L. ***Upgradient well = 5W8B***

Analyte/Quarter/CAS #	*5W8B Q*	*5W9A Q*	*5W10A Q*	*5W11A Q*	*S5W5 Q*	*S5W7 Q*	*QL*	*Background*	*Method*

Definitions:

All plume monitoring well results reported to at or above the permit quantitation limit except for the upgradient well during the Appendix IX monitoring event.

During the Appendix IX monitoring event, results for the upgradient well are reported to the detection limit.

Q Denotes data validation qualifier.
QL Denotes permit required quantitation limit.
U Denotes analyte not detected at or above QL.
UA Denotes analyte not detected at or above adjusted sample QL.
J Denotes result is estimated. When used with "U" (i.e., "**UJ**"), denotes analyte not detected at or above QL and QL is estimated. When used with "UA" (i.e., "**UAJ**"), denotes analyte not detected at or above adjusted QL and adjusted QL is estimated.
UN Denotes analyte concentration is less than the quantiation limit and five times the blank concentration. Not reliably detected due to blank contamination. This qualifier used only for Appendix IX monitoring event when compliance well results are reported to at or above the project detection limit.
R Denotes result rejected.
Background Denotes background concentrations listed in Appendix F to Attachment 2 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002).
CAS# Denotes Chemical Abstract Services registration number.
GPS Denotes groundwater protection standard.
NS denotes not sampled.
NA denotes not analyzed. "–" denotes not detected (pre-2nd Quarter 2003) or not available / not sampled (beginning 2nd Quarter 2003).

Appendix IX Monitoring Events: *Fourth Quarter 2003, Second Quarter 2004, Second Quarter 2005, Third Quarter 2006, Second Quarter 2007, Second Quarter 2008*

APPENDIX A-4

ESTABLISHED BACKGROUND VALUES AND COMPUTATIONS FOR HWMU-5

flow line vectors over the Potentiometric Surface Map, measuring their lengths, calculating the head differential over the distances measured, and dividing the head differential by the length of the flow line vectors. The three calculated gradients were then averaged to a single value. Using this method, the average groundwater hydraulic gradient across the site based on First Quarter 1999 groundwater elevations was calculated to be 0.017 ft/ft. Historical slug test data for the site yielded an average hydraulic conductivity of 5.25×10^{-5} ft/second. This value is consistent with literature values for karst carbonate rock and for clayey, silty sand and gravel alluvium and residuum (Domenico and Schwartz, 1990).

The estimated groundwater velocity across the site was calculated to be approximately 0.193 ft/day or 70.4 ft/year, based on the following:

- an average hydraulic conductivity of 5.25×10^{-5} ft/second;
- an average hydraulic gradient of 0.017 ft/ft; and
- an assumed effective porosity of 0.40, based on a representative range of porosities for karst carbonate rock, weathered residuum, and clayey, silty sand and gravel alluvium (Domenico and Schwartz, 1990).

The actual groundwater flow velocities in the carbonate bedrock may vary as much as one to two orders of magnitude from the velocity presented above, depending on water level conditions and the distribution of karst conduits.

3.3 HWMU-5 GROUNDWATER MONITORING ANALYTE LIST

The groundwater monitoring analyte list for HWMU-5 is presented in **Table 1 (Appendix B)**. The list represents the subset of the constituents listed in Appendix VIII of 40 CFR Part 261 that previously have been detected in the groundwater and/or that are reasonably expected to be in or derived from waste contained in HWMU-5. As discussed in Section 3.5.2 below, 11 inorganic constituents, three volatile organic constituents, and two explosive/ propellant constituents have been detected in the groundwater monitoring network for HWMU-5 at statistically significant concentrations above the Unit's calculated background concentrations.

The concentration limits established for the hazardous constituents also are listed in **Table 1**. The concentration limits represent either background concentrations calculated for the constituents in this GWQAR, Maximum Concentrations of Constituents for Ground-water Protection listed in Table 1 of 40 CFR 264.94, USEPA Drinking Water Standard Maximum Contaminant Levels (MCLs), or alternate concentration limits (ACLs) established by the VDEQ (July 1998).

As Alliant discussed with the VDEQ in the past, the reliability of previous laboratory analytical data - particularly dissolved metals data - appeared to be questionable in some cases. In an April 9, 1996 letter to C. Jake (Alliant), the VDEQ agreed that only total metals concentrations in groundwater would be measured, as described in a USEPA Region III guidance on groundwater sampling in karst terrain. Therefore, all references to metals concentrations in this GWQAR refer to <u>total</u> metals concentrations.

3.4 HWMU-5 GROUNDWATER BACKGROUND CONCENTRATIONS

Background concentrations were calculated for each constituent in the groundwater monitoring program using the analytical data from First Quarter 1996 through First Quarter 1999 for upgradient well 5W8B. The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. The calculated background

concentrations are listed in **Table 2 (Appendix B)**. The background concentrations were used to construct the outermost closing contours on the Isoconcentration Maps (**Appendix A**).

3.5 HWMU-5 STATISTICAL ANALYSIS

Statistical evaluations for HWMU-5 are performed annually and submitted to the VDEQ in accordance with the annual reporting requirements specified in 40 CFR 265.94. As part of this GWQAR, statistical evaluations were performed on First Quarter 1999 analytical data in accordance with the procedures and guidance provided in the following documents:

- Title 40 of the Code of Federal Regulations, 40 CFR 264.97 and 264.98;
- VDEQ Guidance for statistical analysis titled "Data Analysis Plan," undated;
- Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, April 1989;
- Addendum to Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, July 1992; and
- Statistical Methods for Groundwater Monitoring, Gibbons, R.D., 1994.

Statistical threshold values were computed for the 40 constituents for which HWMU-5 is currently monitored based on the concentrations of those constituents in upgradient (background) well 5W8B. All data starting with First Quarter 1996 to First Quarter 1999 were used for this purpose. The 1996 through 1999 monitoring data have been submitted previously to the VDEQ by Alliant in quarterly monitoring reports; therefore, the data are not listed in this GWQAR. Statistical comparisons were performed for the First Quarter 1999 data set. Comparison statistical analyses were performed for all constituents which were detected in any downgradient well during that event.

3.5.1 Background Data and Statistical Comparisons

Statistical analyses were performed using the analytical results from upgradient well 5W8B as background data. Based on the percentage of non-detects and the distribution of the background data, methods of statistical comparisons varied. Background average, standard deviation and other descriptive statistical data were computed for all constituents and are presented in **Appendix C**.

The constituents listed below were 100% non-detected in the background data. The background threshold levels (BTLs) for these constituents were established as equal to their detection limits (DL). Detections of these constituents in the downgradient wells during First Quarter 1999 were compared to these BTLs.

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Antimony	13	100	3	3
Arsenic	13	100	1	1
Selenium	13	100	1	1
Benzene	13	100	0.1	0.1
Chloromethane	13	100	0.3	0.3
1,2-Dichloroethane	13	100	0.1	0.1
Tetrachloroethene	13	100	0.1	0.1
Toluene	13	100	0.1	0.1
trans-1,2-Dichloroethene	13	100	0.1	0.1

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
1,1,2-Trichloroethane	13	100	0.5	0.5
Trichlorofluoromethene	13	100	0.5	0.5
Vinyl chloride	13	100	0.1	0.1
Xylenes (total)	13	100	0.1	0.1
Bis (2-ethylhexyl) phthalate	13	100	10	10
Di-n-butyl phthalate	9	100	5	5
Diethyl phthalate	13	100	5	5
Diphenylamine	13	100	10	10
2,6-Dinitrotoluene	13	100	0.08	0.08

Non-parametric prediction intervals were computed for all of the constituents for which the data from background well 5W8B satisfied one of the following two criteria, per VDEQ regulations and guidance as well as USEPA guidance:

- Percentage of non-detects was greater than or equal to 50 and less than 100; or
- Percentage of non-detects was less than 50, but data was not normally distributed in original or log-transformed mode.

The background threshold levels for these constituents were set as equal to their upper prediction limits (UPLs). The background and relevant statistical data for these constituents are summarized below. The confidence level and false positive rate were calculated based on the number of background data points available and number of future comparisons. For all constituents, the confidence level was determined to be equal to 0.920, and the false positive rate was equal to 0.080. Since the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. The number of confirmation resamples required for all constituents is 2. The background and relevant statistical data for these constituents are summarized below. Associated statistical computations are presented in **Appendix C**.

BTL = Upper Prediction Limit of Non-parametric Prediction Interval w/false positive rate=0.067				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Beryllium	13	54	0.2	0.7
Cobalt	13	46	1	7
Copper	13	54	1	18
Lead	13	69	1	10
Mercury	13	85	0.2	0.9
Nickel	13	69	15	106
Silver	13	85	0.2	2.3
Thallium	13	85	1	2
Vanadium	13	62	4	17
Zinc	13	38	5	75
Acetone	13	92	10.0	89
Chloroform	13	77	0.3	0.5
Methylene chloride	13	92	0.7	0.7
Methylethyl ketone	13	92	1.1	21.3
Trichloroethene	13	85	0.1	0.8
2,4-Dinitrotoluene	13	92	0.08	0.18
Total Organic Carbon	13	69	1,000	253,000
Total Organic Halides	13	46	5	13.4

The following constituents exhibited normally distributed background data with less than 25% non-detects. One sided parametric prediction intervals were computed on the background data for all of these constituents. The UPLs for these constituents were set as their respective BTLs, with one exception. For pH, a two-sided parametric prediction interval was computed; therefore, the BTL for pH consisted of a range between the lower prediction limit (LPL) and the upper prediction limit. The background concentration calculations were based on a site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was below 1% (0.01). A 99% confidence level (0.01 false positive rate) was used for all individual comparisons, which with the most conservative assumptions provided a site-wide false positive rate of >0.05 for all constituents. The background and relevant statistical data for these constituents are summarized below. The prediction interval computations for these constituents are presented in **Appendix C**.

BTL = UPL of one-sided Prediction Interval (exception pH) w/site-wide false positive rate>0.05 (individual comparisons false positive rate=0.01) BTL for pH = LPL – UPL of two-sided Prediction Interval				
Parameter	**Sample Size**	**% Non-Detects**	**DL (µg/l)**	**BTL (µg/l)**
Barium	13	0	2	172.87
Cadmium	13	23	0.1	1.45
Specific Conductivity	8	0	1 µS/cm	450 µS/cm
pH	8	0	0.1 pH units	2.79 - 7.47 pH units

3.5.2 Results of Statistical Comparisons

The following table lists the constituents which were detected during the First Quarter 1999 event at concentrations exceeding their respective background threshold levels (BTLs), and the downgradient wells in which they were detected.

Parameter	Monitoring Well(s)
Arsenic	S5W5
Beryllium	5W7B, 5WC21, S5W5
Cadmium	5WC21
Cobalt	5W5B, 5W7B, 5WC21, 5WC22, S5W7, 5W11A
Copper	5W7B, 5WC21
Lead	5W7B, S5W5
Nickel	5WC21
Selenium	5W5B
Silver	5W5B
Vanadium	5W5B, 5W7B, S5W5
Zinc	5W7B, 5WC21, 5W11A
Chloroform	5WC21
Trichloroethene	5W5B, 5WC21, 5WC22, 5WC23, 5W10A
Xylenes (total)	5W5B
2,4-Dinitrotoluene	5W5B, 5W7B, 5WC21, 5WC22, 5WC23
2,6-Dinitrotoluene	5W5B, 5W7B, 5WC21, 5WC22, 5WC23, 5W9A
Specific Conductivity	5W5B, 5W7B, 5WC21, 5WC22, 5WC23, S5W7, 5W9A, 5W11A
pH	5WC23, 5W10A, 5W11A

TABLE 2
HWMU-5
CALCULATED BACKGROUND VALUES

Constituent	Background Concentration (µg/l unless otherwise noted)
Antimony	3
Arsenic	1
Barium	172.87
Beryllium	0.7
Cadmium	1.45
Cobalt	7
Copper	18
Lead	10
Mercury	0.9
Nickel	106
Selenium	1
Silver	2.3
Thallium	2
Vanadium	17
Zinc	75
Acetone	89
Benzene	0.1
Chloroform	0.5
Chloromethane	0.3
1,2-Dichloroethane	0.1
Methylene chloride	0.7
Methylethylketone	21.3
Tetrachloroethene	0.1
Toluene	0.1
trans-1,2-Dichloroethene	0.1
1,1,2-Trichloroethane	0.5
Trichloroethene	0.8
Trichlorofluoromethane	0.5
Vinyl chloride	0.1
Xylenes (total)	0.1
Bis (2-ethylhexyl) phthalate	10
Di-n-butylphthalate	5
Diethyl phthalate	5
Diphenylamine	10
2,4-Dinitrotoluene	0.18
2,6-Dinitrotoluene	0.08
Total Organic Carbon	253,000
Total Organic Halides	13.4
Specific Conductivity	450 µS/cm
pH	2.79 to 7.47 pH units

Appendix IX Constituents Detected Since Permit Issuance
HWMUs 5, 7, 10, and 16
Radford Army Ammunition Plant

Unit	Quarter Initially Detected	Constituent	Background--Calculated or QL?	Background (ug/L)	GPS Required? (261 Appendix VIII)	Proposed GPS (ug/L)	Source
HMWU-5	Fourth Quarter 2003	Chromium	QL	5	yes	100	USEPA MCL
		Diethyl Ether	QL	12	no	NA	NA
		2-Nitroaniline	QL	20	no	NA	NA
		4-Nitroaniline	QL	20	yes	20	Background/QL
		Nitrobenzene	QL	10	yes	10	Background/QL
	Third Quarter 2006	Dichlorodifluoromethane	QL	1	yes	125.2	VDEQ ACL
HWMU-7	Third Quarter 2003	Copper	Calculated	49	no	NA	NA
	Second Quarter 2004	Zinc	Calculated	217	no	NA	NA
HWMU-10	First Quarter 2003	Cobalt	QL	5	no	NA	NA
	Second Quarter 2003	Vanadium	QL	10	no	NA	NA
	Second Quarter 2005	Acetone	QL	10	no	NA	NA
		2-Propanol	QL	50	no	NA	NA
HWMU-16	Second Quarter 2003	Chloroethane	Calculated	20.7	yes	20.7	Background/QL
		Diethyl Ether	Calculated	75.5	no	NA	NA
		Dimethyl Ether	Calculated	17.0	no	NA	NA
	Third Quarter 2003	Methylene Chloride	Calculated	13.95	no*	NA	NA
	Second Quarter 2004	1,1,2-Trichloro-1,2,2-trifluoroethane	Calculated	1.2	no*	NA	NA

HWMU-5: The additional Appendix IX constituents detected in the downgradient point of compliance wells were not detected above their respective Quantitation Limits (QLs) in the upgradient well. As a result, background concentrations for those constituents were set as equal to their respective QLs. In accordance with the Permit (Condition V.J.1.g.), GPS are proposed for those additional Appendix IX constituents that are listed in Appendix VIII of 40 CFR Part 261 (chromium, 4-nitroaniline, nitrobenzene, and dichlorodifluoromethane). No GPS are proposed for the additional Appendix IX constituents that are not listed in Appendix VIII of 40 CFR Part 261 (diethyl ether and 2-nitroaniline).

HWMU-7: Background concentrations for the additional Appendix IX constituents detected in the downgradient point of compliance wells (copper and zinc) were previously calculated and submitted to the VDEQ in the August 1998 *Groundwater Quality Assessment Report for HWMU-7* prepared by ERM, Inc. In accordance with the Permit (Condition V.J.2.g.), no GPS are proposed for the additional Appendix IX constituents (copper and zinc), as they are not listed in Appendix VIII of 40 CFR Part 261.

HWMU-10: The additional Appendix IX constituents detected in the downgradient point of compliance wells were not detected above their respective Quantitation Limits (QLs) in the upgradient well. As a result, background concentrations for those constituents were set as equal to their respective QLs. In accordance with the Permit (Condition V.J.3.g.), no GPS are proposed for the additional Appendix IX constituents (cobalt, vanadium, acetone, and 2-propanol), as they are not listed in Appendix VIII of 40 CFR Part 261.

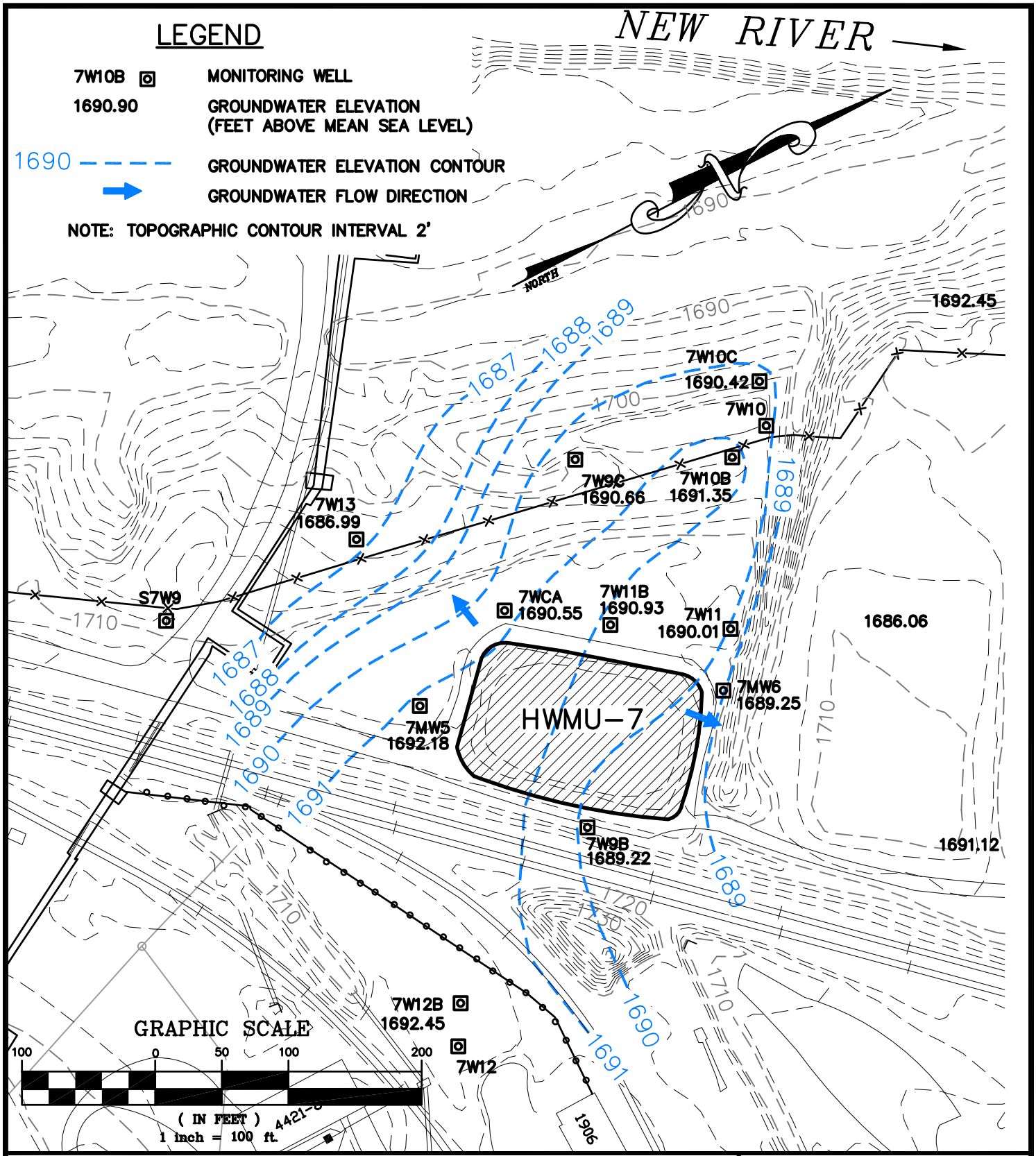
HWMU-16: Background concentrations for additional Appendix IX constituents chloroethane, diethyl ether, dimethyl ether, and methylene chloride were calculated using data collected from upgradient well 16C1 during the period from Third Quarter 2003 through Third Quarter 2004. The background concentration for additional Appendix IX constituent 1,1,2-trichloro-1,2,2-trifluoroethane was calculated using data collected from upgradient well 16C1 during the period from Second Quarter 2004 through Third Quarter 2006.
In accordance with the Permit (Condition V.J.4.g.), GPS are proposed for additional Appendix IX constituents that are listed in Appendix VIII of 40 CFR Part 261 (chloroethane). No GPS are proposed for the additional Appendix IX constituents that are not listed in Appendix VIII of 40 CFR Part 261 (diethyl ether and dimethyl ether).
*Methylene chloride and 1,1,2-trichloro-1,2,2-trifluoroethane should not be added to the Groundwater Monitoring List for HWMU-16, as these constituents were only detected in the upgradient well for the Unit, and not in the downgradient point of compliance wells.

APPENDIX B

HWMU-7

APPENDIX B-1

HWMU-7 POTENTIOMETRIC SURFACE MAPS
SECOND QUARTER 2008
FOURTH QUARTER 2008



HWMU-7 POTENTIOMETRIC SURFACE MAP (2ND QUARTER 2008)

RADFORD ARMY AMMUNITION PLANT

RADFORD, VIRGINIA

SCALE: 1"=100'

PLAN NO. B03204-06

Draper Aden Associates

Engineering ✦ Surveying ✦ Environmental Services

2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291

Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED	RGM
DRAWN	KKD
CHECKED	MDL
DATE	07/30/08

FIGURE 2

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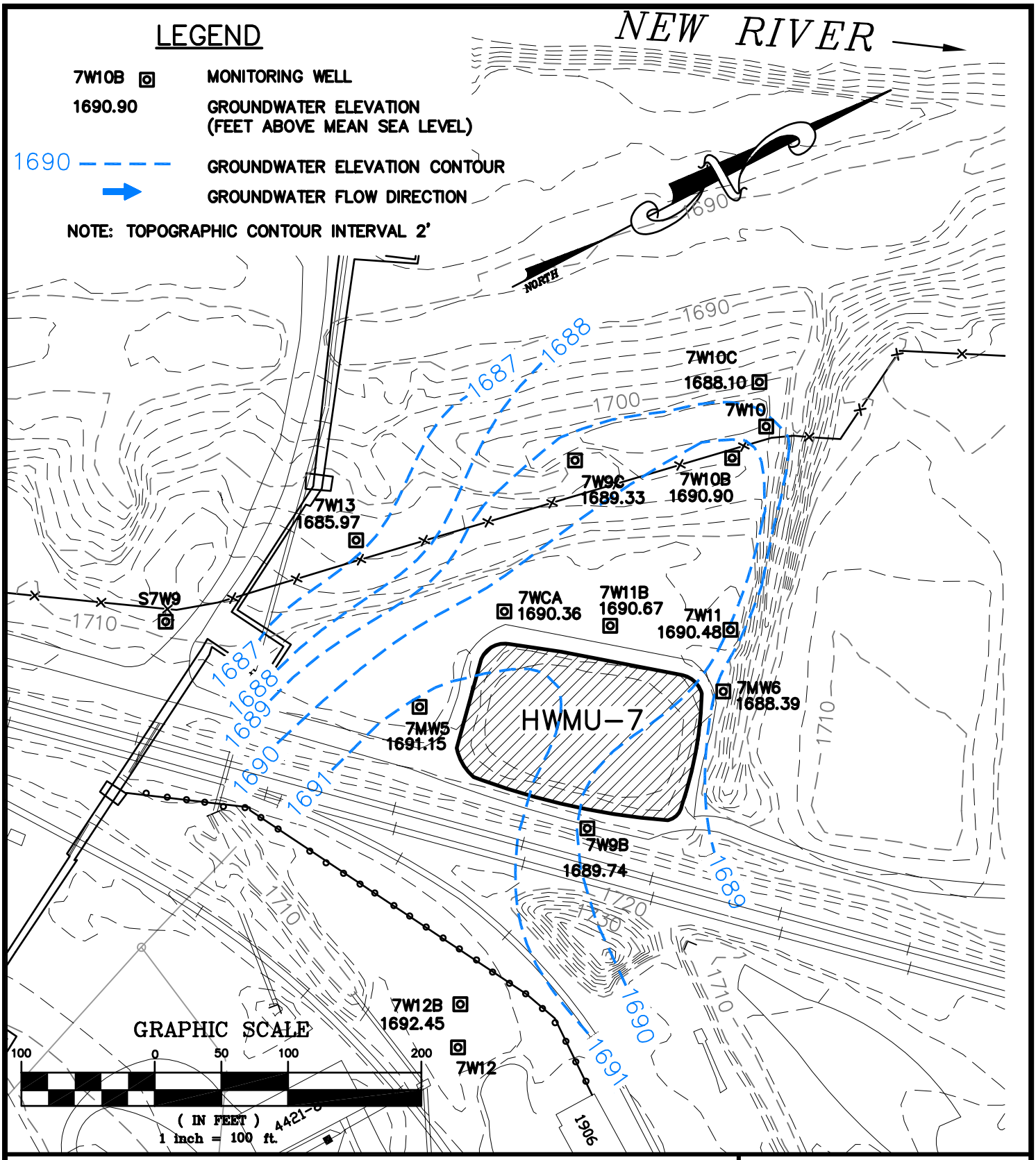

HWMU-7 POTENTIOMETRIC SURFACE MAP (4TH QUARTER 2008)

RADFORD ARMY AMMUNITION PLANT

RADFORD, VIRGINIA

SCALE: 1"=100'

PLAN NO. B03204-06

Draper Aden Associates

Engineering ◆ Surveying ◆ Environmental Services

2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291

Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED	RGM
DRAWN	KKD
CHECKED	MDL
DATE	01/07/09

FIGURE 2

P:\B03200\B03204\B03204-05\CAD\B03204-05ENV\dwg\B03204-05_HWMU-7.dwg Jan 29, 2009 9:32am

APPENDIX B-2

HWMU-7 2008 LABORATORY ANALYTICAL RESULTS
POINT OF COMPLIANCE WELLS

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	*7W12B Q*	*7MW6 Q*	*7WCA Q*	*7W11B Q*	*QL*	*GPS*	*Background*	*Method*
Antimony						*CAS #*		7440-36-0
Second Quarter 2008	U	U	U	U N	1	6	1	6020
Fourth Quarter 2008	U	U	U	U	1	6	1	6020
Arsenic						*CAS #*		7440-38-2
Second Quarter 2008	U	U	U	U	10	10	10	6020
Fourth Quarter 2008	U	U	U	U	10	10	10	6020
Barium						*CAS #*		7440-39-3
Second Quarter 2008	39.7	21.4	28.6	45	10	2000	41	6020
Fourth Quarter 2008	34 J	19.1 J	25.5 J	38.9 J	10	2000	41	6020
Beryllium						*CAS #*		7440-41-7
Second Quarter 2008	U	U	U	U	1	-		6020
Cadmium						*CAS #*		7440-43-9
Second Quarter 2008	U	U	U	U	1	5	1	6020
Fourth Quarter 2008	U	U	U	U	1	5	1	6020
Chromium						*CAS #*		7440-47-3
Second Quarter 2008	8.5	U	U	U	5	100	9.9	6020
Fourth Quarter 2008	7.4	U	U	U	5	100	9.9	6020
Cobalt						*CAS #*		7440-48-4
Second Quarter 2008	U	U	5.8	U	5	156.65	5	6020
Fourth Quarter 2008	U	U	5.5	U	5	156.65	5	6020
Copper						*CAS #*		7440-50-8
Second Quarter 2008	1.7 J	U	1.6 J	2.2 J	5	1300	5	6020
Fourth Quarter 2008	U	U	U	U	5	1300	5	6020
Lead						*CAS #*		7439-92-1
Second Quarter 2008	U	U	0.21 J	U	1	15	1	6020
Fourth Quarter 2008	U	U	U	U	1	15	1	6020
Mercury						*CAS #*		7439-97-6
Second Quarter 2008	U	U	U	U	0.2	2	2	7470A
Fourth Quarter 2008	U	U	U	U	2	2	2	7470A
Nickel						*CAS #*		7440-02-0
Second Quarter 2008	U	U	15.8	2.1 J	10	313	10	6020
Fourth Quarter 2008	U	U	18.1	U	10	313	10	6020
Selenium						*CAS #*		7782-49-2
Second Quarter 2008	U	U	U	U	10	50	10	6020
Fourth Quarter 2008	U	U	U	U	10	50	10	6020
Silver						*CAS #*		7440-22-4
Second Quarter 2008	U	U	U	U	2	78.25	2	6020
Fourth Quarter 2008	U	U	U	U	2	78.25	2	6020
Thallium						*CAS #*		7440-28-0
Second Quarter 2008	U	U	U	U	1	2	1	6020
Fourth Quarter 2008	U J	U J	U J	U J	1	2	1	6020
Tin						*CAS #*		7440-31-5
Second Quarter 2008	U	U	U	U	5	-		6020
Vanadium						*CAS #*		7440-62-2
Second Quarter 2008	U	U	U	U	10	-		6020

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	*7W12B Q*	*7MW6 Q*	*7WCA Q*	*7W11B Q*	*QL*	*GPS*	*Background*	*Method*
Zinc						*CAS #*		7440-66-6
Second Quarter 2008	7.5 J	8.6 J	6.7 J	4.9 J	10	4695	10.9	6020
Fourth Quarter 2008	U	11.1	12.1	U	10	4695	10.9	6020
Sulfide						*CAS #*		18496-25-8
Second Quarter 2008	U	U	U	U	1000	-		9034
Cyanide						*CAS #*		57-12-5
Second Quarter 2008	U	U	U	U	20	200	20	9010B
Fourth Quarter 2008	U	U	U	U	10	200	20	9012A/9010 B
Acenaphthene						*CAS #*		83-32-9
Second Quarter 2008	U	U	U	U	10	-		8270C
Acenaphthylene						*CAS #*		208-96-8
Second Quarter 2008	U	U	U	U	10	-		8270C
Acetone						*CAS #*		67-64-1
Second Quarter 2008	U	U	U	U	5	-		8260B
Acetonitrile						*CAS #*		75-05-8
Second Quarter 2008	U	U	U	U	100	-		8260B
Acetophenone						*CAS #*		98-86-2
Second Quarter 2008	U	U	U	U	10	-		8270C
2-Acetylaminofluorene						*CAS #*		53-96-3
Second Quarter 2008	U J	U J	U J	U J	30	-		8270C
Acrolein						*CAS #*		107-02-8
Second Quarter 2008	U J	U J	U J	U J	10	-		8260B
Acrylonitrile						*CAS #*		107-13-1
Second Quarter 2008	U	U	U	U	1	-		8260B
Aldrin						*CAS #*		309-00-2
Second Quarter 2008	U	U	U	U	0.025	-		8081A
Allyl chloride						*CAS #*		107-05-1
Second Quarter 2008	U	U	U	U	1	-		8260B
4-Aminobiphenyl						*CAS #*		92-67-1
Second Quarter 2008	U	U	U	U	10	-		8270C
Aniline						*CAS #*		62-53-3
Second Quarter 2008	U	U	U	U	10	-		8270C
Anthracene						*CAS #*		120-12-7
Second Quarter 2008	U	U	U	U	10	-		8270C
Aramite						*CAS #*		140-57-8
Second Quarter 2008	U	U	U	U	10	-		8270C
Benzene						*CAS #*		71-43-2
Second Quarter 2008	U	U	U	U	1	-		8260B
Benzo[a]anthracene						*CAS #*		56-55-3
Second Quarter 2008	U	U	U	U	10	-		8270C
Benzo[b]fluoranthene						*CAS #*		205-99-2
Second Quarter 2008	U	U	U	U	10	-		8270C
Benzo[k]fluoranthene						*CAS #*		207-08-9
Second Quarter 2008	U	U	U	U	10	-		8270C
Benzo[ghi]perylene						*CAS #*		191-24-2
Second Quarter 2008	U	U	U	U	10	-		8270C

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	*7W12B Q*	*7MW6 Q*	*7WCA Q*	*7W11B Q*	*QL*	*GPS*	*Background*	*Method*
Benzo(a)pyrene							*CAS #*	50-32-8
Second Quarter 2008	U	U	U	U	10	-		8270C
1,4-Benzenediamine							*CAS #*	106-50-3
Second Quarter 2008	U	U	U	U	50	-		8270C
Benzyl alcohol							*CAS #*	100-51-6
Second Quarter 2008	U	U	U	U	10	-		8270C
alpha-BHC							*CAS #*	319-84-6
Second Quarter 2008	U	U	U	U	0.025	-		8081A
beta-BHC							*CAS #*	319-85-7
Second Quarter 2008	U	U	U	U	0.025	-		8081A
delta-BHC							*CAS #*	319-86-8
Second Quarter 2008	U	U	U	U	0.025	-		8081A
gamma-BHC							*CAS #*	58-89-9
Second Quarter 2008	U	U	U	U	0.025	-		8081A
bis(2-Chloroethoxy)methane							*CAS #*	111-91-1
Second Quarter 2008	U	U	U	U	10	-		8270C
bis(2-Chloroethyl)ether							*CAS #*	111-44-4
Second Quarter 2008	U	U	U	U	10	-		8270C
bis(2-Chloro-1-methylethyl)ether							*CAS #*	108-60-1
Second Quarter 2008	U	U	U	U	10	-		8270C
bis(2-Ethylhexyl)phthalate							*CAS #*	117-81-7
Second Quarter 2008	U	U	U	U	6	6	6	8270C
Fourth Quarter 2008	U	U	U	U	6	6	6	8270C
Bromobenzene							*CAS #*	108-86-1
Second Quarter 2008	U	U	U	U	1	-		8260B
Bromochloromethane							*CAS #*	74-97-5
Second Quarter 2008	U	U	U	U	1	-		8260B
Bromodichloromethane							*CAS #*	75-27-4
Second Quarter 2008	U	U	U	U	1	-		8260B
Bromoform							*CAS #*	75-25-2
Second Quarter 2008	U	U	U	U	1	-		8260B
4-Bromophenyl phenyl ether							*CAS #*	101-55-3
Second Quarter 2008	U	U	U	U	10	-		8270C
n-Butyl alcohol							*CAS #*	71-36-3
Second Quarter 2008	U	U	U	U	200	-		8260B
tert-Butyl alcohol							*CAS #*	75-65-0
Second Quarter 2008	U J	U J	U J	U J	20	-		8260B
n-Butylbenzene							*CAS #*	104-51-8
Second Quarter 2008	U	U	U	U	1	-		8260B
sec-Butylbenzene							*CAS #*	135-98-8
Second Quarter 2008	U	U	U	U	1	-		8260B
tert-Butylbenzene							*CAS #*	98-06-6
Second Quarter 2008	U	U	U	U	1	-		8260B
Butyl benzyl phthalate							*CAS #*	85-68-7
Second Quarter 2008	U	U	U	U	10	3130	10	8270C
Fourth Quarter 2008	U	U	U	U	10	3130	10	8270C

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	*7W12B Q*	*7MW6 Q*	*7WCA Q*	*7W11B Q*	*QL*	*GPS*	*Background*	*Method*
Carbon disulfide							*CAS #*	75-15-0
Second Quarter 2008	U	U	U	U	1	-		8260B
Carbon tetrachloride							*CAS #*	56-23-5
Second Quarter 2008	U	U	U	U	1	-		8260B
Chlordane							*CAS #*	57-74-9
Second Quarter 2008	U	U	U	U	0.25	-		8081A
p-Chloroaniline							*CAS #*	106-47-8
Second Quarter 2008	U	U	U	U	10	-		8270C
Chlorobenzene							*CAS #*	108-90-7
Second Quarter 2008	U	U	U	U	1	-		8260B
Chlorobenzilate							*CAS #*	510-15-6
Second Quarter 2008	U	U	U	U	20	-		8270C
p-Chloro-m-cresol							*CAS #*	59-50-7
Second Quarter 2008	U	U	U	U	10	-		8270C
Chloroethane							*CAS #*	75-00-3
Second Quarter 2008	U	U	U	U	1	-		8260B
Chloroform							*CAS #*	67-66-3
Second Quarter 2008	U	1.5	U	U	1	-		8260B
2-Chloroethyl vinyl ether							*CAS #*	110-75-8
Second Quarter 2008	U J	U J	U J	U J	5	-		8260B
2-Chloronaphthalene							*CAS #*	91-58-7
Second Quarter 2008	U	U	U	U	10	-		8270C
2-Chlorophenol							*CAS #*	95-57-8
Second Quarter 2008	U	U	U	U	10	-		8270C
4-Chlorophenyl phenyl ether							*CAS #*	7005-72-3
Second Quarter 2008	U	U	U	U	10	-		8270C
Chloroprene							*CAS #*	126-99-8
Second Quarter 2008	U	U	U	U	1	-		8260B
2-Chlorotoluene							*CAS #*	95-49-8
Second Quarter 2008	U	U	U	U	1	-		8260B
4-Chlorotoluene							*CAS #*	106-43-4
Second Quarter 2008	U	U	U	U	1	-		8260B
Chrysene							*CAS #*	218-01-9
Second Quarter 2008	U	U	U	U	10	-		8270C
Cyclohexane							*CAS #*	110-82-7
Second Quarter 2008	U	U	U	U	2	-		8260B
2,4-Dichlorophenoxyacetic acid							*CAS #*	94-75-7
Second Quarter 2008	U	U	U	U	5	-		8151
4,4'-DDD							*CAS #*	72-54-8
Second Quarter 2008	U	U	U	U	0.025	-		8081A
4,4'-DDE							*CAS #*	72-55-9
Second Quarter 2008	U	U	U	U	0.025	-		8081A
4,4'-DDT							*CAS #*	50-29-3
Second Quarter 2008	U	U	U	U	0.025	-		8081A
Diallate							*CAS #*	2303-16-4
Second Quarter 2008	U	U	U	U	10	-		8270C

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	*7W12B Q*	*7MW6 Q*	*7WCA Q*	*7W11B Q*	*QL*	*GPS*	*Background*	*Method*
Dibenz(a,h)anthracene							*CAS #*	53-70-3
Second Quarter 2008	U	U	U	U	10	-		8270C
Dibenzofuran							*CAS #*	132-64-9
Second Quarter 2008	U	U	U	U	10	-		8270C
Dibromochloromethane							*CAS #*	124-48-1
Second Quarter 2008	U	U	U	U	1	-		8260B
1,2-Dibromo-3-chloropropane							*CAS #*	96-12-8
Second Quarter 2008	U	U	U	U	1	-		8260B
1,2-Dibromoethane							*CAS #*	106-93-4
Second Quarter 2008	U	U	U	U	1	-		8260B
Di-n-butyl phthalate							*CAS #*	84-74-2
Second Quarter 2008	U	U	U	U	10	-		8270C
1,2-Dichlorobenzene							*CAS #*	95-50-1
Second Quarter 2008	U	U	U	U	1	-		8260B
1,3-Dichlorobenzene							*CAS #*	541-73-1
Second Quarter 2008	U	U	U	U	1	-		8260B
1,4-Dichlorobenzene							*CAS #*	106-46-7
Second Quarter 2008	U	U	U	U	1	-		8260B
3,3'-Dichlorobenzidine							*CAS #*	91-94-1
Second Quarter 2008	U	U	U	U	10	-		8270C
trans-1,4-Dichloro-2-butene							*CAS #*	110-57-6
Second Quarter 2008	U	U	U	U	1	-		8260B
Dichlorodifluoromethane							*CAS #*	75-71-8
Second Quarter 2008	U	U	U	U	1	-		8260B
1,1-Dichloroethane							*CAS #*	75-34-3
Second Quarter 2008	U	U	U	U	1	-		8260B
1,2-Dichloroethane							*CAS #*	107-06-2
Second Quarter 2008	U	U	U	U	1	-		8260B
1,1-Dichloroethene							*CAS #*	75-35-4
Second Quarter 2008	U	U	U	U	1	-		8260B
cis-1,2-Dichloroethene							*CAS #*	156-59-2
Second Quarter 2008	U	U	U	U	1	-		8260B
trans-1,2-Dichloroethene							*CAS #*	156-60-5
Second Quarter 2008	U	U	U	U	1	-		8260B
2,4-Dichlorophenol							*CAS #*	120-83-2
Second Quarter 2008	U	U	U	U	10	-		8270C
2,6-Dichlorophenol							*CAS #*	87-65-0
Second Quarter 2008	U	U	U	U	10	-		8270C
1,2-Dichloropropane							*CAS #*	78-87-5
Second Quarter 2008	U	U	U	U	1	-		8260B
1,3-Dichloropropane							*CAS #*	142-28-9
Second Quarter 2008	U	U	U	U	1	-		8260B
2,2-Dichloropropane							*CAS #*	594-20-7
Second Quarter 2008	U	U	U	U	1	-		8260B
1,1-Dichloropropene							*CAS #*	563-58-6
Second Quarter 2008	U	U	U	U	1	-		8260B

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	7W12B Q	7MW6 Q	7WCA Q	7W11B Q	QL	GPS	Background	Method
cis-1,3-Dichloropropene							CAS #	10061-01-5
Second Quarter 2008	U	U	U	U	1	-		8260B
trans-1,3-Dichloropropene							CAS #	10061-02-6
Second Quarter 2008	U	U	U	U	1	-		8260B
Dieldrin							CAS #	60-57-1
Second Quarter 2008	U	U	U	U	0.025	-		8081A
Diethyl ether							CAS #	60-29-7
Second Quarter 2008	U	U	U	U	2	-		8260B
Diethyl phthalate							CAS #	84-66-2
Second Quarter 2008	U	U	U	U	10	-		8270C
O,O-Diethyl O-2-pyrazinyl							CAS #	297-97-2
Second Quarter 2008	U	U	U	U	10	-		8270C
Dimethoate							CAS #	60-51-5
Second Quarter 2008	U	U	U	U	20	-		8270C
Dimethyl ether							CAS #	115-10-6
Second Quarter 2008	U	U	U	U	2	-		8260B
p-(Dimethylamino)azobenzene							CAS #	60-11-7
Second Quarter 2008	U	U	U	U	10	-		8270C
7,12-Dimethylbenz[a]anthracene							CAS #	57-97-6
Second Quarter 2008	U	U	U	U	20	-		8270C
3,3'-Dimethylbenzidine							CAS #	119-93-7
Second Quarter 2008	U	U	U	U	20	-		8270C
a,a-Dimethylphenethylamine							CAS #	122-09-8
Second Quarter 2008	U	U	U	U	50	-		8270C
2,4-Dimethylphenol							CAS #	105-67-9
Second Quarter 2008	U	U	U	U	10	-		8270C
Dimethyl phthalate							CAS #	131-11-3
Second Quarter 2008	U	U	U	U	10	-		8270C
m-Dinitrobenzene							CAS #	99-65-0
Second Quarter 2008	U	U	U	U	10	-		8270C
4,6-Dinitro-o-cresol							CAS #	534-52-1
Second Quarter 2008	U	U	U	U	20	-		8270C
2,4-Dinitrophenol							CAS #	51-28-5
Second Quarter 2008	U	U	U	U	10	31.3	10	8270C
Fourth Quarter 2008	U J	U J	U J	U J	10	31.3	10	8270C
2,4-Dinitrotoluene							CAS #	121-14-2
Second Quarter 2008	U	U	1.2 J	U	10	31.3	10	8270C
Fourth Quarter 2008	U	U	U	U	10	31.3	10	8270C
2,6-Dinitrotoluene							CAS #	606-20-2
Second Quarter 2008	U	U	U	U	10	15.65	10	8270C
Fourth Quarter 2008	U	U	U	U	10	15.65	10	8270C
Dinoseb							CAS #	88-85-7
Second Quarter 2008	U	U	U	U	2.5	-		8151
Di-n-octyl phthalate							CAS #	117-84-0
Second Quarter 2008	U	U	U	U	10	-		8270C
1,4-Dioxane							CAS #	123-91-1
Second Quarter 2008	U	U	U	U	200	-		8260B

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	*7W12B Q*	*7MW6 Q*	*7WCA Q*	*7W11B Q*	*QL*	*GPS*	*Background*	*Method*
Diphenylamine							*CAS #*	122-39-4
Second Quarter 2008	U	U	U	U	10	-		8270C
Disulfoton							*CAS #*	298-04-4
Second Quarter 2008	U	U	U	U	10	-		8270C
Endosulfan I							*CAS #*	959-98-8
Second Quarter 2008	U	U	U	U	0.025	-		8081A
Endosulfan II							*CAS #*	33213-65-9
Second Quarter 2008	U	U	U	U	0.025	-		8081A
Endosulfan sulfate							*CAS #*	1031-07-8
Second Quarter 2008	U	U	U	U	0.025	-		8081A
Endrin							*CAS #*	72-20-8
Second Quarter 2008	U	U	U	U	0.025	-		8081A
Ethyl acetate							*CAS #*	141-78-6
Second Quarter 2008	U J	U J	U J	U J	2	-		8260B
Endrin aldehyde							*CAS #*	7421-93-4
Second Quarter 2008	U	U	U	U	0.025	-		8081A
Ethanol							*CAS #*	64-17-5
Second Quarter 2008	U	U	U	U	200	-		8260B
Ethylbenzene							*CAS #*	100-41-4
Second Quarter 2008	U	U	U	U	1	-		8260B
Ethyl methacrylate							*CAS #*	97-63-2
Second Quarter 2008	U	U	U	U	1	-		8260B
Ethyl methanesulfonate							*CAS #*	62-50-0
Second Quarter 2008	U	U	U	U	10	-		8270C
Ethylene oxide							*CAS #*	75-21-8
Second Quarter 2008	U	U	U	U	20	-		8260B
Famphur							*CAS #*	52-85-7
Second Quarter 2008	U	U	U	U	10	-		8270C
Fluoranthene							*CAS #*	206-44-0
Second Quarter 2008	U	U	U	U	10	-		8270C
Fluorene							*CAS #*	86-73-7
Second Quarter 2008	U	U	U	U	10	-		8270C
Heptachlor							*CAS #*	76-44-8
Second Quarter 2008	U	U	U	U	0.025	-		8081A
Heptachlor epoxide							*CAS #*	1024-57-3
Second Quarter 2008	U	U	U	U	0.025	-		8081A
Hexachlorobenzene							*CAS #*	118-74-1
Second Quarter 2008	U	U	U	U	10	-		8270C
Hexachlorobutadiene							*CAS #*	87-68-3
Second Quarter 2008	U J	U J	U J	U J	1	-		8260B
Hexachlorocyclopentadiene							*CAS #*	77-47-4
Second Quarter 2008	U J	U J	U J	U J	20	-		8270C
Hexachloroethane							*CAS #*	67-72-1
Second Quarter 2008	U	U	U	U	1	-		8260B
Hexachlorophene							*CAS #*	70-30-4
Second Quarter 2008	U	U	U	U	500	-		8270C

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	*7W12B Q*	*7MW6 Q*	*7WCA Q*	*7W11B Q*	*QL*	*GPS*	*Background*	*Method*
Hexachloropropene							*CAS #*	1888--71-7
Second Quarter 2008	U	U	U	U	10	-		8270C
2-Hexanone							*CAS #*	591-78-6
Second Quarter 2008	U	U	U	U	5	-		8260B
Indeno[1,2,3-cd]pyrene							*CAS #*	193-39-5
Second Quarter 2008	U	U	U	U	10	-		8270C
Isobutyl alcohol							*CAS #*	78-83-1
Second Quarter 2008	U J	U J	U J	U J	125	-		8260B
Isodrin							*CAS #*	465-73-6
Second Quarter 2008	U	U	U	U	10	-		8270C
Isophorone							*CAS #*	78-59-1
Second Quarter 2008	U	U	U	U	10	-		8270C
Isopropylbenzene							*CAS #*	98-82-8
Second Quarter 2008	U	U	U	U	1	-		8260B
Isopropylether							*CAS #*	108-20-3
Second Quarter 2008	U	U	U	U	1	-		8260B
4-Isopropyltoluene							*CAS #*	99-87-6
Second Quarter 2008	U	U	U	U	1	-		8260B
Isosafrole							*CAS #*	120-58-1
Second Quarter 2008	U	U	U	U	10	-		8270C
Kepone							*CAS #*	143-50-0
Second Quarter 2008	U	U	U	U	10	-		8270C
Methacrylonitrile							*CAS #*	126-98-7
Second Quarter 2008	U	U	U	U	10	-		8260B
Methapyrilene							*CAS #*	91-80-5
Second Quarter 2008	U	U	U	U	10	-		8270C
Methoxychlor							*CAS #*	72-43-5
Second Quarter 2008	U	U	U	U	0.025	-		8081A
Bromomethane							*CAS #*	74-83-9
Second Quarter 2008	U	U	U	U	1	-		8260B
Chloromethane							*CAS #*	74-87-3
Second Quarter 2008	U	U	U	U	1	-		8260B
3-Methylcholanthrene							*CAS #*	56-49-5
Second Quarter 2008	U	U	U	U	10	-		8270C
2-Butanone							*CAS #*	78-93-3
Second Quarter 2008	U	U	U	U	5	-		8260B
Iodomethane							*CAS #*	74-88-4
Second Quarter 2008	U	U	U	U	1	-		8260B
Methyl methacrylate							*CAS #*	80-62-6
Second Quarter 2008	U	U	U	U	1	-		8260B
Methyl methane sulfonate							*CAS #*	66-27-3
Second Quarter 2008	U	U	U	U	10	-		8270C
2-Methylnaphthalene							*CAS #*	91-57-6
Second Quarter 2008	U	U	U	U	10	-		8270C
Methyl parathion							*CAS #*	298-00-0
Second Quarter 2008	U	U	U	U	10	-		8270C

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	*7W12B Q*	*7MW6 Q*	*7WCA Q*	*7W11B Q*	*QL*	*GPS*	*Background*	*Method*
4-Methyl-2-pentanone							*CAS #*	108-10-1
Second Quarter 2008	U	U	U	U	5	-		8260B
2-Methylphenol							*CAS #*	95-48-7
Second Quarter 2008	U	U	U	U	10	-		8270C
3 & 4-Methylphenol							*CAS #*	106-44-5
Second Quarter 2008	U	U	U	U	10	-		8270C
Methyl tert-butyl ether							*CAS #*	1634-04-4
Second Quarter 2008	U	U	U	U	1	-		8260B
Dibromomethane							*CAS #*	74-95-3
Second Quarter 2008	U	U	U	U	1	-		8260B
Methylene chloride							*CAS #*	75-09-2
Second Quarter 2008	U	U	U	U	1	-		8260B
Naphthalene							*CAS #*	91-20-3
Second Quarter 2008	U J	U J	U J	U J	1	-		8260B
1,4-Naphthoquinone							*CAS #*	130-15-4
Second Quarter 2008	U	U	U	U	10	-		8270C
1-Naphthylamine							*CAS #*	134-32-7
Second Quarter 2008	U	U	U	U	10	-		8270C
2-Naphthylamine							*CAS #*	91-59-8
Second Quarter 2008	U	U	U	U	10	-		8270C
o-Nitroaniline							*CAS #*	88-74-4
Second Quarter 2008	U	U	U	U	10	-		8270C
m-Nitroaniline							*CAS #*	99-09-2
Second Quarter 2008	U	U	U	U	20	-		8270C
p-Nitroaniline							*CAS #*	100-01-6
Second Quarter 2008	U J	U J	U J	U J	20	-		8270C
Nitrobenzene							*CAS #*	98-95-3
Second Quarter 2008	U	U	U	U	10	-		8270C
o-Nitrophenol							*CAS #*	88-75-5
Second Quarter 2008	U	U	U	U	10	-		8270C
p-Nitrophenol							*CAS #*	100-02-7
Second Quarter 2008	U	U	U	U	10	50	20	8270C
Fourth Quarter 2008	U	U	U	U	10	50	20	8270C
4-Nitroquinoline-1-oxide							*CAS #*	56-57-5
Second Quarter 2008	U	U	U	U	50	-		8270C
N-Nitrosodi-n-butylamine							*CAS #*	924-16-3
Second Quarter 2008	U	U	U	U	10	-		8270C
N-Nitrosodiethylamine							*CAS #*	55-18-5
Second Quarter 2008	U	U	U	U	10	-		8270C
N-Nitrosodimethylamine							*CAS #*	62-75-9
Second Quarter 2008	U	U	U	U	10	-		8270C
N-Nitrosodiphenylamine							*CAS #*	86-30-6
Second Quarter 2008	U	U	U	U	10	-		8270C
N-Nitrosodipropylamine							*CAS #*	621-64-7
Second Quarter 2008	U	U	U	U	10	-		8270C
N-Nitrosomethylethylamine							*CAS #*	10595-95-6
Second Quarter 2008	U	U	U	U	10	-		8270C

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	*7W12B Q*	*7MW6 Q*	*7WCA Q*	*7W11B Q*	*QL*	*GPS*	*Background*	*Method*
N-Nitrosomorpholine							*CAS #*	59-89-2
Second Quarter 2008	U	U	U	U	10	-		8270C
N-Nitrosopiperidine							*CAS #*	100-75-4
Second Quarter 2008	U	U	U	U	10	-		8270C
N-Nitrosopyrrolidine							*CAS #*	930-55-2
Second Quarter 2008	U	U	U	U	10	-		8270C
5-Nitroso-o-toluidine							*CAS #*	99-55-8
Second Quarter 2008	U	U	U	U	10	-		8270C
Parathion							*CAS #*	56-38-2
Second Quarter 2008	U	U	U	U	10	-		8270C
Pentachlorobenzene							*CAS #*	608-93-5
Second Quarter 2008	U	U	U	U	10	-		8270C
Pentachloroethane							*CAS #*	76-01-7
Second Quarter 2008	U J	U J	U J	U J	1	-		8260B
Pentachloronitrobenzene							*CAS #*	82-68-8
Second Quarter 2008	U	U	U	U	10	-		8270C
Pentachlorophenol							*CAS #*	87-86-5
Second Quarter 2008	U	U	U	U	20	-		8270C
Phenacetin							*CAS #*	62-44-2
Second Quarter 2008	U	U	U	U	10	-		8270C
Phenanthrene							*CAS #*	85-01-8
Second Quarter 2008	U	U	U	U	10	-		8270C
Phenol							*CAS #*	108-95-2
Second Quarter 2008	U	U	U	U	10	-		8270C
Total Recoverable Phenolics							*CAS #*	C-020
Second Quarter 2008	U	U	U	U	5	-		9065
Phorate							*CAS #*	298-02-2
Second Quarter 2008	U	U	U	U	20	-		8270C
2-Picoline							*CAS #*	109-06-8
Second Quarter 2008	U	U	U	U	10	-		8270C
Pronamide							*CAS #*	23950-58-5
Second Quarter 2008	U	U	U	U	10	-		8270C
1-Propanol							*CAS #*	71-23-8
Second Quarter 2008	U	U	U	U	1000	-		8260B
2-Propanol							*CAS #*	67-63-0
Second Quarter 2008	U	U	U	U	1000	-		8260B
Propionitrile							*CAS #*	107-12-0
Second Quarter 2008	U	U	U	U	10	-		8260B
n-Propylbenzene							*CAS #*	103-65-1
Second Quarter 2008	U	U	U	U	1	-		8260B
Pyrene							*CAS #*	129-00-0
Second Quarter 2008	U	U	U	U	10	-		8270C
Pyridine							*CAS #*	110-86-1
Second Quarter 2008	U	U	U	U	20	-		8270C
Safrole							*CAS #*	94-59-7
Second Quarter 2008	U	U	U	U	10	-		8270C

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	*7W12B Q*	*7MW6 Q*	*7WCA Q*	*7W11B Q*	*QL*	*GPS*	*Background*	*Method*
Silvex							*CAS #*	93-72-1
Second Quarter 2008	U	U	U	U	2.5	-		8151
Styrene							*CAS #*	100-42-5
Second Quarter 2008	U	U	U	U	1	-		8260B
Sulfotep							*CAS #*	3689-24-5
Second Quarter 2008	U	U	U	U	10	-		8270C
2,4,5-Trichlorophenoxyacetic acid							*CAS #*	93-76-5
Second Quarter 2008	U	U	U	U	2.5	-		8151
1,2,4,5-Tetrachlorobenzene							*CAS #*	95-94-3
Second Quarter 2008	U	U	U	U	10	-		8270C
1,1,1,2-Tetrachloroethane							*CAS #*	630-20-6
Second Quarter 2008	U	U	U	U	1	-		8260B
1,1,2,2-Tetrachloroethane							*CAS #*	79-34-5
Second Quarter 2008	U	U	U	U	1	-		8260B
Tetrachloroethene							*CAS #*	127-18-4
Second Quarter 2008	U	U	U	U	1	-		8260B
Tetrahydrofuran							*CAS #*	109-99-9
Second Quarter 2008	U	U	U	U	5	-		8260B
2,3,4,6-Tetrachlorophenol							*CAS #*	58-90-2
Second Quarter 2008	U	U	U	U	10	-		8270C
Toluene							*CAS #*	108-88-3
Second Quarter 2008	U	U	U	U	1	-		8260B
o-Toluidine							*CAS #*	95-53-4
Second Quarter 2008	U	U	U	U	10	-		8270C
Toxaphene							*CAS #*	8001-35-2
Second Quarter 2008	U	U	U	U	1	-		8081A
1,2,3-Trichlorobenzene							*CAS #*	87-61-6
Second Quarter 2008	U J	U J	U J	U J	1	-		8260B
1,2,4-Trichlorobenzene							*CAS #*	120-82-1
Second Quarter 2008	U J	U J	U J	U J	1	-		8260B
1,1,1-Trichloroethane							*CAS #*	71-55-6
Second Quarter 2008	U	U	U	U	1	-		8260B
1,1,2-Trichloroethane							*CAS #*	79-00-5
Second Quarter 2008	U	U	U	U	1	-		8260B
Trichloroethene							*CAS #*	79-01-6
Second Quarter 2008	U	U	U	U	1	-		8260B
Trichlorofluoromethane							*CAS #*	75-69-4
Second Quarter 2008	U	U	U	U	1	-		8260B
2,4,5-Trichlorophenol							*CAS #*	95-95-4
Second Quarter 2008	U	U	U	U	10	-		8270C
2,4,6-Trichlorophenol							*CAS #*	88-06-2
Second Quarter 2008	U	U	U	U	10	-		8270C
1,2,3-Trichloropropane							*CAS #*	96-18-4
Second Quarter 2008	U	U	U	U	1	-		8260B
1,1,2-Trichloro-1,2,2-Trifluoroethane							*CAS #*	76-13-1
Second Quarter 2008	U	U	U	U	1	-		8260B

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	*7W12B Q*	*7MW6 Q*	*7WCA Q*	*7W11B Q*	*QL*	*GPS*	*Background*	*Method*
O,O,O-Triethyl phosphorothioate							*CAS #*	126-68-1
Second Quarter 2008	U	U	U	U	10	-		8270C
1,2,4-Trimethylbenzene							*CAS #*	95-63-6
Second Quarter 2008	U	U	U	U	1	-		8260B
1,3,5-Trimethylbenzene							*CAS #*	108-67-8
Second Quarter 2008	U	U	U	U	1	-		8260B
sym-Trinitrobenzene							*CAS #*	99-35-4
Second Quarter 2008	U	U	U	U	10	-		8270C
Vinyl acetate							*CAS #*	108-05-4
Second Quarter 2008	U	U	U	U	5	-		8260B
Vinyl chloride							*CAS #*	75-01-4
Second Quarter 2008	U	U	U	U	1	-		8260B
Xylenes (Total)							*CAS #*	1330-20-7
Second Quarter 2008	U	U	U	U	3	-		8260B

Target Analyte Monitoring Results - HWMU-7 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 7W12B
All Results in ug/L.

Analtye/Quarter	*7W12B Q*	*7MW6 Q*	*7WCA Q*	*7W11B Q*	*QL*	*GPS*	*Background*	*Method*

Definitions:

The following definitions apply to results reported for Appendix IX monitoring events.
All Appendix IX monitoring results for compliance wells are reported to the detection limit.

QL Denotes permit required quantitation limit.
U denotes not detected at or above the detection limit.
UA denotes not detected at or above the adjusted detection limit.
J Denotes result is estimated. When used with "U" (i.e., "UJ"), denotes analyte not detected at or above the detection limit and detection limit and QL are estimated. When used with "UA" (i.e., "UAJ"), denotes analyte not detected at or above adjusted detection limit and and adjusted detection limit and QL are estimated.
UN Denotes analyte concentration is less than the quantitation limit and/or five times the blank concentration. Not reliably detected due to blank contamination. This qualifier used only for Appendix IX monitoring event when compliance well results are reported to at or above the project detection limit.
R Denotes result rejected.
Q Denotes data validation qualifier.
Background Denotes background concentrations listed in Appendix F to Attachment 3 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002), where applicable.
CAS# Denotes Chemical Abstract Services registration number.
GPS Denotes groundwater protection standard.

The following definitions apply to results reported for non-Appendix IX monitoring events.
All non-Appendix IX monitoring results for compliance wells are reported to at or above the quantitation limit.

QL Denotes permit required quantitation limit.
U Denotes analyte not detected at or above QL.
UA Denotes analyte not detected at or above adjusted sample QL.
J Denotes result is estimated. When used with "U" (i.e., "**UJ**"), denotes analyte not detected at or above QL and QL is estimated. When used with "UA" (i.e., "**UAJ**"), denotes analyte not detected at or above adjusted QL and adjusted QL is estimated.
R Denotes result rejected.
Q Denotes data validation qualifier.
Background Denotes background concentrations listed in Appendix F to Attachment 3 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002), where applicable.
CAS# Denotes Chemical Abstract Services registration number.
GPS Denotes groundwater protection standard.

Notes:
-**Appendix IX Groundwater Monitoring Events**:
Third Quarter 2003, Second Quarter 2004, Second Quarter 2005, Third Quarter 2006, Second Quarter 2007, Second Quarter 2008
All Appendix IX results evaluated and reported to detection limit.
-9/29/2003: Verification sampling event for 7MW6, 7W11B, 7W12B, 7WCA (copper and zinc).
Verification results reported in this table for copper and zinc.
-6/21-22/2004: Verification sampling event for 7MW6, 7W11B, 7W12B, 7WCA.
Verification results reported in this table for chloroform (7W12B).
-3/23/2005: Verification sampling event for 7MW6. Verification results reported in this table for bis(2-ethylhexyl)phthalate).
-7/26/2005: Verification sampling event for 7MW6, 7W11B, 7W12B, 7WCA (ethyl acetate), 7W11B (beta-BHC), and 7MW6 (alpha-BHC). All verification results reported as not detected. Verification results reported.
-Sept 2006: Verification sampling event for 7W12B and 7W11B 3Q2006 for chloroform. Initial results reported in this table for chloroform (7W11B, 7W12B).
-July 17, 2008: Verification sampling event for 7W13 arsenic and cobalt. 7W9C cobalt

APPENDIX B-3

HWMU-7 2008 LABORATORY ANALYTICAL RESULTS
PLUME MONITORING WELLS

Target Analyte Monitoring Results At or Above Permit Quantitation Limit
HWMU 7 Plume Monitoring Wells
Radford Army Ammunition Plant, Radford, Virginia

All Results in ug/L. *Upgradient well = 7W12B*

Analyte/Quarter	*7W12B Q*	*7W9C Q*	*7W10B Q*	*7W10C Q*	*7W13 Q*	*QL*	*Background*	*GPS*	*Method*	*CAS #*
Antimony										
Second Quarter 2008	U	U N	U	U	U	1	1	6	6020	7440-36-0
Fourth Quarter 2008	U	U	U	U	U	1	1	6	6020	7440-36-0
Arsenic										
Second Quarter 2008	U	U	U	U	U	10	10	10	6020	7440-38-2
Fourth Quarter 2008	U	U	U	U	U	10	10	10	6020	7440-38-2
Barium										
Second Quarter 2008	39.7	26.6	83.2	51.8	14.1	10	41	2000	6020	7440-39-3
Fourth Quarter 2008	34 J	21.8J	84.7J	48.5 J	13.2 J	10	41	2000	6020	7440-39-3
Cadmium										
Second Quarter 2008	U	U	U	U	U	1	1	5	6020	7440-43-9
Fourth Quarter 2008	U	U	U	U	U	1	1	5	6020	7440-43-9
Chromium										
Second Quarter 2008	8.5	U	U	U	U	5	9.9	100	6020	7440-47-3
Fourth Quarter 2008	7.4	U	U	U	U	5	9.9	100	6020	7440-47-3
Cobalt										
Second Quarter 2008	U	U	U	U	5.8	5	5	156.65	6020	7440-48-4
Fourth Quarter 2008	U	U	U	U	12	5	5	156.65	6020	7440-48-4
Copper										
Second Quarter 2008	1.7 J	U	U	U	U	5	5	1300	6020	7440-50-8
Fourth Quarter 2008	U	U	U	U	U	5	5	1300	6020	7440-50-8
Lead										
Second Quarter 2008	U	U	U	U	U	1	1	15	6020	7439-92-1
Fourth Quarter 2008	U	U	U	U	U	1	1	15	6020	7439-92-1
Mercury										
Second Quarter 2008	U	U	U	U	U	0.2	2	2	7470A	7439-97-6
Fourth Quarter 2008	U	U	U	U	U	2	2	2	7470A	7439-97-6
Nickel										
Second Quarter 2008	U	U	U	U	U	10	10	313	6020	7440-02-0
Fourth Quarter 2008	U	U	U	U	U	10	10	313	6020	7440-02-0
Selenium										
Second Quarter 2008	U	U	U	U	U	10	10	50	6020	7782-49-2
Fourth Quarter 2008	U	U	U	U	U	10	10	50	6020	7782-49-2
Silver										
Second Quarter 2008	U	U	U	U	U	2	2	78.25	6020	7440-22-4
Fourth Quarter 2008	U	U	U	U	U	2	2	78.25	6020	7440-22-4
Thallium										
Second Quarter 2008	U	U	U	U	U	1	1	2	6020	7440-28-0
Fourth Quarter 2008	U J	U J	U J	U J	U J	1	1	2	6020	7440-28-0
Zinc										
Second Quarter 2008	7.5 J	U	U	U	U	10	10.9	4695	6020	7440-66-6
Fourth Quarter 2008	U	U	U	U	U	10	10.9	4695	6020	7440-66-6
Cyanide										
Second Quarter 2008	U	U	U	U	U	20	20	200	9010B	57-12-5
Fourth Quarter 2008	U	U	U	U	U	10	20	200	9012A/9010B	57-12-5
bis(2-Ethylhexyl)phthalate										
Second Quarter 2008	U	U	U J	U	U	6	6	6	8270C	117-81-7
Fourth Quarter 2008	U	U	U	U	U	6	6	6	8270C	117-81-7
Butyl benzyl phthalate										
Second Quarter 2008	U	U	U J	U	U	10	10	3130	8270C	85-68-7
Fourth Quarter 2008	U	U	U	U	U	10	10	3130	8270C	85-68-7

See last page of this report for definitions.

Target Analyte Monitoring Results At or Above Permit Quantitation Limit
HWMU 7 Plume Monitoring Wells
Radford Army Ammunition Plant, Radford, Virginia

All Results in ug/L. ***Upgradient well = 7W12B***

Analyte/Quarter	*7W12B Q*	*7W9C Q*	*7W10B Q*	*7W10C Q*	*7W13 Q*	*QL*	*Background*	*GPS*	*Method*	*CAS #*
2,4-Dinitrophenol										
Second Quarter 2008	U	U	U J	U	U	10	10	31.3	8270C	51-28-5
Fourth Quarter 2008	U J	U J	U J	U J	U J	10	10	31.3	8270C	51-28-5
2,4-Dinitrotoluene										
Second Quarter 2008	U	U	U J	U	U	10	10	31.3	8270C	121-14-2
Fourth Quarter 2008	U	U	U	U	U	10	10	31.3	8270C	121-14-2
2,6-Dinitrotoluene										
Second Quarter 2008	U	U	U J	U	U	10	10	15.65	8270C	606-20-2
Fourth Quarter 2008	U	U	U	U	U	10	10	15.65	8270C	606-20-2
p-Nitrophenol										
Second Quarter 2008	U	U	U J	U	U	10	20	50	8270C	100-02-7
Fourth Quarter 2008	U	U	U	U	U	10	20	50	8270C	100-02-7

Definitions:

All plume monitoring well results reported to at or above the permit quantitation limit except for the upgradient well during the Appendix IX monitoring Event. During this event, results for the upgradient well are reported to the detection limit.

Q Denotes data validation qualifier.
QL Denotes permit required quantitation limit.
U Denotes analyte not detected at or above QL.
UA Denotes analyte not detected at or above adjusted sample QL.
J Denotes result is estimated. When used with "U" (i.e., "**UJ**"), denotes analyte not detected at or above QL and QL is estimated. When used with "UA" (i.e., "**UAJ**"), denotes analyte not detected at or above adjusted QL and adjusted QL is estimated.
UN Denotes analyte concentration is less than the quantiation limit and five times the blank concentration. Not reliably detected due to blank contamination. This qualifier used only for Appendix IX monitoring event when compliance well results are reported to at or above the project detection limit.
R Denotes result rejected.
Background Denotes background concentrations calculated using 2nd Quarter 2003 through 4th Quarter 2007 data from the upgradient well 7W12B.
CAS# Denotes Chemical Abstract Services registration number. **GPS** Denotes groundwater protection standard.

Notes:
-January 2005: Verification sampling event for 7MW13 4Q2004 arsenic. Verification results reported in this table for arsenic (7W13).
-March 2006: Verification sampling event for 7MW13 1Q2006 arsenic. Verification results reported in this table for arsenic (7W13).
-July 2006: Verification sampling event for 7MW13 2Q2006 arsenic. Verification results reported in this table for arsenic (7W13).
-Sept 2006: Verification sampling event for 7W12B 3Q2006 chloroform. Initial results reported in this table for chloroform (7W12B).
-July 17, 2007: Verification sampling event for 7W13 arsenic-verification event result reported, highest of four quadruplicate results, 7W13 cobalt-original result reported.. 7W9C cobalt- Verification result reported.
-Dec 17, 2008: Verification sampling event for 7W13 . cobalt- Original result reported.

See last page of this report for definitions.

APPENDIX B-4

ESTABLISHED BACKGROUND VALUES AND COMPUTATIONS FOR HWMU-7

CONSTITUENT BACKGROUND VALUES FOR THE GROUNDWATER MONITORING PROGRAM

HWMU-7
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

Prepared for:

Alliant Techsystems Inc.
Radford Army Ammunition Plant
Route 114
Radford, Virginia 24141-0100

Prepared by:

Draper Aden Associates
2206 South Main Street
Blacksburg, Virginia 24060
(540) 552-0444

December 2007
DAA Job No. B03204-101

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RADFORD ARMY AMMUNITION PLANT – HWMU-7
CALCULATION OF CONSTITUENT BACKGROUND VALUES

Draper Aden Associates recalculated background values for the plume monitoring well constituents of the groundwater monitoring program for Hazardous Waste Management Unit No. 7 (HWMU-7) located at the Radford Army Ammunition Plant (Radford AAP) in Radford, Virginia. Background values were calculated for all plume monitoring well constituents.

The background values for HWMU-7 plume monitoring well constituents were calculated using the analytical data for upgradient well 7W12B using data from Second Quarter 2003 through Second Quarter 2007 (available most recent data with one exception-cyanide includes 4th Quarter 2007 data). Inter-well upper prediction limits (UPL) were calculated on the background data for the target parameters in accordance with the facility permit and VHWMR (40 CFR 264.97(h)). Where applicable, the background value calculations were based on site-wide 95% confidence, 95% coverage upper prediction intervals. The calculated background values for all target constituents are listed on **Table 1**.

Background Data and Background Value Calculations

The constituents listed below were 100% non-detected (<LOQ) in the background well. The background values for these constituents were established as equal to their quantitation limits (QL).

Background Value = Quantitation Limit (QL)				
Constituent	Sample Size	% Non-Detects	QL (µg/l)	Background Value (µg/l)
Antimony	17	100	1	1
Arsenic	17	100	10	10
Cadmium	17	100	1	1
Cobalt	17	100	5	5
Copper	16	100	5	5
Lead	17	100	1	1
Mercury	17	100	2	2
Nickel	17	100	10	10
Selenium	17	100	10	10
Silver	17	100	2	2
Thallium	17	100	1	1
Cyanide	18	100	20	20
Bis(2-ethylhexyl)phthalate	17	100	6	6
Butyl benzyl phthalate	17	100	10	10
2,4-Dinitrophenol	17	100	10	10
2,4-Dinitrotoluene	17	100	10	10
2,6-Dinitrotoluene	17	100	10	10
p-Nitrophenol	17	100	10	10

Non-parametric prediction intervals were computed for the constituents for which the data from upgradient well 7W-12B satisfied one of the following two criteria, per VDEQ regulations and guidance as well as USEPA guidance:

- Percentage of non-detects was greater than or equal to 50 and less than 100; or
- Percentage of non-detects was less than 50, but data was not normally distributed in original or log-transformed mode.

Only one result for zinc was reported above its LOQ. The reported result (10.9 µg/l) is the NUPL for zinc. The non-parametric prediction limit computation for chromium is presented in **Appendix A**.

Background Value = UPL of Non-parametric Prediction Interval (NUPL)					
Parameter	**Sample Size**	**% Non-Detects**	**QL (µg/l)**	**NUPL (µg/l)**	**Background Value (µg/l)**
Chromium	17	12	5	9.9	9.9
Zinc	14	93	10	10.9	10.9

The following constituent (barium) exhibited normally distributed background data with less than 0% non-detects. One sided parametric prediction interval was computed on the background data for barium. The background value for barium was set as equal to its UPL. The background concentration calculations were based on a site wide 95% confidence, 95% coverage upper prediction intervals. The background and relevant statistical data for barium is summarized below. The prediction interval computation is presented in **Appendix A**.

Background Value = UPL of one-sided Prediction Interval					
Parameter	**Sample Size**	**% Non-Detects**	**QL (µg/l)**	**UPL (µg/l)**	**Background Value (µg/l)**
Barium	17	0	10	41.0	41.0

TABLE 1

HWMU-7
CALCULATED BACKGROUND VALUES

Constituent	Background Value (µg/l unless otherwise noted)
Antimony	1
Arsenic	10
Barium	41.0
Cadmium	1
Chromium	9.9
Cobalt	5
Copper	5
Lead	1
Mercury	2
Nickel	10
Selenium	10
Silver	2
Thallium	1
Zinc	10.9
Cyanide	20
Bis(2-ethylhexyl)phthalate	6
Butyl benzyl phthalate	10
2,4-Dinitrophenol	10
2,4-Dinitrotoluene	10
2,6-Dinitrotoluene	10
p-Nitrophenol	10

APPENDIX A

HWMU-7
BACKGROUND VALUE CALCULATIONS
STATISTICAL COMPUTATIONS FOR BARIUM AND CHROMIUM

RAAP-HWMU-7 - Background Calculation - December 2007
17-Dec-07

Y2K Correction dates are as shown in table below.

Actual Event			Date Used in Stat Software
2003-Qtr2			8/1/1999
2003-Qtr3			8/2/1999
2003-Qtr4			8/3/1999
2004-Qtr1			8/4/1999
2004-Qtr2			8/5/1999
2004-Qtr3			8/6/1999
2004-Qtr4			8/7/1999
2005-Qtr1			8/8/1999
2005-Qtr2			8/9/1999
2005-Qtr3			8/10/1999
2005-Qtr4			8/11/1999
2006-Qtr1			8/12/1999
2006-Qtr2			8/13/1999
2006-Qtr3			8/14/1999
2006-Qtr4			8/15/1999
2007-Qtr1			8/16/1999
2007-Qtr2			8/17/1999

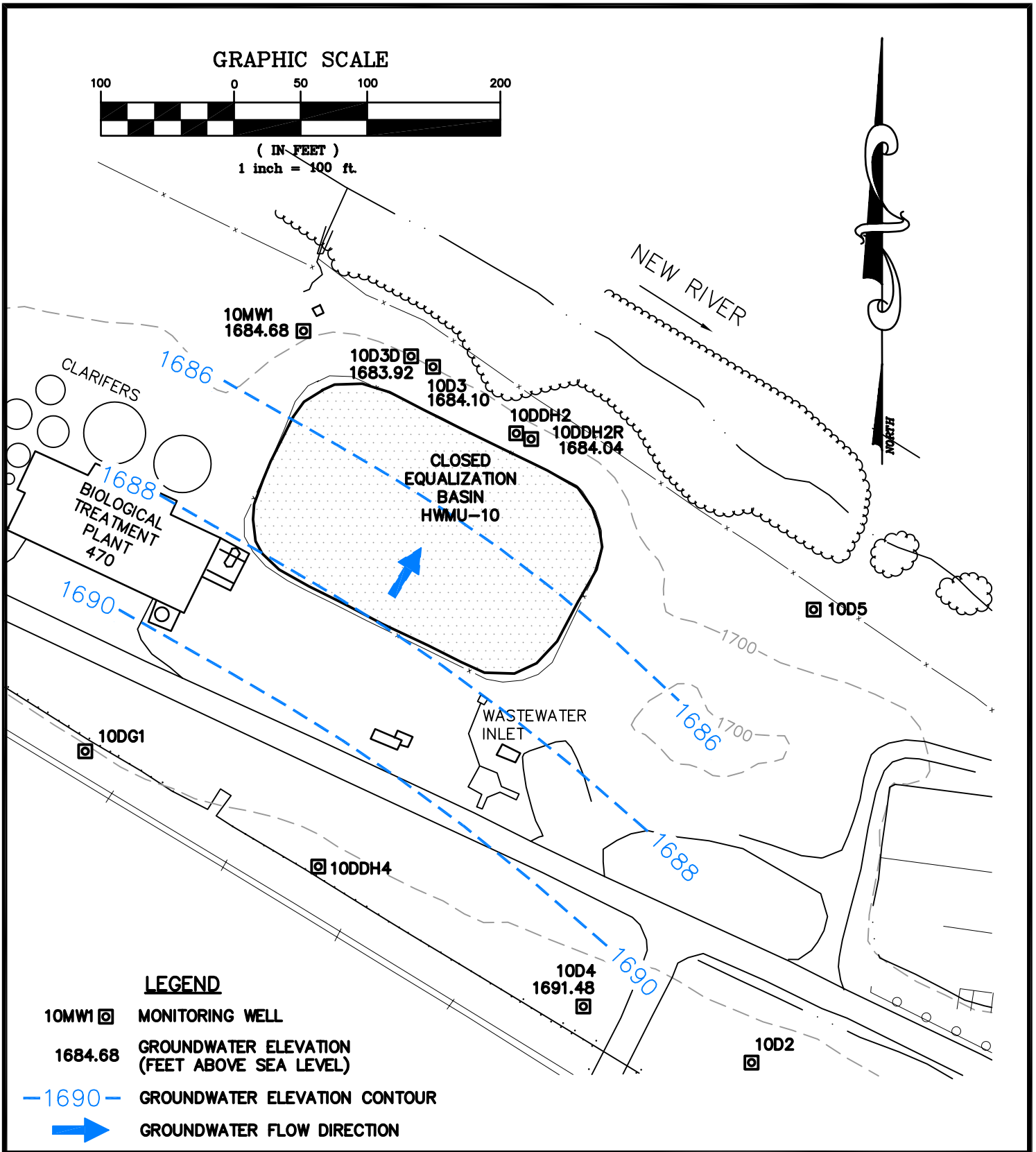
Notes:
1) Background data was computed for all target constituents using the 2Q 2003 - 2Q 2007 data for background well 7W12B. Background data was 100% <LOQ for all target parameters except barium, chromium and zinc. Zinc had only one reported result > LOQ.
Statistical computations using GRITS/STAT V5.0 performed only for barium and chromium, as applicable.

APPENDIX C

HWMU-10

APPENDIX C-1

HWMU-10 POTENTIOMETRIC SURFACE MAPS
SECOND QUARTER 2008
FOURTH QUARTER 2008



HWMU-10 POTENTIOMETRIC SURFACE MAP (2ND QUARTER 2008)

RADFORD ARMY AMMUNITION PLANT

RADFORD, VIRGINIA

SCALE: 1"=100'

PLAN NO. B03204-06

Draper Aden Associates

Engineering ✦ Surveying ✦ Environmental Services

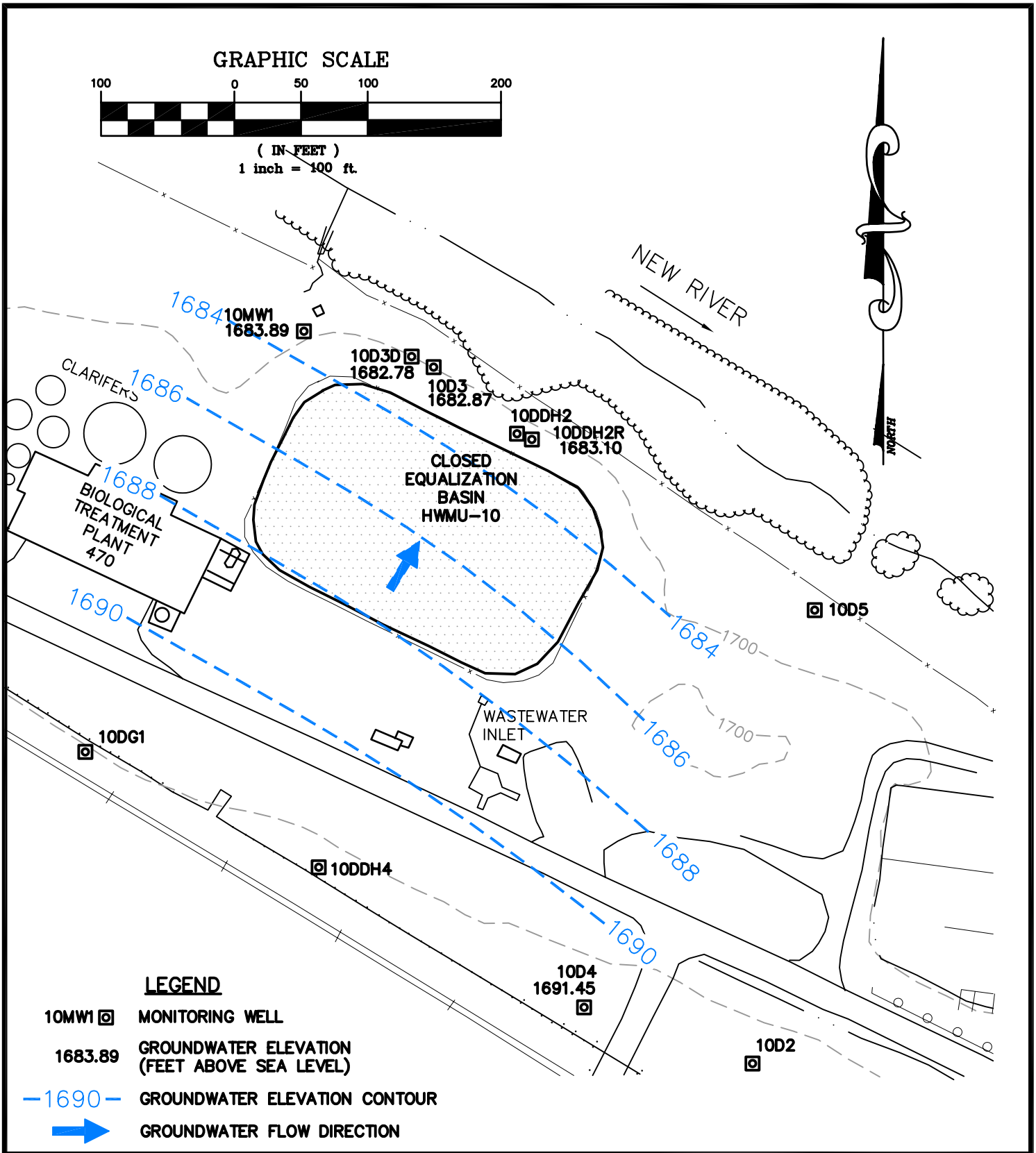
2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291

Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED	RGM
DRAWN	KKD
CHECKED	MDL
DATE	07/30/08

FIGURE 3

P:\B03\200\B03204\B03204-05\CAD\B03204-05ENV\dwg\B03204-05_HWMU-10.dwg Jan 29, 2009 9:40am



HWMU-10 POTENTIOMETRIC SURFACE MAP (4TH QUARTER 2008)

RADFORD ARMY AMMUNITION PLANT

RADFORD, VIRGINIA

SCALE: 1"=100'

PLAN NO. B03204-06

Draper Aden Associates

Engineering ◆ Surveying ◆ Environmental Services

2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291

Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED	RGM
DRAWN	KKD
CHECKED	MDL
DATE	01/07/09

FIGURE 3

P:\B03\200\B03204\B03204-05\CAD\B03204-05ENV\dwg\B03204-05_HWMU-10.dwg Jan 29, 2009 10:49am

APPENDIX C-2

HWMU-10 2008 LABORATORY ANALYTICAL RESULTS
POINT OF COMPLIANCE WELLS

Target Analyte Monitoring Results - HWMU-10 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4 ***All Results in ug/L.***

Analyte/Quarter	*10D4 Q*	*10D3 Q*	*10D3D Q*	*10DDH2R Q*	*10MW1 Q*	*QL*	*GPS*	*Method*
Antimony				*CAS #*	*7440-36-0*			
Second Quarter 2008	U	U	U	U	U	1	-	6020
Arsenic				*CAS #*	*7440-38-2*			
Second Quarter 2008	U	U	U	U	U	10	50	6020
Fourth Quarter 2008	U	U	U	U	U	10	50	6020
Barium				*CAS #*	*7440-39-3*			
Second Quarter 2008	123 J	118 J	54.4 J	95.3 J	92.9 J	10	2000	6020
Fourth Quarter 2008	119	124	53.3	71.5	87.1	10	2000	6020
Beryllium				*CAS #*	*7440-41-7*			
Second Quarter 2008	U	U	U	U	U	1	-	6020
Cadmium				*CAS #*	*7440-43-9*			
Second Quarter 2008	U	U	U	U	U	1	-	6020
Chromium				*CAS #*	*7440-47-3*			
Second Quarter 2008	3.5 J	1.8 J	U	4 J	2.4 J	5	100	6020
Fourth Quarter 2008	U	U	U	U	U	5	100	6020
Cobalt				*CAS #*	*7440-48-4*			
Second Quarter 2008	U	U	U	U	U	5	-	6020
Fourth Quarter 2008	U	U	U	U	U	5	-	6020
Copper				*CAS #*	*7440-50-8*			
Second Quarter 2008	1.2 J	1.1 J	U	U	U	5	1300	6020
Fourth Quarter 2008	U	U	U	U	U	5	1300	6020
Lead				*CAS #*	*7439-92-1*			
Second Quarter 2008	0.38 J	U	U	U	U	1	15	6020
Fourth Quarter 2008	U J	U J	U J	U J	U J	1	15	6020
Mercury				*CAS #*	*7439-97-6*			
Second Quarter 2008	U	U	U	U	U	2	2	7470A
Fourth Quarter 2008	-	-	-	-	-	2	2	SW7470A
Fourth Quarter 2008	U	U	U	U	U	2	2	7470A
Nickel				*CAS #*	*7440-02-0*			
Second Quarter 2008	U	U	U	U	U	10	313	6020
Fourth Quarter 2008	U	U	U	U	U	10	313	6020
Selenium				*CAS #*	*7782-49-2*			
Second Quarter 2008	U	U	U	U	U	10	50	6020
Fourth Quarter 2008	U	U	U	U	U	10	50	6020
Silver				*CAS #*	*7440-22-4*			
Second Quarter 2008	U	U	U	U	U	2	78.25	6020
Fourth Quarter 2008	U	U	U	U	U	2	78.25	6020
Thallium				*CAS #*	*7440-28-0*			
Second Quarter 2008	U J	U J	U J	U J	U J	1	-	6020
Tin				*CAS #*	*7440-31-5*			
Second Quarter 2008	U	U	U	U	U	5	-	6020
Vanadium				*CAS #*	*7440-62-2*			
Second Quarter 2008	U	U	U	U	U	10	-	6020
Fourth Quarter 2008	U	U	U	U	U	10	-	6020
Zinc				*CAS #*	*7440-66-6*			
Second Quarter 2008	5 J	4.9 J	6.7 J	3.5 J	3.7 J	10	4695	6020
Fourth Quarter 2008	U	U	U	U	U	10	4695	6020
Sulfide				*CAS #*	*18496-25-8*			
Second Quarter 2008	U	U	U	U	U	1000	-	9034

Target Analyte Monitoring Results - HWMU-10 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4 ***All Results in ug/L.***

Analyte/Quarter	*10D4 Q*	*10D3 Q*	*10D3D Q*	*10DDH2R Q*	*10MW1 Q*	*QL*	*GPS*	*Method*
Cyanide				*CAS # 57-12-5*				
Second Quarter 2008	U	U	U	U	U	20	200	9014
Fourth Quarter 2008	U	U	U	U	U	20	200	9012A
Acenaphthene				*CAS # 83-32-9*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Acenaphthylene				*CAS # 208-96-8*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Acetone				*CAS # 67-64-1*				
Second Quarter 2008	U	U	18000	180 J	U	5	-	8260B
Fourth Quarter 2008	-	-	-	-	-	5	-	8260B
Fourth Quarter 2008	U	U	8600	U	U	5	-	8260B
Acetonitrile				*CAS # 75-05-8*				
Second Quarter 2008	U	U	U A	U	U	100	-	8260B
Acetophenone				*CAS # 98-86-2*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2-Acetylaminofluorene				*CAS # 53-96-3*				
Second Quarter 2008	U	U	U	U	U	30	-	8270C
Acrolein				*CAS # 107-02-8*				
Second Quarter 2008	U J	U J	U JA	U J	U J	10	-	8260B
Acrylonitrile				*CAS # 107-13-1*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Aldrin				*CAS # 309-00-2*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Allyl chloride				*CAS # 107-05-1*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
4-Aminobiphenyl				*CAS # 92-67-1*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Aniline				*CAS # 62-53-3*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Anthracene				*CAS # 120-12-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Aramite				*CAS # 140-57-8*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Benzene				*CAS # 71-43-2*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Benzo[a]anthracene				*CAS # 56-55-3*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Benzo[b]fluoranthene				*CAS # 205-99-2*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Benzo[k]fluoranthene				*CAS # 207-08-9*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Benzo[ghi]perylene				*CAS # 191-24-2*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Benzo(a)pyrene				*CAS # 50-32-8*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1,4-Benzenediamine				*CAS # 106-50-3*				
Second Quarter 2008	U	U	U	U	U	50	-	8270C
Benzyl alcohol				*CAS # 100-51-6*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C

Target Analyte Monitoring Results - HWMU-10 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4 ***All Results in ug/L.***

Analyte/Quarter	*10D4 Q*	*10D3 Q*	*10D3D Q*	*10DDH2R Q*	*10MW1 Q*	*QL*	*GPS*	*Method*
alpha-BHC				*CAS # 319-84-6*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
beta-BHC				*CAS # 319-85-7*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
delta-BHC				*CAS # 319-86-8*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
gamma-BHC				*CAS # 58-89-9*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
bis(2-Chloroethoxy)methane				*CAS # 111-91-1*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
bis(2-Chloroethyl)ether				*CAS # 111-44-4*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
bis(2-Chloro-1-methylethyl)ether				*CAS # 108-60-1*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
bis(2-Ethylhexyl)phthalate				*CAS # 117-81-7*				
Second Quarter 2008	U	U	U	U	U	6	-	8270C
Bromobenzene				*CAS # 108-86-1*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Bromochloromethane				*CAS # 74-97-5*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Bromodichloromethane				*CAS # 75-27-4*				
Second Quarter 2008	U	U	U A	U	U	1	80	8260B
Fourth Quarter 2008	U	U	U	U	U	0.5	80	8260B
Bromoform				*CAS # 75-25-2*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
4-Bromophenyl phenyl ether				*CAS # 101-55-3*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2-Butanone				*CAS # 78-93-3*				
Second Quarter 2008	U	U	U A	U	U	5	691.08	8260B
Fourth Quarter 2008	U	U	U	U	U	5	691.08	8260B
n-Butyl alcohol				*CAS # 71-36-3*				
Second Quarter 2008	U	U	U A	U	U	200	-	8260B
tert-Butyl alcohol				*CAS # 75-65-0*				
Second Quarter 2008	U J	U J	U JA	U J	U J	20	-	8260B
n-Butylbenzene				*CAS # 104-51-8*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
sec-Butylbenzene				*CAS # 135-98-8*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
tert-Butylbenzene				*CAS # 98-06-6*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Butyl benzyl phthalate				*CAS # 85-68-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Carbon disulfide				*CAS # 75-15-0*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Carbon tetrachloride				*CAS # 56-23-5*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Chlordane				*CAS # 57-74-9*				
Second Quarter 2008	U	U	U	U	U A	0.25	-	8081A

Target Analyte Monitoring Results - HWMU-10 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4 ***All Results in ug/L.***

Analyte/Quarter	*10D4 Q*	*10D3 Q*	*10D3D Q*	*10DDH2R Q*	*10MW1 Q*	*QL*	*GPS*	*Method*
p-Chloroaniline				*CAS # 106-47-8*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Chlorobenzene				*CAS # 108-90-7*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Chlorobenzilate				*CAS # 510-15-6*				
Second Quarter 2008	U	U	U	U	U	20	-	8270C
p-Chloro-m-cresol				*CAS # 59-50-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Chloroethane				*CAS # 75-00-3*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Chloroform				*CAS # 67-66-3*				
Second Quarter 2008	17	1.5	U A	U	3.7	1	80	8260B
Fourth Quarter 2008	-	1.8	1.6	U	4.8	0.5	80	8260B
Fourth Quarter 2008	22	-	-	-	-	0.5	80	8260B
2-Chloroethyl vinyl ether				*CAS # 110-75-8*				
Second Quarter 2008	U	U	U A	U	U	5	-	8260B
2-Chloronaphthalene				*CAS # 91-58-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2-Chlorophenol				*CAS # 95-57-8*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
4-Chlorophenyl phenyl ether				*CAS # 7005-72-3*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Chloroprene				*CAS # 126-99-8*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
2-Chlorotoluene				*CAS # 95-49-8*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
4-Chlorotoluene				*CAS # 106-43-4*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Chrysene				*CAS # 218-01-9*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Cyclohexane				*CAS # 71-36-3*				
Second Quarter 2008	U	U	U A	U	U	2	-	8260B
2,4-Dichlorophenoxyacetic acid				*CAS # 94-75-7*				
Second Quarter 2008	U	U	U	U	U	5	-	8151A
4,4'-DDD				*CAS # 72-54-8*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
4,4'-DDE				*CAS # 72-55-9*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
4,4'-DDT				*CAS # 50-29-3*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Diallate				*CAS # 2303-16-4*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Dibenz(a,h)anthracene				*CAS # 53-70-3*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Dibenzofuran				*CAS # 132-64-9*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Dibromochloromethane				*CAS # 124-48-1*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B

Target Analyte Monitoring Results - HWMU-10 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4 ***All Results in ug/L.***

Analyte/Quarter	*10D4 Q*	*10D3 Q*	*10D3D Q*	*10DDH2R Q*	*10MW1 Q*	*QL*	*GPS*	*Method*
1,2-Dibromo-3-chloropropane				*CAS #* 96-12-8				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,2-Dibromoethane				*CAS #* 106-93-4				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Di-n-butyl phthalate				*CAS #* 84-74-2				
Second Quarter 2008	U	U	U	U	U N	10	-	8270C
1,2-Dichlorobenzene				*CAS #* 95-50-1				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,3-Dichlorobenzene				*CAS #* 541-73-1				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,4-Dichlorobenzene				*CAS #* 106-46-7				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
3,3'-Dichlorobenzidine				*CAS #* 91-94-1				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
trans-1,4-Dichloro-2-butene				*CAS #* 110-57-6				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Dichlorodifluoromethane				*CAS #* 75-71-8				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,1-Dichloroethane				*CAS #* 75-34-3				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,2-Dichloroethane				*CAS #* 107-06-2				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,1-Dichloroethene				*CAS #* 75-35-4				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
cis-1,2-Dichloroethene				*CAS #* 156-59-2				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
trans-1,2-Dichloroethene				*CAS #* 156-60-5				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
2,4-Dichlorophenol				*CAS #* 120-83-2				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2,6-Dichlorophenol				*CAS #* 87-65-0				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1,2-Dichloropropane				*CAS #* 78-87-5				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,3-Dichloropropane				*CAS #* 142-28-9				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
2,2-Dichloropropane				*CAS #* 594-20-7				
Second Quarter 2008	U J	U J	U JA	U J	U J	1	-	8260B
1,1-Dichloropropene				*CAS #* 563-58-6				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
cis-1,3-Dichloropropene				*CAS #* 10061-01-5				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
trans-1,3-Dichloropropene				*CAS #* 10061-02-6				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Dieldrin				*CAS #* 60-57-1				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Diethyl ether				*CAS #* 60-29-7				
Second Quarter 2008	U	U	U A	U	U	2	-	8260B

Target Analyte Monitoring Results - HWMU-10 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4 ***All Results in ug/L.***

Analyte/Quarter	*10D4 Q*	*10D3 Q*	*10D3D Q*	*10DDH2R Q*	*10MW1 Q*	*QL*	*GPS*	*Method*
Diethyl phthalate				*CAS # 84-66-2*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
O,O-Diethyl O-2-pyrazinyl				*CAS # 297-97-2*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Dimethoate				*CAS # 60-51-5*				
Second Quarter 2008	U	U	U	U	U	20	-	8270C
Dimethyl ether				*CAS # 115-10-6*				
Second Quarter 2008	U	U	U A	U	U	2	-	8260B
p-(Dimethylamino)azobenzene				*CAS # 60-11-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
7,12-Dimethylbenz[a]anthracene				*CAS # 57-97-6*				
Second Quarter 2008	U	U	U	U	U	20	-	8270C
3,3'-Dimethylbenzidine				*CAS # 119-93-7*				
Second Quarter 2008	U	U	U	U	U	20	-	8270C
a,a-Dimethylphenethylamine				*CAS # 122-09-8*				
Second Quarter 2008	U	U	U	U	U	50	-	8270C
2,4-Dimethylphenol				*CAS # 105-67-9*				
Second Quarter 2008	U J	U J	U J	U J	U J	10	-	8270C
Dimethyl phthalate				*CAS # 131-11-3*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
m-Dinitrobenzene				*CAS # 99-65-0*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
4,6-Dinitro-o-cresol				*CAS # 534-52-1*				
Second Quarter 2008	U	U	U	U	U	20	-	8270C
2,4-Dinitrophenol				*CAS # 51-28-5*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2,4-Dinitrotoluene				*CAS # 121-14-2*				
Second Quarter 2008	U	U	U	U	U	10	31.3	8270C
Fourth Quarter 2008	U	U	U	U	U	10	31.3	8270C
Fourth Quarter 2008	-	-	-	-	-	10	31.3	8270C
2,6-Dinitrotoluene				*CAS # 606-20-2*				
Second Quarter 2008	U	U	U	U	U	10	15.65	8270C
Fourth Quarter 2008	U	U	U	U	U	10	15.65	8270C
Fourth Quarter 2008	-	-	-	-	-	10	15.65	8270C
Dinoseb				*CAS # 88-85-7*				
Second Quarter 2008	U	U	U	U	U	2.5	-	8151A
Di-n-octyl phthalate				*CAS # 117-84-0*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1,4-Dioxane				*CAS # 123-91-1*				
Second Quarter 2008	U	U	U A	U	U	200	-	8260B
Diphenylamine				*CAS # 122-39-4*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Disulfoton				*CAS # 298-04-4*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Endosulfan I				*CAS # 959-98-8*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Endosulfan II				*CAS # 33213-65-9*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A

Target Analyte Monitoring Results - HWMU-10 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4 ***All Results in ug/L.***

Analyte/Quarter	*10D4 Q*	*10D3 Q*	*10D3D Q*	*10DDH2R Q*	*10MW1 Q*	*QL*	*GPS*	*Method*
Endosulfan sulfate				*CAS # 1031-07-8*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Endrin				*CAS # 72-20-8*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Ethyl acetate				*CAS # 75-25-2*				
Second Quarter 2008	U	U	U A	U	U	2	-	8260B
Endrin aldehyde				*CAS # 7421-93-4*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Ethanol				*CAS # 60-29-7*				
Second Quarter 2008	U	U	U A	U	U	200	-	8260B
Ethylbenzene				*CAS # 100-41-4*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Ethyl methacrylate				*CAS # 97-63-2*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Ethyl methanesulfonate				*CAS # 62-50-0*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Ethylene oxide				*CAS # 75-21-8*				
Second Quarter 2008	U	U	U A	U	U	20	-	8260B
Famphur				*CAS # 52-85-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Fluoranthene				*CAS # 206-44-0*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Fluorene				*CAS # 86-73-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Heptachlor				*CAS # 76-44-8*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Heptachlor epoxide				*CAS # 1024-57-3*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Hexachlorobenzene				*CAS # 118-74-1*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Hexachlorobutadiene				*CAS # 87-68-3*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Hexachlorocyclopentadiene				*CAS # 77-47-4*				
Second Quarter 2008	U J	U J	U J	U J	U J	20	-	8270C
Hexachloroethane				*CAS # 67-72-1*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Hexachlorophene				*CAS # 70-30-4*				
Second Quarter 2008	U	U	U	U	U	500	-	8270C
Hexachloropropene				*CAS # 1888--71-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2-Hexanone				*CAS # 591-78-6*				
Second Quarter 2008	U	U	U A	U	U	5	-	8260B
Indeno[1,2,3-cd]pyrene				*CAS # 193-39-5*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Isobutyl alcohol				*CAS # 78-83-1*				
Second Quarter 2008	U J	U J	U JA	U J	U J	125	-	8260B
Isodrin				*CAS # 465-73-6*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C

Target Analyte Monitoring Results - HWMU-10 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4 ***All Results in ug/L.***

Analyte/Quarter	*10D4 Q*	*10D3 Q*	*10D3D Q*	*10DDH2R Q*	*10MW1 Q*	*QL*	*GPS*	*Method*
Isophorone				*CAS # 78-59-1*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Isopropylbenzene				*CAS # 98-82-8*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Isopropylether				*CAS # 108-20-3*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
4-Isopropyltoluene				*CAS # 99-87-6*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Isosafrole				*CAS # 120-58-1*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Kepone				*CAS # 143-50-0*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Methacrylonitrile				*CAS # 126-98-7*				
Second Quarter 2008	U	U	U A	U	U	10	-	8260B
Methapyrilene				*CAS # 91-80-5*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Methoxychlor				*CAS # 72-43-5*				
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Bromomethane				*CAS # 74-83-9*				
Second Quarter 2008	U J	U J	U JA	U J	U J	1	-	8260B
Chloromethane				*CAS # 74-87-3*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
3-Methylcholanthrene				*CAS # 56-49-5*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Iodomethane				*CAS # 74-88-4*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Methyl methacrylate				*CAS # 80-62-6*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Methyl methane sulfonate				*CAS # 66-27-3*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2-Methylnaphthalene				*CAS # 91-57-6*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Methyl parathion				*CAS # 298-00-0*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
4-Methyl-2-pentanone				*CAS # 108-10-1*				
Second Quarter 2008	U	U	U A	U	U	5	-	8260B
2-Methylphenol				*CAS # 95-48-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
3 & 4-Methylphenol				*CAS # 106-44-5*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Methyl tert-butyl ether				*CAS # 1634-04-4*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Dibromomethane				*CAS # 74-95-3*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Methylene chloride				*CAS # 75-09-2*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Naphthalene				*CAS # 91-20-3*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B

Target Analyte Monitoring Results - HWMU-10 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4 ***All Results in ug/L.***

Analyte/Quarter	*10D4 Q*	*10D3 Q*	*10D3D Q*	*10DDH2R Q*	*10MW1 Q*	*QL*	*GPS*	*Method*
1,4-Naphthoquinone				*CAS # 130-15-4*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1-Naphthylamine				*CAS # 134-32-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2-Naphthylamine				*CAS # 91-59-8*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
o-Nitroaniline				*CAS # 88-74-4*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
m-Nitroaniline				*CAS # 99-09-2*				
Second Quarter 2008	U	U	U	U	U	20	-	8270C
p-Nitroaniline				*CAS # 100-01-6*				
Second Quarter 2008	U	U	U	U	U	20	-	8270C
Nitrobenzene				*CAS # 98-95-3*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
o-Nitrophenol				*CAS # 88-75-5*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
p-Nitrophenol				*CAS # 100-02-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
4-Nitroquinoline-1-oxide				*CAS # 56-57-5*				
Second Quarter 2008	U	U	U	U	U	50	-	8270C
N-Nitrosodi-n-butylamine				*CAS # 924-16-3*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosodiethylamine				*CAS # 55-18-5*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosodimethylamine				*CAS # 62-75-9*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosodiphenylamine				*CAS # 86-30-6*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosodipropylamine				*CAS # 621-64-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosomethylethylamine				*CAS # 10595-95-6*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosomorpholine				*CAS # 59-89-2*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosopiperidine				*CAS # 100-75-4*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosopyrrolidine				*CAS # 930-55-2*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
5-Nitroso-o-toluidine				*CAS # 99-55-8*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Parathion				*CAS # 56-38-2*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Pentachlorobenzene				*CAS # 608-93-5*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Pentachloroethane				*CAS # 76-01-7*				
Second Quarter 2008	U J	U J	U JA	U J	U J	1	-	8260B
Pentachloronitrobenzene				*CAS # 82-68-8*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C

Target Analyte Monitoring Results - HWMU-10 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4 ***All Results in ug/L.***

Analyte/Quarter	*10D4 Q*	*10D3 Q*	*10D3D Q*	*10DDH2R Q*	*10MW1 Q*	*QL*	*GPS*	*Method*
Pentachlorophenol				*CAS # 87-86-5*				
Second Quarter 2008	U	U	U	U	U	20	-	8270C
Phenacetin				*CAS # 62-44-2*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Phenanthrene				*CAS # 85-01-8*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Phenol				*CAS # 108-95-2*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Total Recoverable Phenolics				*CAS # C-020*				
Second Quarter 2008	U	U	U	U	U	5	-	9065
Phorate				*CAS # 298-02-2*				
Second Quarter 2008	U	U	U	U	U	20	-	8270C
2-Picoline				*CAS # 109-06-8*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Pronamide				*CAS # 23950-58-5*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1-Propanol				*CAS # 71-23-8*				
Second Quarter 2008	U	U	U A	U	U	1000	-	8260B
2-Propanol				*CAS # 67-63-0*				
Second Quarter 2008	U	U	40000	6300	U	1000	-	8260B
Fourth Quarter 2008	U	U	25000	U	U	100	-	8260B
Propionitrile				*CAS # 107-12-0*				
Second Quarter 2008	U	U	U A	U	U	10	-	8260B
n-Propylbenzene				*CAS # 103-65-1*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Pyrene				*CAS # 129-00-0*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Pyridine				*CAS # 110-86-1*				
Second Quarter 2008	U	U	U	U	U	20	-	8270C
Safrole				*CAS # 94-59-7*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Silvex				*CAS # 93-72-1*				
Second Quarter 2008	U	U	U	U	U	2.5	-	8151A
Styrene				*CAS # 100-42-5*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Sulfotep				*CAS # 3689-24-5*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2,4,5-Trichlorophenoxyacetic acid				*CAS # 93-76-5*				
Second Quarter 2008	U	U	U	U	U	2.5	-	8151A
1,2,4,5-Tetrachlorobenzene				*CAS # 95-94-3*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1,1,1,2-Tetrachloroethane				*CAS # 630-20-6*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,1,2,2-Tetrachloroethane				*CAS # 79-34-5*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Tetrachloroethene				*CAS # 127-18-4*				
Second Quarter 2008	U J	U J	U JA	U J	U J	1	-	8260B
Tetrahydrofuran				*CAS # 109-99-9*				
Second Quarter 2008	U	U	U A	U	U	5	-	8260B

Target Analyte Monitoring Results - HWMU-10 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4 ***All Results in ug/L.***

Analyte/Quarter	*10D4 Q*	*10D3 Q*	*10D3D Q*	*10DDH2R Q*	*10MW1 Q*	*QL*	*GPS*	*Method*
2,3,4,6-Tetrachlorophenol				*CAS # 58-90-2*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Toluene				*CAS # 108-88-3*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
o-Toluidine				*CAS # 95-53-4*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Toxaphene				*CAS # 8001-35-2*				
Second Quarter 2008	U	U	U	U	U	1	-	8081A
1,2,3-Trichlorobenzene				*CAS # 87-61-6*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,2,4-Trichlorobenzene				*CAS # 120-82-1*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,1,1-Trichloroethane				*CAS # 71-55-6*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,1,2-Trichloroethane				*CAS # 79-00-5*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
Trichloroethene				*CAS # 79-01-6*				
Second Quarter 2008	U	U	U A	U	U	1	5	8260B
Fourth Quarter 2008	U	U	U	U	U	0.5	5	8260B
Trichlorofluoromethane				*CAS # 75-69-4*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
2,4,5-Trichlorophenol				*CAS # 95-95-4*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2,4,6-Trichlorophenol				*CAS # 88-06-2*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1,2,3-Trichloropropane				*CAS # 96-18-4*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,1,2-Trichloro-1,2,2-Trifluoroethane				*CAS # 76-13-1*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
O,O,O-Triethyl phosphorothioate				*CAS # 126-68-1*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1,2,4-Trimethylbenzene				*CAS # 95-63-6*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
1,3,5-Trimethylbenzene				*CAS # 108-67-8*				
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
sym-Trinitrobenzene				*CAS # 99-35-4*				
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Vinyl acetate				*CAS # 108-05-4*				
Second Quarter 2008	U J	U J	U JA	U J	U J	5	-	8260B
Vinyl chloride				*CAS # 75-01-4*				
Second Quarter 2008	U J	U J	U JA	U J	U J	1	-	8260B
Xylenes (Total)				*CAS # 1330-20-7*				
Second Quarter 2008	U	U	U A	U	U	3	10000	8260B
Fourth Quarter 2008	U	U	U	U	U	0.5	10000	8260B

Target Analyte Monitoring Results - HWMU-10 Point of Compliance Wells

Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4 ***All Results in ug/L.***

Analyte/Quarter	*10D4 Q*	*10D3 Q*	*10D3D Q*	*10DDH2R Q*	*10MW1 Q*	*QL*	*GPS*	*Method*

Definitions:

QL Denotes permit required quantitation limit.
U Denotes analyte not detected at or above QL.
UA Denotes analyte not detected at or above adjusted sample QL.
J Denotes associated result is estimated. When used with "U" (i.e., "**UJ**"), denotes analyte not detected at or above QL and QL is estimated. When used with "UA" (i.e., "**UAJ**"), denotes analyte not detected at or above adjusted QL and adjusted QL is estimated.
UN Denotes analyte concentration is less than the quantiation limit and five times the blank concentration. Not reliably detected due to blank contamination. This qualifier used only for Appendix IX monitoring event when results are reported to at or above the detection limit.
R Denotes result rejected.
Q Denotes data validation qualifier.
CAS# Denotes Chemical Abstract Services registration number.
GPS Denotes Groundwater Protection Standards listed in Appendix G to Attachment 4 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002). For cobalt, vanadium, acetone and 2-propanol, these analytes are not listed in Appendix VIII to 40 CFR Part 261; therefore, GPSs will not be established for these constituents.
NS denotes not sampled.
NA denotes not analyzed.
"–" denotes not detected (pre-2nd Quarter 2003) or not available / not sampled (beginning 2nd Quarter 2003).

Appendix IX Monitoring Events:
First Quarter 2003, Second Quarter 2004, Second Quarter 2005, Third Quarter 2006, Second Quarter 2007, Second Quarter 2008

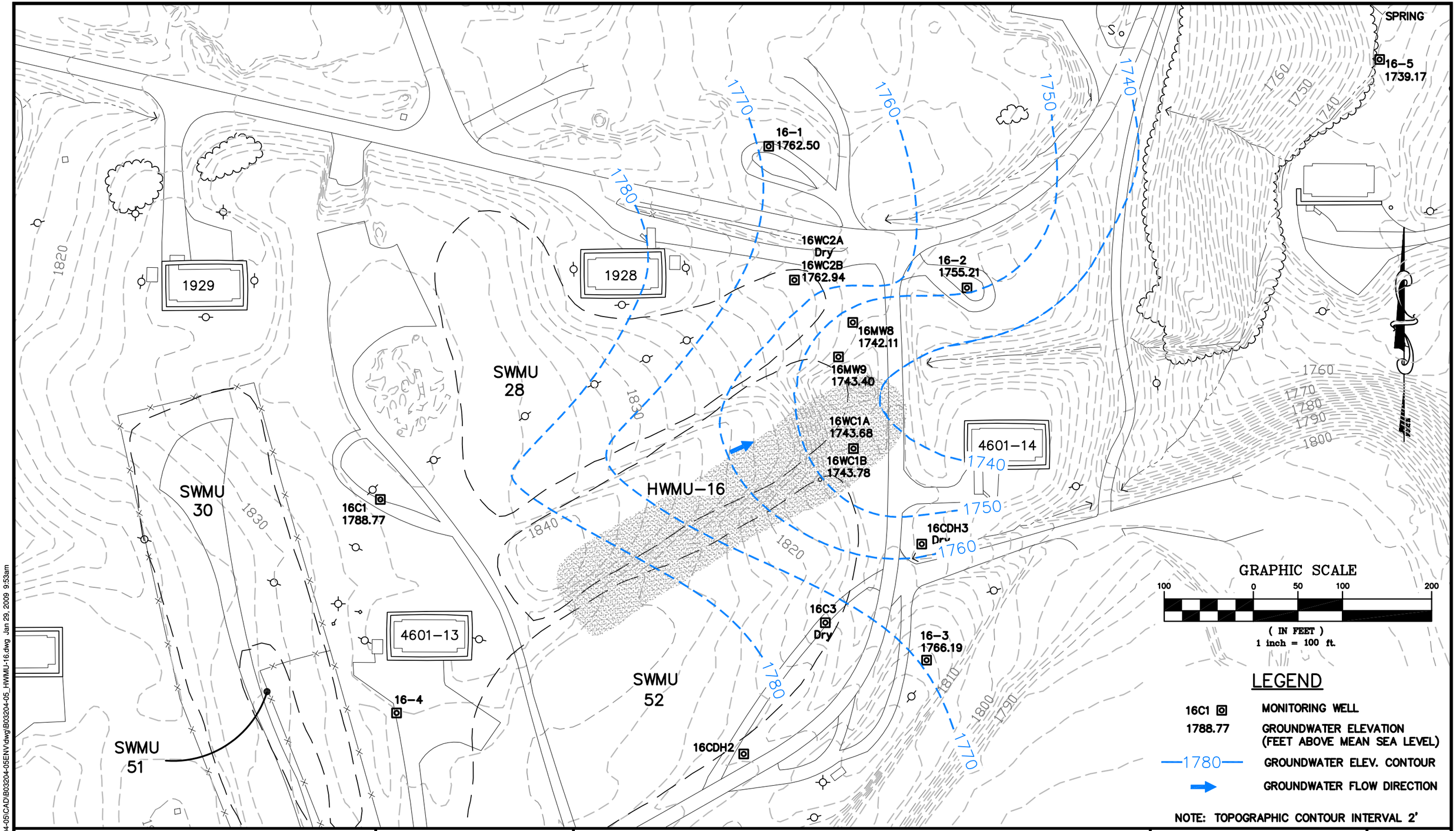
For Appendix IX monitoring, compliance well results reported/evaluated to detection limit.
Verification events: 12/12/03, 06/17/04, 7/25/2005.
6/17/04. Verification event. Acetone: 10D3D was not detected during verification event. Verification event result reported.
7/25/05. Verification event. All wells: ethyl acetate. 10D3D: alpha-BHC, acetone and 2-propanol. All verification results: Not detected except for acetone and 2-propanol. Verification results presented in table.
7/17/2008. Verification event. 10MW1. Technical chlordane, diethylphthalate. Verification results reported-all not detected.

APPENDIX D

HWMU-16

APPENDIX D-1

HWMU-16 POTENTIOMETRIC SURFACE MAPS
SECOND QUARTER 2008
FOURTH QUARTER 2008



Draper Aden Associates
Engineering ◆ Surveying ◆ Environmental Services
2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291
Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED	RGM
DRAWN	KKD
CHECKED	MDL
DATE	07/31/08

HWMU-16 POTENTIOMETRIC SURFACE MAP (2ND QUARTER 2008)

RADFORD ARMY AMMUNITION PLANT

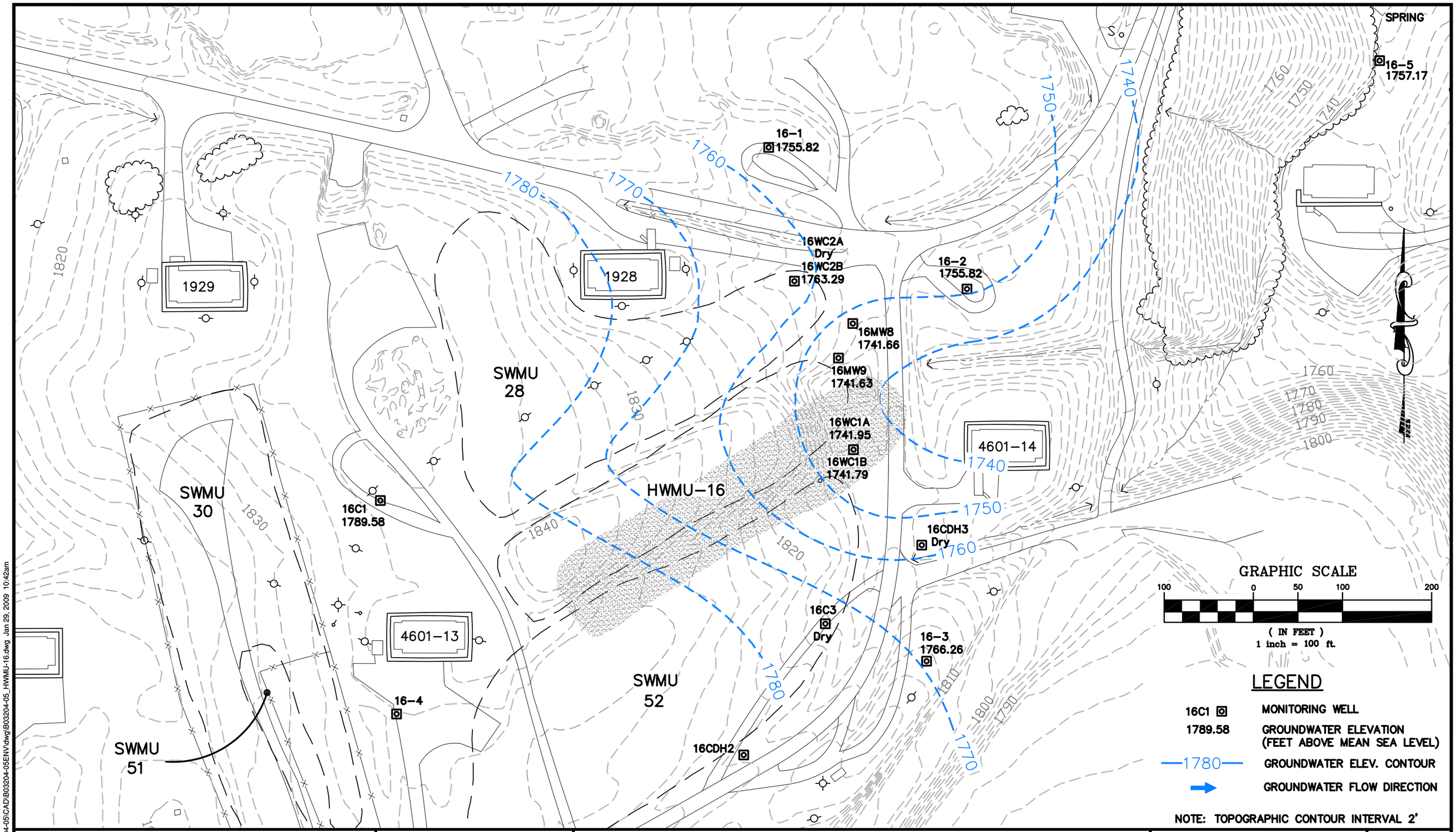
RADFORD, VIRGINIA

SCALE: 1"=100'

PLAN NO. B03204-06

FIGURE 4

P:\B03\200\B03204\B03204-05\CAD\B03204-05ENV\dwg\B03204-05_HWMU-16.dwg Jan 29, 2009 9:53am



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Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED	RGM
DRAWN	KKD
CHECKED	MDL
DATE	01/07/09

HWMU-16 POTENTIOMETRIC SURFACE MAP (4TH QUARTER 2008)
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

SCALE: 1"=100'

PLAN NO. B03204-06

FIGURE 4

P:\B03\200\B03204\B03204-05\CAD\B03204-05ENV.dwg\B03204-05_HWMU-16.dwg Jan 29, 2009 10:42am

APPENDIX D-2

HWMU-16 2008 LABORATORY ANALYTICAL RESULTS
POINT OF COMPLIANCE WELLS

Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 16C1

All Results in ug/L.

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*OL*	*GPS*	*Method*
Antimony					*CAS #*	*7440-36-0*		
Second Quarter 2008	U	U	U	U N	U	1	6	6020
Fourth Quarter 2008	U	U	U	U	U	1	6	6020
Arsenic					*CAS #*	*7440-38-2*		
Second Quarter 2008	U	U	U	U	U	10	50	6020
Fourth Quarter 2008	U	U	U	U	U	10	50	6020
Barium					*CAS #*	*7440-39-3*		
Second Quarter 2008	201 J	109 J	305 J	244 J	178 J	10	2000	6020
Fourth Quarter 2008	182 J	85.3 J	499 J	186 J	103 J	10	2000	6020
Beryllium					*CAS #*	*7440-41-7*		
Second Quarter 2008	U	0.29 J	U	U	U	1	4	6020
Fourth Quarter 2008	U	U	U	U	U	1	4	6020
Cadmium					*CAS #*	*7440-43-9*		
Second Quarter 2008	U	0.25 J	U	U	U	1	5	6020
Fourth Quarter 2008	U	U	U	U	U	1	5	6020
Chromium					*CAS #*	*7440-47-3*		
Second Quarter 2008	U	1.4 J	U	U	2 J	5	100	6020
Fourth Quarter 2008	U	U	U	U	U	5	100	6020
Cobalt					*CAS #*	*7440-48-4*		
Second Quarter 2008	U J	U J	1.8 J	28.8 J	U J	5	313	6020
Fourth Quarter 2008	U	U	U	28.1 J	U	5	313	6020
Copper					*CAS #*	*7440-50-8*		
Second Quarter 2008	U	3 J	U	2 J	U	5	1300	6020
Fourth Quarter 2008	U	5.5	U	U	U	5	1300	6020
Lead					*CAS #*	*7439-92-1*		
Second Quarter 2008	U	0.64 J	U	0.38 J	0.24 J	1	15	6020
Fourth Quarter 2008	U	U	U	U	U	1	15	6020
Mercury					*CAS #*	*7439-97-6*		
Second Quarter 2008	U	U	U	U	0.66 J	0.2	2	7470A
Fourth Quarter 2008	U	U	U	U	U	2	2	7470A
Nickel					*CAS #*	*7440-02-0*		
Second Quarter 2008	U J	6.6 J	7.2 J	8.8 J	U J	10	313	6020
Fourth Quarter 2008	U	U	10.4	U	U	10	313	6020
Selenium					*CAS #*	*7782-49-2*		
Second Quarter 2008	U	U	U	U	U	10	50	6020
Fourth Quarter 2008	U	U	U	U	U	10	50	6020
Silver					*CAS #*	*7440-22-4*		
Second Quarter 2008	U	2.2	U	U	U	2	78.25	6020
Fourth Quarter 2008	U	U	U	U	U	2	78.25	6020
Thallium					*CAS #*	*7440-28-0*		
Second Quarter 2008	U	U	U	U	U	1	-	6020
Tin					*CAS #*	*7440-31-5*		
Second Quarter 2008	U	U	U	U	U	5	-	6020
Vanadium					*CAS #*	*7440-62-2*		
Second Quarter 2008	U	U	U	U	1 J	10	109.55	6020
Fourth Quarter 2008	U	U	U	U	U	10	109.55	6020
Zinc					*CAS #*	*7440-66-6*		
Second Quarter 2008	U	24.1	U	8.8 J	7 J	10	4695	6020
Fourth Quarter 2008	U	19.1	U	U	U	10	4695	6020
Sulfide					*CAS #*	*18496-25-8*		
Second Quarter 2008	U	U	U	U	U	1000	-	9034
Cyanide					*CAS #*	*57-12-5*		
Second Quarter 2008	U	U	U	U	U	20	-	9014
Acenaphthene					*CAS #*	*83-32-9*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C

See last page of this report for definitions.

Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 16C1

All Results in ug/L.

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*QL*	*GPS*	*Method*
Acenaphthylene					*CAS #*	*208-96-8*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Acetone					*CAS #*	*67-64-1*		
Second Quarter 2008	U	U	U	U	U	5	223.57	8260B
Acetonitrile					*CAS #*	*75-05-8*		
Second Quarter 2008	U	U	U	U	U	100	-	8260B
Acetophenone					*CAS #*	*98-86-2*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2-Acetylaminofluorene					*CAS #*	*53-96-3*		
Second Quarter 2008	U	U	U	U	U	30	-	8270C
Acrolein					*CAS #*	*107-02-8*		
Second Quarter 2008	U J	U J	U J	U J	U J	10	-	8260B
Acrylonitrile					*CAS #*	*107-13-1*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Aldrin					*CAS #*	*309-00-2*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Allyl chloride					*CAS #*	*107-05-1*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
4-Aminobiphenyl					*CAS #*	*92-67-1*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Aniline					*CAS #*	*62-53-3*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Anthracene					*CAS #*	*120-12-7*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Aramite					*CAS #*	*140-57-8*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Benzene					*CAS #*	*71-43-2*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Benzo[a]anthracene					*CAS #*	*56-55-3*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Benzo[b]fluoranthene					*CAS #*	*205-99-2*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Benzo[k]fluoranthene					*CAS #*	*207-08-9*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Benzo[ghi]perylene					*CAS #*	*191-24-2*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Benzo(a)pyrene					*CAS #*	*50-32-8*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1,4-Benzenediamine					*CAS #*	*106-50-3*		
Second Quarter 2008	U	U	U	U	U	50	-	8270C
Benzyl alcohol					*CAS #*	*100-51-6*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
alpha-BHC					*CAS #*	*319-84-6*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
beta-BHC					*CAS #*	*319-85-7*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
delta-BHC					*CAS #*	*319-86-8*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
gamma-BHC					*CAS #*	*58-89-9*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
bis(2-Chloroethoxy)methane					*CAS #*	*111-91-1*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
bis(2-Chloroethyl)ether					*CAS #*	*111-44-4*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
bis(2-Chloro-1-methylethyl)ether					*CAS #*	*108-60-1*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C

See last page of this report for definitions.

Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 16C1

All Results in ug/L.

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*QL*	*GPS*	*Method*
bis(2-Ethylhexyl)phthalate					*CAS #*	*117-81-7*		
Second Quarter 2008	U	U	U	U	U	6	10	8270C
Bromobenzene					*CAS #*	*108-86-1*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Bromochloromethane					*CAS #*	*74-97-5*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Bromodichloromethane					*CAS #*	*75-27-4*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Bromoform					*CAS #*	*75-25-2*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
4-Bromophenyl phenyl ether					*CAS #*	*101-55-3*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2-Butanone					*CAS #*	*78-93-3*		
Second Quarter 2008	U	U	U	U	U	10	691.08	8260B
Fourth Quarter 2008	U	U	U	U	U	10	691.08	8260B
n-Butyl alcohol					*CAS #*	*71-36-3*		
Second Quarter 2008	U	U	U	U J	U	200	-	8260B
tert-Butyl alcohol					*CAS #*	*75-65-0*		
Second Quarter 2008	U J	U J	U J	U J	U J	20	-	8260B
n-Butylbenzene					*CAS #*	*104-51-8*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
sec-Butylbenzene					*CAS #*	*135-98-8*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
tert-Butylbenzene					*CAS #*	*98-06-6*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Butyl benzyl phthalate					*CAS #*	*85-68-7*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Carbon disulfide					*CAS #*	*75-15-0*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Carbon tetrachloride					*CAS #*	*56-23-5*		
Second Quarter 2008	U	U	U	U	U	1	5	8260B
Fourth Quarter 2008	U	U	U	U	U	5	5	8260B
Chlordane					*CAS #*	*57-74-9*		
Second Quarter 2008	U	U	U	U	U	0.25	-	8081A
p-Chloroaniline					*CAS #*	*106-47-8*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Chlorobenzene					*CAS #*	*108-90-7*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Chlorobenzilate					*CAS #*	*510-15-6*		
Second Quarter 2008	U	U	U	U	U	20	-	8270C
p-Chloro-m-cresol					*CAS #*	*59-50-7*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Chloroethane					*CAS #*	*75-00-3*		
Second Quarter 2008	4.6	U	U	U	U	1	-	8260B
Fourth Quarter 2008	4 J	U	2 J	U	U	5	-	8260B
Chloroform					*CAS #*	*67-66-3*		
Second Quarter 2008	U	U	U	U	U	1	80	8260B
2-Chloroethyl vinyl ether					*CAS #*	*110-75-8*		
Second Quarter 2008	U J	U J	U J	U J	U J	5	-	8260B
2-Chloronaphthalene					*CAS #*	*91-58-7*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2-Chlorophenol					*CAS #*	*95-57-8*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
4-Chlorophenyl phenyl ether					*CAS #*	*7005-72-3*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Chloroprene					*CAS #*	*126-99-8*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B

See last page of this report for definitions.

Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 16C1

All Results in ug/L.

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*QL*	*GPS*	*Method*
2-Chlorotoluene					*CAS #*	*95-49-8*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
4-Chlorotoluene					*CAS #*	*106-43-4*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Chrysene					*CAS #*	*218-01-9*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Cyclohexane					*CAS #*			
Second Quarter 2008	U	U	U	U J	U	2	-	8260B
2,4-Dichlorophenoxyacetic acid					*CAS #*	*94-75-7*		
Second Quarter 2008	U	U	U	U	U	5	-	8151A
4,4'-DDD					*CAS #*	*72-54-8*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
4,4'-DDE					*CAS #*	*72-55-9*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
4,4'-DDT					*CAS #*	*50-29-3*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Diallate					*CAS #*	*2303-16-4*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Dibenz(a,h)anthracene					*CAS #*	*53-70-3*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Dibenzofuran					*CAS #*	*132-64-9*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Dibromochloromethane					*CAS #*	*124-48-1*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
1,2-Dibromo-3-chloropropane					*CAS #*	*96-12-8*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
1,2-Dibromoethane					*CAS #*	*106-93-4*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Di-n-butyl phthalate					*CAS #*	*84-74-2*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1,2-Dichlorobenzene					*CAS #*	*95-50-1*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
1,3-Dichlorobenzene					*CAS #*	*541-73-1*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
1,4-Dichlorobenzene					*CAS #*	*106-46-7*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
3,3'-Dichlorobenzidine					*CAS #*	*91-94-1*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
trans-1,4-Dichloro-2-butene					*CAS #*	*110-57-6*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Dichlorodifluoromethane					*CAS #*	*75-71-8*		
Second Quarter 2008	U	U	U	U	U	1	46.5	8260B
Fourth Quarter 2008	U	U	U	U	U	5	46.5	8260B
1,1-Dichloroethane					*CAS #*	*75-34-3*		
Second Quarter 2008	6.6	U	2.2	1.4	1.6	1	296.08	8260B
Fourth Quarter 2008	8	U	6	U	U	5	296.08	8260B
1,2-Dichloroethane					*CAS #*	*107-06-2*		
Second Quarter 2008	U	U	U	U	U	1	5	8260B
1,1-Dichloroethene					*CAS #*	*75-35-4*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
cis-1,2-Dichloroethene					*CAS #*	*156-59-2*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
trans-1,2-Dichloroethene					*CAS #*	*156-60-5*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
2,4-Dichlorophenol					*CAS #*	*120-83-2*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C

See last page of this report for definitions.

Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 16C1

All Results in ug/L.

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*QL*	*GPS*	*Method*
2,6-Dichlorophenol					*CAS #*	*87-65-0*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1,2-Dichloropropane					*CAS #*	*78-87-5*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
1,3-Dichloropropane					*CAS #*	*142-28-9*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
2,2-Dichloropropane					*CAS #*	*594-20-7*		
Second Quarter 2008	U	U	U	U J	U	1	-	8260B
1,1-Dichloropropene					*CAS #*	*563-58-6*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
cis-1,3-Dichloropropene					*CAS #*	*10061-01-5*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
trans-1,3-Dichloropropene					*CAS #*	*10061-02-6*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Dieldrin					*CAS #*	*60-57-1*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Diethyl ether					*CAS #*	*60-29-7*		
Second Quarter 2008	U	U	U	U J	U	12.5	-	8260B
Fourth Quarter 2008	31	U	13	U	U	5	-	8260B
Diethyl phthalate					*CAS #*	*84-66-2*		
Second Quarter 2008	U	U	U	U	U	10	12,520	8270C
O,O-Diethyl O-2-pyrazinyl					*CAS #*	*297-97-2*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Dimethoate					*CAS #*	*60-51-5*		
Second Quarter 2008	U	U	U	U	U	20	-	8270C
Dimethyl ether					*CAS #*	*115-10-6*		
Second Quarter 2008	8.1 J	U	2.7 J	1.6 J	U	12.5	-	8260B
Fourth Quarter 2008	U J	U J	U J	U J	U J	10	-	8260B
p-(Dimethylamino)azobenzene					*CAS #*	*60-11-7*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
7,12-Dimethylbenz[a]anthracene					*CAS #*	*57-97-6*		
Second Quarter 2008	U	U	U	U	U	20	-	8270C
3,3'-Dimethylbenzidine					*CAS #*	*119-93-7*		
Second Quarter 2008	U	U	U	U	U	20	-	8270C
a,a-Dimethylphenethylamine					*CAS #*	*122-09-8*		
Second Quarter 2008	U	U	U	U	U	50	-	8270C
2,4-Dimethylphenol					*CAS #*	*105-67-9*		
Second Quarter 2008	U J	U J	U J	U J	U J	10	-	8270C
Dimethyl phthalate					*CAS #*	*131-11-3*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
m-Dinitrobenzene					*CAS #*	*99-65-0*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
4,6-Dinitro-o-cresol					*CAS #*	*534-52-1*		
Second Quarter 2008	U	U	U	U	U	20	-	8270C
2,4-Dinitrophenol					*CAS #*	*51-28-5*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2,4-Dinitrotoluene					*CAS #*	*121-14-2*		
Second Quarter 2008	U	U	U	U	U	10	31.3	8270C
Fourth Quarter 2008	U	U	U	U	U	10	31.3	8270C
2,6-Dinitrotoluene					*CAS #*	*606-20-2*		
Second Quarter 2008	U	U	U	U	U	10	15.65	8270C
Fourth Quarter 2008	U	U	U	U	U	10	15.65	8270C
Dinoseb					*CAS #*	*88-85-7*		
Second Quarter 2008	U	U	U	U	U	2.5	-	8151A
Di-n-octyl phthalate					*CAS #*	*117-84-0*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C

See last page of this report for definitions.

Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 16C1

All Results in ug/L.

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*QL*	*GPS*	*Method*
1,4-Dioxane					*CAS #*	*123-91-1*		
Second Quarter 2008	U	U	U	U	U	200	-	8260B
Diphenylamine					*CAS #*	*122-39-4*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Disulfoton					*CAS #*	*298-04-4*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Endosulfan I					*CAS #*	*959-98-8*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Endosulfan II					*CAS #*	*33213-65-9*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Endosulfan sulfate					*CAS #*	*1031-07-8*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Endrin					*CAS #*	*72-20-8*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Ethyl acetate					*CAS #*	*141-78-6*		
Second Quarter 2008	U	U	U	U	U	2	-	8260B
Endrin aldehyde					*CAS #*	*7421-93-4*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Ethanol					*CAS #*	*64-17-5*		
Second Quarter 2008	U	U	U	U J	U	200	-	8260B
Ethylbenzene					*CAS #*	*100-41-4*		
Second Quarter 2008	U	U	U	U	U	1	70	8260B
Fourth Quarter 2008	U	U	U	U	U	5	70	8260B
Ethyl methacrylate					*CAS #*	*97-63-2*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Ethyl methanesulfonate					*CAS #*	*62-50-0*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Ethylene oxide					*CAS #*	*75-21-8*		
Second Quarter 2008	U	U	U	U J	U	20	-	8260B
Famphur					*CAS #*	*52-85-7*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Fluoranthene					*CAS #*	*206-44-0*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Fluorene					*CAS #*	*86-73-7*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Heptachlor					*CAS #*	*76-44-8*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Heptachlor epoxide					*CAS #*	*1024-57-3*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Hexachlorobenzene					*CAS #*	*118-74-1*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Hexachlorobutadiene					*CAS #*	*87-68-3*		
Second Quarter 2008	U J	U J	U J	U J	U J	1	-	8260B
Hexachlorocyclopentadiene					*CAS #*	*77-47-4*		
Second Quarter 2008	U J	U J	U J	U J	U J	20	-	8270C
Hexachloroethane					*CAS #*	*67-72-1*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Hexachlorophene					*CAS #*	*70-30-4*		
Second Quarter 2008	U	U	U	U	U	500	-	8270C
Hexachloropropene					*CAS #*	*1888-71-7*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2-Hexanone					*CAS #*	*591-78-6*		
Second Quarter 2008	U	U	U	U	U	5	-	8260B
Indeno[1,2,3-cd]pyrene					*CAS #*	*193-39-5*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Isobutyl alcohol					*CAS #*	*78-83-1*		
Second Quarter 2008	U J	U J	U J	U J	U J	125	-	8260B

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Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 16C1

All Results in ug/L.

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*QL*	*GPS*	*Method*
Isodrin					*CAS #*	*465-73-6*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Isophorone					*CAS #*	*78-59-1*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Isopropylbenzene					*CAS #*	*98-82-8*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Isopropylether					*CAS #*	*108-20-3*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
4-Isopropyltoluene					*CAS #*	*99-87-6*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Isosafrole					*CAS #*	*120-58-1*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Kepone					*CAS #*	*143-50-0*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Methacrylonitrile					*CAS #*	*126-98-7*		
Second Quarter 2008	U	U	U	U	U	10	-	8260B
Methapyrilene					*CAS #*	*91-80-5*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Methoxychlor					*CAS #*	*72-43-5*		
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
Bromomethane					*CAS #*	*74-83-9*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Chloromethane					*CAS #*	*74-87-3*		
Second Quarter 2008	U	U	U	U	U	1	2.11	8260B
Fourth Quarter 2008	U	U	U	U	U	5	2.11	8260B
3-Methylcholanthrene					*CAS #*	*56-49-5*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Iodomethane					*CAS #*	*74-88-4*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Methyl methacrylate					*CAS #*	*80-62-6*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Methyl methane sulfonate					*CAS #*	*66-27-3*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2-Methylnaphthalene					*CAS #*	*91-57-6*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Methyl parathion					*CAS #*	*298-00-0*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
4-Methyl-2-pentanone					*CAS #*	*108-10-1*		
Second Quarter 2008	U	U	U	U	U	5	-	8260B
2-Methylphenol					*CAS #*	*95-48-7*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
3 & 4-Methylphenol					*CAS #*	*m 108-39-4*	*p 106-44-*	
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Methyl tert-butyl ether					*CAS #*	*1634-04-4*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Dibromomethane					*CAS #*	*74-95-3*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Methylene chloride					*CAS #*	*75-09-2*		
Second Quarter 2008	5.3	U	U	U	U	1	-	8260B
Fourth Quarter 2008	6	U	U	U	U	5	-	8260B
Naphthalene					*CAS #*	*91-20-3*		
Second Quarter 2008	U J	U J	U J	U J	U J	1	-	8260B
1,4-Naphthoquinone					*CAS #*	*130-15-4*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1-Naphthylamine					*CAS #*	*134-32-7*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C

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Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 16C1 *All Results in ug/L.*

Analtye/Quarter	16C1	16MW8	16MW9	16WC1A	16WC1B	QL	GPS	Method
2-Naphthylamine					CAS # 91-59-8			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
o-Nitroaniline					CAS # 88-74-4			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
m-Nitroaniline					CAS # 99-09-2			
Second Quarter 2008	U	U	U	U	U	20	-	8270C
p-Nitroaniline					CAS # 100-01-6			
Second Quarter 2008	U	U	U	U	U	20	-	8270C
Nitrobenzene					CAS # 98-95-3			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
o-Nitrophenol					CAS # 88-75-5			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
p-Nitrophenol					CAS # 100-02-7			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
4-Nitroquinoline-1-oxide					CAS # 56-57-5			
Second Quarter 2008	U	U	U	U	U	50	-	8270C
N-Nitrosodi-n-butylamine					CAS # 924-16-3			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosodiethylamine					CAS # 55-18-5			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosodimethylamine					CAS # 62-75-9			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosodiphenylamine					CAS # 86-30-6			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosodipropylamine					CAS # 621-64-7			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosomethylethylamine					CAS # 10595-95-6			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosomorpholine					CAS # 59-89-2			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosopiperidine					CAS # 100-75-4			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
N-Nitrosopyrrolidine					CAS # 930-55-2			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
5-Nitroso-o-toluidine					CAS # 99-55-8			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Parathion					CAS # 56-38-2			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Pentachlorobenzene					CAS # 608-93-5			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Pentachloroethane					CAS # 76-01-7			
Second Quarter 2008	U J	U J	U J	U J	U J	1	-	8260B
Pentachloronitrobenzene					CAS # 82-68-8			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Pentachlorophenol					CAS # 87-86-5			
Second Quarter 2008	U	U	U	U	U	20	-	8270C
Phenacetin					CAS # 62-44-2			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Phenanthrene					CAS # 85-01-8			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Phenol					CAS # 108-95-2			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Total Recoverable Phenolics					CAS # C-020			
Second Quarter 2008	U	U	U	U	U	20	-	9065
Phorate					CAS # 298-02-2			
Second Quarter 2008	U	U	U	U	U	20	-	8270C

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Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 16C1

All Results in ug/L.

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*QL*	*GPS*	*Method*
2-Picoline					*CAS #*	*931-19-1*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Pronamide					*CAS #*	*23950-58-5*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1-Propanol					*CAS #*	*71-23-8*		
Second Quarter 2008	U	U	U	U	U	1000	-	8260B
2-Propanol					*CAS #*	*67-63-0*		
Second Quarter 2008	U N	U	U	U	U	1000	-	8260B
Propionitrile					*CAS #*	*107-12-0*		
Second Quarter 2008	U	U	U	U	U	10	-	8260B
n-Propylbenzene					*CAS #*	*103-65-1*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Pyrene					*CAS #*	*129-00-0*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Pyridine					*CAS #*	*110-86-1*		
Second Quarter 2008	U	U	U	U	U	20	-	8270C
Safrole					*CAS #*	*94-59-7*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Silvex					*CAS #*	*93-72-1*		
Second Quarter 2008	U	U	U	U	U	2.5	-	8151A
Styrene					*CAS #*	*100-42-5*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Sulfotep					*CAS #*	*3689-24-5*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2,4,5-Trichlorophenoxyacetic acid					*CAS #*	*93-76-5*		
Second Quarter 2008	U	U	U	U	U	5	-	8151A
1,2,4,5-Tetrachlorobenzene					*CAS #*	*95-94-3*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1,1,1,2-Tetrachloroethane					*CAS #*	*630-20-6*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
1,1,2,2-Tetrachloroethane					*CAS #*	*79-34-5*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Tetrachloroethene					*CAS #*	*127-18-4*		
Second Quarter 2008	U	U	U	U	U	1	5	8260B
Fourth Quarter 2008	U	U	U	U	U	5	5	8260B
Tetrahydrofuran					*CAS #*	*109-99-9*		
Second Quarter 2008	U	U	U	U J	U	5	-	8260B
2,3,4,6-Tetrachlorophenol					*CAS #*	*58-90-2*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Toluene					*CAS #*	*108-88-3*		
Second Quarter 2008	U	U	U	U	U	1	1000	8260B
Fourth Quarter 2008	U	U	U	U	U	5	1000	8260B
o-Toluidine					*CAS #*	*95-53-4*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Toxaphene					*CAS #*	*8001-35-2*		
Second Quarter 2008	U	U	U	U	U	1	-	8081A
1,2,3-Trichlorobenzene					*CAS #*	*87-61-6*		
Second Quarter 2008	U J	U J	U J	U J	U J	1	-	8260B
1,2,4-Trichlorobenzene					*CAS #*	*120-82-1*		
Second Quarter 2008	U J	U J	U J	U J	U J	1	-	8260B
1,1,1-Trichloroethane					*CAS #*	*71-55-6*		
Second Quarter 2008	U	U	U	U	U	1	200	8260B
Fourth Quarter 2008	U	U	U	U	U	5	200	8260B
1,1,2-Trichloroethane					*CAS #*	*79-00-5*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B

See last page of this report for definitions.

Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 16C1 *All Results in ug/L.*

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*QL*	*GPS*	*Method*
Trichloroethene					*CAS #*	*79-01-6*		
Second Quarter 2008	U	U	U	U	U	1	5	8260B
Fourth Quarter 2008	U	U	U	U	U	5	5	8260B
Trichlorofluoromethane					*CAS #*	*75-69-4*		
Second Quarter 2008	U	U	U	U	U	1	469.5	8260B
Fourth Quarter 2008	U	U	U	U	U	5	469.5	8260B
2,4,5-Trichlorophenol					*CAS #*	*95-95-4*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
2,4,6-Trichlorophenol					*CAS #*	*88-06-2*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1,2,3-Trichloropropane					*CAS #*	*96-18-4*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
1,1,2-Trichloro-1,2,2-Trifluoroethane					*CAS #*	*76-13-1*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Fourth Quarter 2008	U	U	U	U	U	10	-	8260B
O,O,O-Triethyl phosphorothioate					*CAS #*	*126-68-1*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
1,2,4-Trimethylbenzene					*CAS #*	*95-63-6*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
1,3,5-Trimethylbenzene					*CAS #*	*108-67-8*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
sym-Trinitrobenzene					*CAS #*	*99-35-4*		
Second Quarter 2008	U	U	U	U	U	10	-	8270C
Vinyl acetate					*CAS #*	*108-05-4*		
Second Quarter 2008	U	U	U	U J	U	5	-	8260B
Vinyl chloride					*CAS #*	*75-01-4*		
Second Quarter 2008	U	U	U	U	U	1	-	8260B
Xylenes (Total)					*CAS #*	*1330-20-7*		
Second Quarter 2008	U	U	U	U	U	3	10000	8260B
Fourth Quarter 2008	U	U	U	U	U	5	10000	8260B

See last page of this report for definitions.

Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 16C1 ***All Results in ug/L.***

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*QL*	*GPS*	*Method*

Definitions:

The following definitions apply to results reported for Appendix IX monitoring events.
All Appendix IX monitoring results for compliance wells are reported to the detection limit.

Appendix IX Monitoring Events: 3Q-2003, 2Q -2004, 2Q-2005, 3Q2006, 2Q2007, 2Q2008

QL Denotes permit required quantitation limit.
U denotes not detected at or above the detection limit.
UA denotes not detected at or above the adjusted detection limit.
J Denotes result is estimated. When used with "U" (i.e., "UJ"), denotes analyte not detected at or above the detection limit and detection limit and QL are estimated. When used with "UA" (i.e., "UAJ"), denotes analyte not detected at or above adjusted detection limit and and adjusted detection limit and QL are estimated.
UN Denotes analyte concentration is less than the quantitation limit and/or five times the blank concentration. Not reliably detected due to blank contamination. This qualifier used only for Appendix IX monitoring event when compliance well results are reported to at or above the project detection limit.
R Denotes result rejected.
Q Denotes data validation qualifier. **X** Denotes mass spectral confirmation not obtained-result suspect.
Background Denotes background concentrations listed in Appendix F to Attachment 5 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002), where applicable.
CAS# Denotes Chemical Abstract Services registration number.
GPS Denotes Groundwater Protection Standards listed in Appendix G to Attachment 5 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002).
NS denotes not sampled. **NA** denotes not analyzed.
"–" denotes not detected (pre-2nd Quarter 2003) or not available / not sampled (beginning 2nd Quarter 2003).

The following definitions apply to results reported for non-Appendix IX monitoring events.
All non-Appendix IX monitoring results for compliance wells are reported to at or above the quantitation limit.

QL Denotes permit required quantitation limit.
U Denotes analyte not detected at or above QL.
UA Denotes analyte not detected at or above adjusted sample QL.
J Denotes result is estimated. When used with "U" (i.e., "**UJ**"), denotes analyte not detected at or above QL and QL is estimated. When used with "UA" (i.e., "**UAJ**"), denotes analyte not detected at or above adjusted QL and adjusted QL is estimated.
R Denotes result rejected.
Q Denotes data validation qualifier.
Background Denotes background concentrations listed in Appendix F to Attachment 5 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002), where applicable.
CAS# Denotes Chemical Abstract Services registration number.
GPS Denotes Groundwater Protection Standards listed in Appendix G to Attachment 5 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002).

NOTE:
Fourth Quarter 2008
Due to laboratory error all HWMU 16 samples were analyzed using Method 8260B 5 ml purge instead of a 25 ml purge which resulted in a higher QL. For these samples, all results were evaluated to the detection limit, which is comparable to the permit QL. Results below the laboratory QL but at or above the permit QL are reported and qualified as estimated.

APPENDIX D-3

HWMU-16 2008 LABORATORY ANALYTICAL RESULTS
PLUME MONITORING WELLS

Target Analyte Monitoring Results At Or Above Permit Quantitation Limit
HWMU-16 Plume Monitoring Wells
Radford Army Ammunition Plant, Radford, Virginia

All Results in ug/L.

Upgradient well = 16C1

Analtye/Quarter	*16C1 Q*	*16-1 Q*	*16-2 Q*	*16-3 Q*	*16-5 Q*	*16WC2B Q*	*16SPRING Q*	*QL*	*Background*	*Method*
Antimony						*CAS # 7440-36-0*				
Second Quarter 2008	U	U	U	U	U	1.4	U	1	3	6020
Fourth Quarter 2008	U	-	U	U	U	U	U	1	3	6020
Arsenic						*CAS # 7440-38-2*				
Second Quarter 2008	U	U	U	U	U	U	U	10	1	6020
Fourth Quarter 2008	U	-	U	U	U	U	U	10	1	6020
Barium						*CAS # 7440-39-3*				
Second Quarter 2008	201 J	245	310	776	195	134	319	10	175.4	6020
Fourth Quarter 2008	182 J	-	303 J	647 J	182 J	112 J	240 J	10	175.4	6020
Beryllium						*CAS # 7440-41-7*				
Second Quarter 2008	U	U	U	U	U	U	U	1	0.7	6020
Fourth Quarter 2008	U	-	U	U	U	U	U	1	0.7	6020
Cadmium						*CAS # 7440-43-9*				
Second Quarter 2008	U	U	U	U	U	U	U	1	0.2	6020
Fourth Quarter 2008	U	-	U	U	U	U	U	1	0.2	6020
Chromium						*CAS # 7440-47-3*				
Second Quarter 2008	U	U	U	5	5.9	U	U	5	6.2	6020
Fourth Quarter 2008	U	-	U	U	U	U	U	5	6.2	6020
Cobalt						*CAS # 7440-48-4*				
Second Quarter 2008	U J	U J	U J	U J	U J	U J	U J	5	5	6020
Fourth Quarter 2008	U	-	U	U	U	U	U	5	5	6020
Copper						*CAS # 7440-50-8*				
Second Quarter 2008	U	U	U	U	U	U	U	5	13	6020
Fourth Quarter 2008	U	-	U	U	U	U	U	5	13	6020
Lead						*CAS # 7439-92-1*				
Second Quarter 2008	U	U	U	U	U	U	U	1	10	6020
Fourth Quarter 2008	U	-	U	U	1	U	U	1	10	6020
Mercury						*CAS # 7439-97-6*				
Second Quarter 2008	U	U	U	U	U	U	U	0.2	0.2	7470A
Fourth Quarter 2008	U	-	U	U	U	U	U	2	0.2	7470A
Nickel						*CAS # 7440-02-0*				
Second Quarter 2008	U J	U	U	U	U	U	U	10	16	6020
Fourth Quarter 2008	U	-	U	U	U	U	U	10	16	6020
Selenium						*CAS # 7782-49-2*				
Second Quarter 2008	U	U	U	U	U	U	U	10	1	6020
Fourth Quarter 2008	U	-	U	U	U	U	U	10	1	6020
Silver						*CAS # 7440-22-4*				
Second Quarter 2008	U	U	U	U	U	U	U	2	0.5	6020
Fourth Quarter 2008	U	-	U	U	U	U	U	2	0.5	6020
Vanadium						*CAS # 7440-62-2*				
Second Quarter 2008	U	U	U	U	U	U	U	10	151	6020
Fourth Quarter 2008	U	-	U	U	U	U	U	10	151	6020
Zinc						*CAS # 7440-66-6*				
Second Quarter 2008	U	U	U	U	U	12.2	U	10	51	6020
Fourth Quarter 2008	U	-	U	U	U	U	U	10	51	6020

See last page of this report for definitions.

Target Analyte Monitoring Results At Or Above Permit Quantitation Limit
HWMU-16 Plume Monitoring Wells
Radford Army Ammunition Plant, Radford, Virginia

All Results in ug/L.

Upgradient well = 16C1

Analtye/Quarter	*16C1 Q*	*16-1 Q*	*16-2 Q*	*16-3 Q*	*16-5 Q*	*16WC2B Q*	*16SPRING Q*	*QL*	*Background*	*Method*
2-Butanone						*CAS # 78-93-3*				
Second Quarter 2008	U	U	U	U	U	U	U	10	1.1	8260B
Fourth Quarter 2008	U	-	U	U	U	U	U	10	1.1	8260B
Carbon tetrachloride						*CAS # 56-23-5*				
Second Quarter 2008	U	U	U	U	U	U	U	1	0.2	8260B
Fourth Quarter 2008	U	-	U	U	U	U	U	5	0.2	8260B
Chloroethane						*CAS # 75-00-3*				
Second Quarter 2008	4.6	U	U	U	U	U	U	1	20.7	8260B
Fourth Quarter 2008	4 J	-	U	U	U	U	U	5	20.7	8260B
Dichlorodifluoromethane						*CAS # 75-71-8*				
Second Quarter 2008	U	U	U	U	U	U	U	1	46.5	8260B
Fourth Quarter 2008	U	-	U	U	U	U	U	5	46.5	8260B
1,1-Dichloroethane						*CAS # 75-34-3*				
Second Quarter 2008	6.6	U	U	U	U	U	U	1	9.5	8260B
Fourth Quarter 2008	8	-	U	U	U	U	U	5	9.5	8260B
Diethyl ether						*CAS # 60-29-7*				
Second Quarter 2008	U	U	U	U J	U	U	U	12.5	75.5	8260B
Fourth Quarter 2008	31	-	U	U	U	U	U	5	75.5	8260B
Dimethyl ether						*CAS # 115-10-6*				
Second Quarter 2008	8.1 J	U	U	U J	1.9 J	U	U	12.5	17.0	8260B
Fourth Quarter 2008	U J	-	U J	U J	U J	U J	U J	10	17.0	8260B
2,4-Dinitrotoluene						*CAS # 121-14-2*				
Second Quarter 2008	U	U	U	U	U	U	U	10	0.1	8270C
Fourth Quarter 2008	U	-	U	U	U	U	U	10	0.1	8270C
2,6-Dinitrotoluene						*CAS # 606-20-2*				
Second Quarter 2008	U	U	U	U	U	U	U	10	0.11	8270C
Fourth Quarter 2008	U	-	U	U	U	U	U	10	0.11	8270C
Ethylbenzene						*CAS # 100-41-4*				
Second Quarter 2008	U	U	U	U	U	U	U	1	0.1	8260B
Fourth Quarter 2008	U	-	U	U	U	U	U	5	0.1	8260B
Chloromethane						*CAS # 74-87-3*				
Second Quarter 2008	U	U	U	U	U	U	U	1	0.3	8260B
Fourth Quarter 2008	U	-	U	U	U	U	U	5	0.3	8260B
Methylene chloride						*CAS # 75-09-2*				
Second Quarter 2008	5.3	U	U	U	U	U	U	1	13.95	8260B
Fourth Quarter 2008	6	-	U	U	U	U	U	5	13.95	8260B
Tetrachloroethene						*CAS # 127-18-4*				
Second Quarter 2008	U	U	U	U	U	U	U	1	0.7	8260B
Fourth Quarter 2008	U	-	U	U	U	U	U	5	0.7	8260B
Toluene						*CAS # 108-88-3*				
Second Quarter 2008	U	U	U	U	U	U	U	1	0.1	8260B
Fourth Quarter 2008	U	-	U	U	U	U	U	5	0.1	8260B
1,1,1-Trichloroethane						*CAS # 71-55-6*				
Second Quarter 2008	U	U	U	U	U	U	U	1	9.2	8260B
Fourth Quarter 2008	U	-	U	U	U	U	U	5	9.2	8260B

Target Analyte Monitoring Results At Or Above Permit Quantitation Limit
HWMU-16 Plume Monitoring Wells
Radford Army Ammunition Plant, Radford, Virginia

All Results in ug/L. ***Upgradient well = 16C1***

Analtye/Quarter	*16C1 Q*	*16-1 Q*	*16-2 Q*	*16-3 Q*	*16-5 Q*	*16WC2B Q*	*16SPRING Q*	*QL*	*Background*	*Method*
Trichloroethene						*CAS # 79-01-6*				
Second Quarter 2008	U	U	U	U	U	U	U	1	0.1	8260B
Fourth Quarter 2008	U	-	U	U	U	U	U	5	0.1	8260B
Trichlorofluoromethane						*CAS # 75-69-4*				
Second Quarter 2008	U	U	U	U	U	U	U	1	11.3	8260B
Fourth Quarter 2008	U	-	U	U	U	U	U	5	11.3	8260B
1,1,2-Trichloro-1,2,2-Trifluoroethane						*CAS # 76-13-1*				
Second Quarter 2008	U	U	U	U	U	U	U	1	1.2	8260B
Fourth Quarter 2008	U	-	U	U	U	U	U	10	1.2	8260B
Xylenes (Total)						*CAS # 1330-20-7*				
Second Quarter 2008	U	U	U	U	U	U	U	3	0.2	8260B
Fourth Quarter 2008	U	-	U	U	U	U	U	5	0.2	8260B

Definitions:

All plume monitoring well results reported to at or above the permit quantitation limit except for the upgradient well during the Appendix IX monitoring Event. During this event, results for the upgradient well are reported to the detection limit.

Q Denotes data validation qualifier.
QL Denotes permit required quantitation limit.
U Denotes analyte not detected at or above QL.
UA Denotes analyte not detected at or above adjusted sample QL.
J Denotes result is estimated. When used with "U" (i.e., "**UJ**"), denotes analyte not detected at or above QL and QL is estimated. When used with "UA" (i.e., "**UAJ**"), denotes analyte not detected at or above adjusted QL and adjusted QL is estimated.
UN Denotes analyte concentration is less than the quantiation limit and five times the blank concentration. Not reliably detected due to blank contamination. This qualifier used only for Appendix IX monitoring event when compliance well results are reported to at or above the project detection limit.
R Denotes result rejected.
Background Denotes background concentrations listed in Appendix F to Attachment 5 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002).
CAS# Denotes Chemical Abstract Services registration number.
GPS Denotes groundwater protection standard.

NS denotes not sampled. **NA** denotes not analyzed. "–"denotes not detected (pre-2nd Quarter 2003) or not available / not sampled (beginning 2nd Quarter 2003).

Notes:
4Q2004. No data for 16-1 8270C-semivolatiles. Well dry-insufficient sample volume.
4Q2006 - No data for 16-1; well dry.
4Q2008- No data for 16-1; well dry.

NOTE:
Fourth Quarter 2008
Due to laboratory error all HWMU 16 samples were analyzed using Method 8260B 5 ml purge instead of a 25 ml purge which resulted in a higher QL. For these samples, all results were evaluated to the detection limit, which is comparable to the permit QL. Results below the laboratory QL but at or above the permit QL are reported and qualified as estimated.

APPENDIX D-4

ESTABLISHED BACKGROUND VALUES AND COMPUTATIONS FOR HWMU-16

- It was not understood why the majority of fluorescein detections were considered false positive detections. The basis of this observation is unclear considering a lack of background and laboratory confirmation results.

- It was not apparent why certain samples were selected for laboratory confirmation and others were not. There was no apparent consistency in the selection of samples for laboratory confirmation.

- Samples were submitted for confirmation laboratory analyses three months or more following the collection of the samples in the field. No information was provided regarding the custody and/or storage of the samples. The samples were submitted to the analytical laboratory with incomplete chain-of-custody (COC), and the COC documentation was not completed by the laboratory.

In summary, the data from the study do not provide the basis for meaningful interpretation. Any attempt to formulate conclusions from the data as presented regarding the presence of preferred or predominant groundwater flow patterns is not warranted or recommended.

3.3 HWMU-16 GROUNDWATER MONITORING ANALYTE LIST

The groundwater monitoring analyte list for HWMU-16 is presented in **Table 1 (Appendix B)**. The list represents the subset of the constituents listed in Appendix III of 40 CFR Part 261 that previously have been detected in the groundwater and/or that are reasonably expected to be in or derived from waste contained in HWMU-16. As discussed in Section 3.5.2 below, 12 inorganic constituents and two explosive/propellant constituents have been detected in the groundwater monitoring network for HWMU-16 at statistically significant concentrations above the Unit's calculated background concentrations. The inorganic constituents may be derived from the aquifer formation materials; however, the two explosive/propellant constituents (2,4-Dinitrotoluene and 2,6-Dinitrotoluene) are byproducts of wastes derived from explosives. Therefore, the two explosive/propellant constituents detected could only be from HWMU-16.

The concentration limits established for the hazardous constituents also are listed in **Table 1**. The concentration limits represent either background concentrations calculated for the constituents in this GWQAR, Maximum Concentrations of Constituents for Ground-water Protection listed in Table 1 of 40 CFR 264.94, USEPA Drinking Water Standard Maximum Contaminant Levels (MCLs), or alternate concentration limits (ACLs) established by the VDEQ (July 1998). Certain organic constituents on the list do not have USEPA MCLs or VDEQ ACLs; they also do not have calculated background concentrations because they have not been detected in the Unit's upgradient well. Therefore, the concentration limits for these constituents are equal to their respective method detection limits.

As Alliant discussed with the VDEQ in the past, the reliability of previous laboratory analytical data - particularly dissolved metals data - appeared to be questionable in some cases. In an April 9, 1996 letter to C. Jake (Alliant), the VDEQ agreed that only total metals concentrations in groundwater would be measured, as described in a USEPA Region III guidance on groundwater sampling in karst terrain. Therefore, all references to metals concentrations in this GWQAR refer to <u>total</u> metals concentrations.

3.4 HWMU-16 GROUNDWATER BACKGROUND CONCENTRATIONS

Background concentrations were calculated for each constituent in the groundwater monitoring program using the analytical data from 1996 through 1998 for upgradient well 16C1.

The background concentration calculations were based on site wide 95% confidence, 95% coverage upper prediction intervals. The calculated background concentrations are listed in **Table 2 (Appendix B)**. The background concentrations were used to construct the outermost closing contours on the Isoconcentration Maps (**Appendix A**).

3.5 HWMU-16 STATISTICAL ANALYSIS

Statistical evaluations for HWMU-16 are performed annually and submitted to the VDEQ in accordance with the annual reporting requirements specified in 40 CFR 265.94. As part of this GWQAR, statistical evaluations were performed on Fourth Quarter 1998 analytical data in accordance with the procedures and guidance provided in the following documents:

- Title 40 of the Code of Federal Regulations, 40 CFR 264.97 and 264.98;
- VDEQ Guidance for statistical analysis titled "Data Analysis Plan," undated;
- Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, April 1989;
- Addendum to Interim Final Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, USEPA, July 1992; and
- Statistical Methods for Groundwater Monitoring, Gibbons, R.D., 1994.

Statistical threshold values were computed for the 54 constituents for which HWMU-16 is currently monitored based on the concentrations of those constituents in upgradient (background) well 16C1. All data starting with First Quarter 1996 to Fourth Quarter 1998 were used for this purpose. The 1996 through 1998 monitoring data have been submitted previously to the VDEQ by Alliant in quarterly monitoring reports; therefore, the data are not listed in this GWQAR. Statistical comparisons were performed for the Fourth Quarter 1998 data set. Comparison statistical analyses were performed for all constituents which were detected in any downgradient well during that event.

3.5.1 Background Data and Statistical Comparisons

Statistical analyses were performed using the analytical results from upgradient well 16C1 data as background data. Based on the percentage of non-detects and the distribution of the background data, methods of statistical comparisons varied. Background average, standard deviation and other descriptive statistical data were computed for all constituents and are presented in **Appendix C**.

The constituents listed below were 100% non-detected in the background data. The background threshold levels (BTLs) for these constituents were established as equal to their detection limits (DL). Detections of these constituents in the downgradient wells during Fourth Quarter 1998 were compared to these BTLs.

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Antimony	12	100	3	3
Arsenic	12	100	1	1
Bromoform	12	100	0.3	0.3
Carbon tetrachloride	12	100	0.2	0.2
Chlorobenzene	12	100	0.1	0.1
Chloromethane	12	100	0.3	0.3
Cyanide	12	100	10	10

Background Threshold Level (BTL) = Detection Limit (DL)				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Di-n-butyl phthalate	12	100	5	5
1,2-Dichloroethane	12	100	0.1	0.1
trans-1,2-Dichloroethene	12	100	0.1	0.1
1,4-Dichlorobenzene	12	100	0.1	0.1
Ethylbenzene	12	100	0.1	0.1
Mercury	12	100	0.2	0.2
Methyl ethyl ketone	12	100	1.1	1.1
Selenium	12	100	1	1
1,1,2,2-Tetrachloroethane	12	100	0.3	0.3
1,1,2-Trichloroethane	12	100	0.5	0.5
Trichloroethene	12	100	0.1	0.1
Toluene	12	100	0.1	0.1
2378-TCDF	12	100	0.0485 ppt	0.0485 ppt
12378-PECDF	12	100	0.0439 ppt	0.0439 ppt
23478-PECDF	12	100	0.0417 ppt	0.0417 ppt
123478-HXCDF	12	100	0.0390 ppt	0.0390 ppt
123678-HXCDF	12	100	0.0377 ppt	0.0377 ppt
234678-HXCDF	12	100	0.0428 ppt	0.0428 ppt
123789-HXCDF	12	100	0.0415 ppt	0.0415 ppt
1234678-HPCDF	12	100	0.0615 ppt	0.0615 ppt
1234789-HPCDF	12	100	0.0709 ppt	0.0709 ppt
OCDF	12	100	0.1307 ppt	0.1307 ppt

Non-parametric prediction intervals were computed for all of the constituents for which the data from background well 16C1 satisfied one of the following two criteria, per VDEQ regulations and guidance as well as USEPA guidance:

- Percentage of non-detects was greater than or equal to 50 and less than 100; or
- Percentage of non-detects was less than 50, but data was not normally distributed in original or log-transformed mode.

The background threshold levels for these constituents were set as equal to their upper prediction limits (UPLs). The background and relevant statistical data for these constituents are summarized below. The confidence level and false positive rate were calculated based on the number of background data points available and number of future comparisons. For all constituents, the confidence level was determined to be equal to 0.933, and the false positive rate was equal to 0.067. Since the upper control limit of a non-parametric interval cannot be adjusted for multiple comparisons and inadequate number of background data, the number of resampling events required was adjusted to account for the high error rates inherent in those situations. The number of confirmation resamples required for all constituents is 2. The background and relevant statistical data for these constituents are summarized below. Associated statistical computations are presented in **Appendix C**.

BTL = Upper Prediction Limit of Non-parametric Prediction Interval w/false positive rate=0.067				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Beryllium	12	75	0.2	0.7
Cadmium	12	75	0.1	0.2
Cobalt	12	75	1	5
Copper	12	50	1	13
1,1-Dichloroethane	12	0	0.2	9.5
2,4-Dinitrotoluene	12	92	0.08	0.10

BTL = Upper Prediction Limit of Non-parametric Prediction Interval w/false positive rate=0.067				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
2,6-Dinitrotoluene	12	75	0.08	0.11
Lead	12	42	1	10
Nickel	12	92	15	16
Silver	12	75	0.2	0.5
Thallium	12	67	1	6
TOC	12	75	1000	7000
1,1,1-Trichloroethane	12	17	0.3	9.2
Vanadium	12	83	4	151
Vinyl Chloride	12	92	0.1	0.1
Xylene (total)	12	92	0.1	0.2
Zinc	12	50	5	51

Chromium exhibited normally distributed data (excluding non-detects) with between 25% and 50% non-detects in the background well. The mean and standard deviation of the background data for chromium were adjusted using Cohen's Maximum Likelihood Estimator Method (1959, 1961). A one-sided parametric prediction interval was then computed for chromium based on the adjusted mean and standard deviation. The Upper Prediction Limit was set as the BTL for chromium. The background and relevant statistical data for chromium are summarized below. Cohen's adjustment computations and prediction interval computations are presented in **Appendix C**.

BTL = Upper Prediction Limit of Prediction Interval w/false positive rate=0.05 Original Mean = 3.54, Original SD = 1.933 Adjusted Mean = 3.642. Adjusted SD = 1.95				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Chromium	12	25	1	6.2

The following constituents exhibited normally distributed background data with less than 25% non-detects. One sided parametric prediction intervals were computed on the background data for all of these constituents. The UPLs for these constituents were set as their respective BTLs, with one exception. For pH, a two-sided parametric prediction interval was computed; therefore, the BTL for pH consisted of a range between the lower prediction limit (LPL) and the upper prediction limit. The background concentration calculations were based on a site wide 95% confidence, 95% coverage upper prediction intervals. When adjusted for multiple comparisons of the background data, the minimum required false positive rate was below 1% (0.01). A 99% confidence level (0.01 false positive rate) was used for all individual comparisons, which with the most conservative assumptions provided a site-wide false positive rate of >0.05 for all constituents. The background and relevant statistical data for these constituents are summarized below. The prediction interval computations for these constituents are presented in **Appendix C**.

BTL = UPL of one-sided Prediction Interval (exception pH) w/site-wide false positive rate>0.05 (individual comparisons false positive rate=0.01) BTL for pH = LPL – UPL of two-sided Prediction Interval				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Barium	12	0	2	175.4
Dichlorodifluoromethane	12	8	0.3	46.5
Tetrachloroethene	12	17	0.1	0.7
TOX	12	17	5	42.2

BTL = UPL of one-sided Prediction Interval (exception pH) w/site-wide false positive rate>0.05 (individual comparisons false positive rate=0.01) BTL for pH = LPL – UPL of two-sided Prediction Interval				
Parameter	Sample Size	% Non-Detects	DL (µg/l)	BTL (µg/l)
Trichlorofluoromethane	12	0	0.5	11.3
Specific Conductivity	8	0	1 µS/cm	672 µS/cm
pH	8	0	0.1 pH units	5.7 to 7.9 pH units

3.5.2 Results of Statistical Comparisons

The following table lists the constituents which were detected during the Fourth Quarter 1998 event at concentrations exceeding their respective background threshold levels (BTLs), and the downgradient wells in which they were detected.

Parameter	Monitoring Well(s)
Arsenic	16-5, 16WC2B
Barium	16-2, 16-3, 16-5, 16WC1A, 16WC1B, 16WC2B, 16SPRING
Beryllium	16WC1B, 16WC2B
Cadmium	16WC1B
Chromium	16-3, 16-5, 16WC1B, 16WC2B
Cobalt	16-5, 16WC1B, 16WC2B
Copper	16-5, 16WC1B, 16WC2B
Lead	16WC1B
Mercury	16WC1B
Nickel	16-5, 16WC1A, 16WC2B
Selenium	16-5, 16WC1B, 16WC2B
Zinc	16WC1B
2,4-Dinitrotoluene	16-3, 16-5, 16WC1B, 16WC2B, 16SPRING
2,6-Dinitrotoluene	16WC1A, 16WC1B

Any HWMU-16 target constituents not listed above were not detected in the downgradient monitoring wells at concentrations exceeding their respective BTLs.

3.6 HWMU-16 PLUME DELINEATIONS

In accordance with VDEQ instructions presented during the May 19, 1999 meeting between Alliant and the VDEQ, Isoconcentration Maps were produced to depict constituent plumes in the groundwater beneath the site (**Appendix A**). In order to evaluate the shape and position of constituent plumes over time, historical Isoconcentration Maps were developed using the historical maximum concentrations for the constituents monitored at the site for the time periods of 1992 through 1995 and 1996 through 1998. The historical maximum concentrations for these time periods are listed in **Tables 3** and **4**, respectively (**Appendix B**).

Groundwater analytical data collected prior to 1992 were not included in the evaluation of historical maximum concentrations. The data collected prior to 1992 are considered unreliable due to "order-of-magnitude" variations in parameter concentrations from quarter to quarter, as well as a general lack of laboratory QA/QC. Additionally, the groundwater monitoring analyte lists prior to 1992 did not include many of the parameters on the current groundwater monitoring analyte list for HWMU-16.

TABLE 2
HWMU-16
Calculated Background Values

Constituent	Background Concentration (µg/l unless otherwise noted)
Antimony	3
Arsenic	1
Barium	175.4
Beryllium	0.7
Cadmium	0.2
Chromium	6.2
Cobalt	5
Copper	13
Lead	10
Mercury	0.2
Nickel	16
Selenium	1
Silver	0.5
Thallium	6
Vanadium	151
Zinc	51
Bromoform	0.3
Carbon Tetrachloride	0.2
Chlorobenzene	0.1
Chloromethane	0.3
1,4-Dichlorobenzene	0.1
Dichlorodifluoromethane	46.5
1,1-Dichloroethane	9.5
1,2-Dichloroethane	0.1
trans-1,2-Dichloroethene	0.1
Ethylbenzene	0.1
Methyl Ethyl Ketone	1.1
1,1,2,2-Tetrachloroethane	0.3
Tetrachloroethene	0.7
Toluene	0.1
1,1,1-Trichloroethane	9.2
1,1,2-Trichloroethane	0.5
Trichloroethene	0.1
Trichlorofluoromethane	11.3
Vinyl Chloride	0.1
Xylenes (total)	0.2

TABLE 2
HWMU-16
Calculated Background Values

Constituent	Background Concentration (µg/l unless otherwise noted)
Di-n-butylphthalate	5
2,4-Dinitrotoluene	0.10
2,6-Dinitrotoluene	0.11
2378-TCDF	0.0485 ppt
12378-PECDF	0.0439 ppt
23478-PECDF	0.0417 ppt
123478-HXCDF	0.0390 ppt
123678-HXCDF	0.0377 ppt
234678-HXCDF	0.0428 ppt
123789-HXCDF	0.0415 ppt
1234678-HPCDF	0.0615 ppt
1234789-HPCDF	0.0709 ppt
OCDF	0.1307 ppt
Cyanide	10
Total Organic Carbon (x4)	7000
Total Organic Halides (x4)	42.2
Specific Conductivity	672 µS/cm
pH	5.7 to 7.9 pH units

Appendix IX Constituents Detected Since Permit Issuance
HWMUs 5, 7, 10, and 16
Radford Army Ammunition Plant

Unit	Quarter Initially Detected	Constituent	Background--Calculated or QL?	Background (ug/L)	GPS Required? (261 Appendix VIII)	Proposed GPS (ug/L)	Source
HMWU-5	Fourth Quarter 2003	Chromium	QL	5	yes	100	USEPA MCL
		Diethyl Ether	QL	12	no	NA	NA
		2-Nitroaniline	QL	20	no	NA	NA
		4-Nitroaniline	QL	20	yes	20	Background/QL
		Nitrobenzene	QL	10	yes	10	Background/QL
	Third Quarter 2006	Dichlorodifluoromethane	QL	1	yes	125.2	VDEQ ACL
HWMU-7	Third Quarter 2003	Copper	Calculated	49	no	NA	NA
	Second Quarter 2004	Zinc	Calculated	217	no	NA	NA
HWMU-10	First Quarter 2003	Cobalt	QL	5	no	NA	NA
	Second Quarter 2003	Vanadium	QL	10	no	NA	NA
	Second Quarter 2005	Acetone	QL	10	no	NA	NA
		2-Propanol	QL	50	no	NA	NA
HWMU-16	Second Quarter 2003	Chloroethane	Calculated	20.7	yes	20.7	Background/QL
		Diethyl Ether	Calculated	75.5	no	NA	NA
		Dimethyl Ether	Calculated	17.0	no	NA	NA
	Third Quarter 2003	Methylene Chloride	Calculated	13.95	no*	NA	NA
	Second Quarter 2004	1,1,2-Trichloro-1,2,2-trifluoroethane	Calculated	1.2	no*	NA	NA

HWMU-5: The additional Appendix IX constituents detected in the downgradient point of compliance wells were not detected above their respective Quantitation Limits (QLs) in the upgradient well. As a result, background concentrations for those constituents were set as equal to their respective QLs. In accordance with the Permit (Condition V.J.1.g.), GPS are proposed for those additional Appendix IX constituents that are listed in Appendix VIII of 40 CFR Part 261 (chromium, 4-nitroaniline, nitrobenzene, and dichlorodifluoromethane). No GPS are proposed for the additional Appendix IX constituents that are not listed in Appendix VIII of 40 CFR Part 261 (diethyl ether and 2-nitroaniline).

HWMU-7: Background concentrations for the additional Appendix IX constituents detected in the downgradient point of compliance wells (copper and zinc) were previously calculated and submitted to the VDEQ in the August 1998 *Groundwater Quality Assessment Report for HWMU-7* prepared by ERM, Inc. In accordance with the Permit (Condition V.J.2.g.), no GPS are proposed for the additional Appendix IX constituents (copper and zinc), as they are not listed in Appendix VIII of 40 CFR Part 261.

HWMU-10: The additional Appendix IX constituents detected in the downgradient point of compliance wells were not detected above their respective Quantitation Limits (QLs) in the upgradient well. As a result, background concentrations for those constituents were set as equal to their respective QLs. In accordance with the Permit (Condition V.J.3.g.), no GPS are proposed for the additional Appendix IX constituents (cobalt, vanadium, acetone, and 2-propanol), as they are not listed in Appendix VIII of 40 CFR Part 261.

HWMU-16: Background concentrations for additional Appendix IX constituents chloroethane, diethyl ether, dimethyl ether, and methylene chloride were calculated using data collected from upgradient well 16C1 during the period from Third Quarter 2003 through Third Quarter 2004. The background concentration for additional Appendix IX constituent 1,1,2-trichloro-1,2,2-trifluoroethane was calculated using data collected from upgradient well 16C1 during the period from Second Quarter 2004 through Third Quarter 2006.
In accordance with the Permit (Condition V.J.4.g.), GPS are proposed for additional Appendix IX constituents that are listed in Appendix VIII of 40 CFR Part 261 (chloroethane). No GPS are proposed for the additional Appendix IX constituents that are not listed in Appendix VIII of 40 CFR Part 261 (diethyl ether and dimethyl ether).
*Methylene chloride and 1,1,2-trichloro-1,2,2-trifluoroethane should not be added to the Groundwater Monitoring List for HWMU-16, as these constituents were only detected in the upgradient well for the Unit, and not in the downgradient point of compliance wells.

Statistical Computations – RAAP HWMU-16 – 1,1,2-Trichloro-1,2,2-Trifluoroethane

In accordance with the facility permit and VHWMR, statistical background concentration is being established for 1,1,1-Trichloro-1,2,2-Trifluoroethane. Inter-well upper prediction limits (UPL) were calculated on the background data for this target parameter in accordance with the facility permit and VHWMR (40 CFR 264.97(h)). Background data for this target parameter consisted of all data for the background well 16C1 collected from 2nd quarter 2004 through 3rd quarter 2006.

Discussion of Tests for Normality

The power of a statistical tool to account for false positive and false negative results, while accurately detecting true statistical variations for a facility under scrutiny depends on numerous factors, one of which is the distribution of the data. A great number of statistical tools are based on the assumption that data are normally distributed. Hence the distribution of the sample population for parameters evaluated under this statistical analysis is first determined. Sample populations are tested for normal distribution using several normality tests. "Groundwater Information Tracking System with Statistical Analysis Capability" (GRITS/STAT) v5.0 was the software used to run these statistical tests. GRITS/STAT is an analytical software package provided by the USEPA. The distributions of the data sets were verified in the original mode as well as in log-transformed mode. The normality of the data set was evaluated using the Shapiro-Wilk test for normality.

Discussion of Prediction Interval Tests

Normality tests are performed prior to running parametric tests (tests that require that the data be normal). Results of the normality tests show that the background data for 1,1,2-Trichloro-1,2,2-Trifluoroethane is non-normally distributed. Non-parametric UPL (NUPL) was constructed on the background data for this parameter. The confidence levels of NUPLs are typically approximate and estimated to be around 91%.

Summary of UPL

Parameter	Background Data Distribution	Type of UPL	Multiple Comparisons/year	UPL (µg/l)
1,1,2-Trichloro-1,2,2-Trifluoroethane	Non-Normal	NUPL	N/A	1.2

Statistical Computations – RAAP HWMU-16

In accordance with the facility permit and VHWMR, statistical background concentrations are being established for the four new target parameters chloroethane, diethyl ether, dimethyl ether and methylene chloride. These four target parameters were added to the facility monitoring program during the 3rd quarter 2003 monitoring event. Inter-well upper prediction limits (UPL) were calculated on the background data for the target parameters in accordance with the facility permit and VHWMR (40 CFR 264.97(h)). Background data for these target parameters consisted of all data for the background well 16C1 collected from 3rd quarter 2003 through 3rd quarter 2004.

Discussion of Tests for Normality

The power of a statistical tool to account for false positive and false negative results, while accurately detecting true statistical variations for a facility under scrutiny depends on numerous factors, one of which is the distribution of the data. A great number of statistical tools are based on the assumption that data are normally distributed. Hence the distribution of the sample population for parameters evaluated under this statistical analysis is first determined. Sample populations were tested for normal distribution using several normality tests. "Groundwater Information Tracking System with Statistical Analysis Capability" (GRITS/STAT) v5.0 was the software used to run these statistical tests. GRITS/STAT is an analytical software package provided by the USEPA. The distributions of the data sets were verified in the original mode as well as in log-transformed mode. The normality of the data sets was evaluated using the Shapiro-Wilk test for normality.

Discussion of Prediction Interval Tests

Normality tests are performed prior to running parametric tests (tests that require that the data be normal). A 99% confidence parametric inter-well UPL was computed for each of the four target parameters that showed normally distributed background data. Results of the normality tests show that the background data for chloroethane, diethyl ether and methylene chloride are normally distributed, and the background data for dimethyl ether is non-normally distributed. Non-parametric UPL (NUPL) was constructed on the background data for dimethyl ether, and parametric UPLs (PUPL) were constructed on the background data for chloroethane, diethyl ether and methylene chloride. No adjustments to the error rates were made to the NUPLs for multiple comparisons. Adjustment for 10 comparisons per year (considering 10 compliance monitoring wells at the facility and 4 quarters of data for each year, and considering historic detects, 10 is considered a representative number for multiple comparisons per year) was made to the PUPLs. The confidence levels of NUPLs are well less than 95%. Any statistically significant increase (SSI) must be confirmed by verification sampling.

Summary of UPLs

Parameter	Background Data Distribution	Type of UPL	Multiple Comparisons/year	UPL (µg/l)
Chloroethane	Normal	PUPL	10	20.7
Diethyl ether	Normal	NUPL	10	75.5
Dimethyl ether	Non-normal	PUPL	N/A	17.0
Methylene Chloride	Normal	PUPL	10	13.95

RAAP-HWMU-16 - Statistical Analysis - Notes

1) Y2K Correction dates are as shown in table below.

Actual Event	Date Used in Stat Software
2000-Qtr1	12/13/1999
2000-Qtr2	12/14/1999
2000-Qtr3	12/15/1999
2000-Qtr4	12/16/1999
2001-Qtr1	12/17/1999
2003-Qtr3	12/18/1999
2003-Qtr4	12/19/1999
2004-Qtr1	12/20/1999
2004-Qtr2	12/21/1999
2004-Qtr3	12/22/1999

Interwell Tests:
2) Background data for target parameters chloroethane, diethyl ether, dimethyl ether and methylene chloride were evaluated using Shapiro-Wilk test. Background data showed normal distribution for chloroethane, diethyl ether and methylene chloride. Parametric interwell 99% confidence upper prediction limits were computed for parameters with normally distributed background data. Dimethyl ether background data was non-normally distributed. Therefore non-parametric Upper Prediction Limit (UPL) was computed for dimethyl ether.

3) No adjustments for multiple comparisons could be made for non-parametric UPLs. Adjustments were made to the parametric UPLs for 10 future comparisons per year to account for multiple compliance monitoring wells and quarterly event data.
Any Statistically significant increase (SSI) must be confirmed by verification sampling.

E:\Ross Work\Radford AAP Archives\HWMU-16\[HWMU16StatDate correction.xls]Sheet1

Normality Tests

Report Printed: 02-02-2005 13:49

Facility:RAAPHWMU16 Haz. Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:24141
County:PULASKI

Contact:
Phone:( ) -

Permit Type:Detection

Constituent:ClEthane Chloroethane

CAS Number: 75-00-3
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 2.000 ppb

Start Date:Mar 31 1996
End Date:Dec 22 1999

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:5

Scale	Minimum	Maximum	Mean	Std Dev
Original:	1.000	6.400	4.340	2.078
Log:	0.000	1.856	1.303	0.749

Pooled Statistics
Observations: 5

Statistic	Original Scale	Log Scale
Mean:	4.340	1.303
Std Dev:	2.078	0.749
Skewness:	-0.810	-1.296*
Kurtosis:	-0.555	-0.011
Minimum:	1.000	0.000
Maximum:	6.400	1.856
CV:	0.479	0.575

Shapiro-Wilk Statistics

Scale	Test Statistic	5% Critical Value	1% Critical Value
Original:	0.9037	0.7620	0.6860

Log:	0.7615*	0.7620	0.6860

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Parametric Prediction Interval
Report Printed February 2,2005

Facility:Haz. Waste Unit 16 - RAAP
Parameter:Chloroethane(CAS Number:75-00-3)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n):	5
Shapiro-Wilk (W):	0.9037
Critical W,α=0.01:	0.6860
Mean:	4.340 ppb
Std Dev:	2.078 ppb
DF:	4
Conf. Level (1-α):	~~0.9500~~ 0.99
Future Samples (k):	10
$t_{\left[1-\frac{\alpha}{k}\right]}$:	7.1732
Kappa:	7.8579
UL:	20.669 ppb
LL:	-∞

Report Produced by GRITS/STAT 5.01

Normality Tests

Report Printed: 02-02-2005 13:49

Facility:RAAPHWMU16 Haz. Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:24141
County:PULASKI

Contact:
Phone:( ) -

Permit Type:Detection

Constituent:DEthEth Diethyl ether

CAS Number: - -
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 24.000 ppb

Start Date:Mar 31 1996
End Date:Dec 22 1999

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:5

Scale	Minimum	Maximum	Mean	Std Dev
Original:	12.000	30.000	21.200	6.907
Log:	2.485	3.401	3.007	0.355

Pooled Statistics
Observations: 5

Statistic	Original Scale	Log Scale
Mean:	21.200	3.007
Std Dev:	6.907	0.355
Skewness:	-0.122	-0.491
Kurtosis:	-1.140	-1.024
Minimum:	12.000	2.485
Maximum:	30.000	3.401
CV:	0.326	0.118

Shapiro-Wilk Statistics

Scale	Test Statistic	5% Critical Value	1% Critical Value
Original:	0.9768	0.7620	0.6860

Log:	0.9507	0.7620	0.6860

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Parametric Prediction Interval
Report Printed February 2,2005

Facility:Haz. Waste Unit 16 - RAAP
Parameter:Diethyl ether(CAS Number:- -)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n):	5
Shapiro-Wilk (W):	0.9768
Critical W, α=0.01:	0.6860
Mean:	21.200 ppb
Std Dev:	6.907 ppb
DF:	4
Conf. Level (1-α):	~~0.9500~~ 0.99
Future Samples (k):	10
$t_{\left[1-\frac{\alpha}{k}\right]}$:	7.1732
Kappa:	7.8579
UL:	75.470 ppb
LL:	-∞

Report Produced by GRITS/STAT 5.01

Normality Tests

Report Printed: 02-02-2005 13:53

Facility:RAAPHWMU16 Haz. Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:24141
County:PULASKI

Contact:
Phone:( ) -

Permit Type:Detection

Constituent:DMethEth Dimethyl ether

CAS Number: - -
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 24.000 ppb

Start Date:Mar 31 1996
End Date:Dec 22 1999

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:5

Scale	Minimum	Maximum	Mean	Std Dev
Original:	12.000	17.000	13.000	2.236
Log:	2.485	2.833	2.555	0.156

Pooled Statistics
Observations: 5

Statistic	Original Scale	Log Scale
Mean:	13.000	2.555
Std Dev:	2.236	0.156
Skewness:	1.500*	1.500*
Kurtosis:	0.250	0.250
Minimum:	12.000	2.485
Maximum:	17.000	2.833
CV:	0.172	0.061

Shapiro-Wilk Statistics

Scale	Test Statistic	5% Critical Value	1% Critical Value
Original:	0.5521*	0.7620	0.6860

Log:	0.5521*	0.7620	0.6860

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Nonparametric Prediction Interval
Report Printed February 2,2005

Facility:Haz. Waste Unit 16 - RAAP
Parameter:Dimethyl ether(CAS Number:- -)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n):	5
Conf. Level (1-α):	33.330%

UL: 17.000 ppb
LL: 0.000

Normality Tests

Report Printed: 02-02-2005 13:54

Facility:RAAPHWMU16 Haz. Waste Unit 16 - RAAP

Address:

City:Radford ST:VA Zip:24141
County:PULASKI

Contact:
Phone:( ) -

Permit Type:Detection

Constituent:MeCl Dichloromethane (Methylene chloride)

CAS Number: 75-09-2
MCL: 0.000 ppb
ACL: 0.000 ppb
Detect Limit: 2.000 ppb

Start Date:Mar 31 1996
End Date:Dec 22 1999

Normality Test on Observations for wells listed below:

Well:16C1 Position:Upgradient Observations:5

Scale	Minimum	Maximum	Mean	Std Dev
Original:	4.100	6.800	5.800	1.037
Log:	1.411	1.917	1.743	0.197

Pooled Statistics
Observations: 5

Statistic	Original Scale	Log Scale
Mean:	5.800	1.743
Std Dev:	1.037	0.197
Skewness:	-0.925	-1.088*
Kurtosis:	-0.436	-0.263
Minimum:	4.100	1.411
Maximum:	6.800	1.917
CV:	0.179	0.113

Shapiro-Wilk Statistics

Scale	Test Statistic	5% Critical Value	1% Critical Value
Original:	0.8964	0.7620	0.6860

Log:	0.8519	0.7620	0.6860

* Indicates statistically significant evidence of non-normality.
GRIT/STAT Version 5.0

Parametric Prediction Interval
Report Printed February 2,2005

Facility:Haz. Waste Unit 16 - RAAP
Parameter:Dichloromethane (Methylene chloride(CAS Number:75-09-2)

ONE-TAILED UPPER PARAMETRIC PREDICTION INTERVAL

Observations (n):	5
Shapiro-Wilk (W):	0.8964
Critical W, α=0.01:	0.6860
Mean:	5.800 ppb
Std Dev:	1.037 ppb
DF:	4
Conf. Level (1-α):	~~0.9500~~ 0.99
Future Samples (k):	10
$t_{\left[1-\frac{\alpha}{k}\right]}$:	7.1732
Kappa:	7.8579
UL:	13.947 ppb
LL:	-∞

Report Produced by GRITS/STAT 5.01

Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia
Upgradient well = 16C1

All Results in ug/L.

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*QL*	*GPS*	*Method*
Chloroethane					*CAS #*	*75-00-3*		
Third Quarter 2003	6.4	U	4.8	U	U	1	20.7	8260B
Fourth Quarter 2003	5.7	U	2.6	1.1	U	1	20.7	8260B
First Quarter 2004	U J	U J	U J	U J	U J	1	20.7	8260B
Second Quarter 2004	4.4	U	2.4	0.63 J	U	1	20.7	8260B
Third Quarter 2004	4.2	U	2	U	U	1	20.7	8260B
Fourth Quarter 2004	4.9	U	2.5	U	U	1	20.7	8260B
First Quarter 2005	7.6 J	U J	3.7 J	U J	U J	1	20.7	8260B
Second Quarter 2005	U J	U	U J	U	U	1	20.7	8260B
Third Quarter 2005	4.7 J	U J	U	U J	U J	1	20.7	8260B
Fourth Quarter 2005	4.6 J	U	2.6 J	U	U	1	20.7	8260B
First Quarter 2006	5.3	U	U	U	U	1	20.7	8260B
Second Quarter 2006	5 J	U	2 J	U	U	1	20.7	8260B
Third Quarter 2006	5	U	0.7 J	0.7 J	U	1	20.7	8260B
Fourth Quarter 2006	5.8	U	1	U	U	1	20.7	8260B
First Quarter 2007	6.1	U	1	U	U	1	20.7	8260B
Second Quarter 2007	5.2	U	1.4	U	U	1	20.7	8260B
Diethyl ether					*CAS #*	*60-29-7*		
Third Quarter 2003	12 J	U	12 J	U	U	12	-	8260B
Fourth Quarter 2003	30	U	14	U	U	12	-	8260B
First Quarter 2004	24	U	U	U	U	12	-	8260B
Second Quarter 2004	23 J	U J	13 J	U J	U J	12	-	8260B
Third Quarter 2004	17	U	U	U	U	12	-	8260B
Fourth Quarter 2004	24	U J	U	U	U J	12	-	8260B
First Quarter 2005	29	U	14	U	U	12	-	8260B
Second Quarter 2005	20	U J	9.2	U J	U J	12	-	8260B
Third Quarter 2005	30	U	15	U	U	12	-	8260B
Fourth Quarter 2005	25	U	18	U	U	12	-	8260B
First Quarter 2006	19	U	U	U	U	12	-	8260B
Second Quarter 2006	17	U	U	U	U	12.5	-	8260B
Third Quarter 2006	33	1.5 J	4.3 J	4.6 J	U	12.5	-	8260B
Fourth Quarter 2006	20	U	U	U	U	12.5	-	8260B
First Quarter 2007	21	U	U	U	U	12.5	-	8260B
Second Quarter 2007	17 J	1.5 J	5.7 J	2.1 J	U J	12.5	-	8260B
Dimethyl ether					*CAS #*	*115-10-6*		
Third Quarter 2003	6.6 J	U	9.9 J	U	U	12	-	8260B
Fourth Quarter 2003	U	U	U	U	U	12	-	8260B
First Quarter 2004	17 J	U J	13 J	U J	U J	12	-	8260B
Second Quarter 2004	U J	U J	6.6 J	U J	U J	12	-	8260B
Third Quarter 2004	U J	U J	U J	U J	U J	12	-	8260B
Fourth Quarter 2004	16 J	U J	12 J	U	U J	12	-	8260B
First Quarter 2005	26	U	25	U	U	12	-	8260B
Second Quarter 2005	15	U	14	U	U	12	-	8260B
Third Quarter 2005	13	U	U	U	U	12	-	8260B
Fourth Quarter 2005	U	U	U	U	U	12	-	8260B
First Quarter 2006	U	U	U	U	U	12	-	8260B
Second Quarter 2006	U	U	U	U	U	12.5	-	8260B
Third Quarter 2006	11 J	U J	3.2 J	2.8 J	U J	12.5	-	8260B
Fourth Quarter 2006	U	U	U	U	U	12.5	-	8260B
First Quarter 2007	U	U	U	U	U	12.5	-	8260B
Second Quarter 2007	11 J	U	7 J	2.6 J	1.2 J	12.5	-	8260B

See last page of this report for definitions.

Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 16C1 *All Results in ug/L.*

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*QL*	*GPS*	*Method*
Methylene chloride					*CAS #* 75-09-2			
Third Quarter 2003	4.1	U	U	U	U	1	13.95	8260B
Fourth Quarter 2003	6.8	U	U	U	U	1	13.95	8260B
First Quarter 2004	6.4	U	U	U	U	1	13.95	8260B
Second Quarter 2004	5.7	U	U	U	U	1	13.95	8260B
Third Quarter 2004	6	U A	U A	U A	U A	1	13.95	8260B
Fourth Quarter 2004	6.4	U	U	U	U	1	13.95	8260B
First Quarter 2005	6.8 J	U	U	U	U	1	13.95	8260B
Second Quarter 2005	6.3	U	U	U	U	1	13.95	8260B
Third Quarter 2005	6.2	U	U	U	U	1	13.95	8260B
Fourth Quarter 2005	4.7	U	U	U	U	1	13.95	8260B
First Quarter 2006	4.9	U	U	U	U	1	13.95	8260B
Second Quarter 2006	7	U	U	U	U	1	13.95	8260B
Third Quarter 2006	U N	U N	U N	U N	U N	1	13.95	8260B
Fourth Quarter 2006	U A	U	U	U A	U	1	13.95	8260B
First Quarter 2007	6.3	U	U	U	U	1	13.95	8260B
Second Quarter 2007	3.4	U	U	U	U	1	13.95	8260B
1,1,2-Trichloro-1,2,2-Trifluoroethane					*CAS #* 76-13-1			
Third Quarter 2003	U	U	U	U	U	1	-	8260B
Second Quarter 2004	1.2	U J	U J	U J	U J	1	-	8260B
Third Quarter 2004	U	U	U	U	U	1	-	8260B
Fourth Quarter 2004	U	U	U	U	U	1	-	8260B
First Quarter 2005	1	U	U	U	U	1	-	8260B
Second Quarter 2005	U	U	U	U	U	1	-	8260B
Third Quarter 2005	U	U	U	U	U	1	-	8260B
Fourth Quarter 2005	U	U	U	U	U	1	-	8260B
First Quarter 2006	U	U	U	U	U	1	-	8260B
Second Quarter 2006	U	U	U	U	U	1	-	8260B
Third Quarter 2006	U	U	U	U	U	1	-	8260B
Fourth Quarter 2006	U	U	U	U	U	1	-	8260B
First Quarter 2007	U	U	U	U	U	1	-	8260B
Second Quarter 2007	U	U	U	U	U	1	-	8260B

See last page of this report for definitions.

Target Analyte Monitoring Results - HWMU-16 Point of Compliance Wells
Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 16C1 *All Results in ug/L.*

Analtye/Quarter	*16C1*	*16MW8*	*16MW9*	*16WC1A*	*16WC1B*	*QL*	*GPS*	*Method*

Definitions: **QL** Denotes permit required quantitation limit. **U** Denotes analyte not detected at or above QL. **UA** Denotes analyte not detected at or above adjusted sample QL. **J** Denotes associated result is estimated. When used with "U" (i.e., "**UJ**"), denotes analyte not detected at or above QL and QL is estimated. When used with "UA" (i.e., "**UAJ**"), denotes analyte not detected at or above adjusted QL and adjusted QL is estimated. **UN** Denotes analyte concentration is less than the quantiation limit and five times the blank concentration. Not reliably detected due to blank contamination. This qualifier used only for Appendix IX monitoring event when results are reported to at or above the project detection limit. **R** Denotes result rejected. **Q** Denotes data validation qualifier. **CAS#** Denotes Chemical Abstract Services registration number. **X** Denotes mass spectral confirmation not obtained-result suspect.

GPS Denotes Groundwater Protection Standards listed in Appendix G to Attachment 5 in the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Units 5, 7, 10, and 16 (October 4, 2002).
NS denotes not sampled. **NA** denotes not analyzed. "–" denotes not detected (pre-2nd Quarter 2003) or not available / not sampled (beginning 2nd Quarter 2003).

Notes:
-Appendix IX Groundwater Monitoring Events:
Third Quarter 2003, Second Quarter 2004, Second Quarter 2005, Third Quarter 2006, Second Quarter 2007
For Appendix IX monitoring events, all results evaluated to detection limit. See laboratory data deliverable for detection limit.

-9/30/2003: Verification sampling event for 16C1 (heptachlor) and 16C1B (Endrin). Verification results: all results reported not detected to detection limit. Original results 0.067 µg/l and 0.39 µg/l, respectively. Confirmation results reported in this table.
-9/30/2003: Verification sampling event for 16C1 (chloroethane, ethyl ether, methyl ether, methylene chloride) and 16MW9 (chloroethane, ethyl ether, methyl ether). Verification results: all results confirmed original analysis. Original results reported in this table.
-June 21, 2004: Verification event for 8260B 16C1 (1,1-dichloroethene and 1,1,2-trichloro-1,2,2-trifluoroethane). Verification results: all not detected except 1,1,2-trichloro-1,2,2-trifluoroethane added to quarterly analyte list beginning 3Q 2004. Due to laboratory error, Appendix IX results for semivolatiles (Method 8270C) will be presented in 3Q 2004. Verification event results for 16WC1B and 16C1 (8081A) – all verification results were not confirmed.
-07/27-28/2005. Verification event for 16WC1B (Mercury Method 7470A.) Not detected in verification sample. Also, verification event for 16C1, 16WC1B-8081A. and 16C1, 16MW9, 16WC1A-ethanol. All verification results not detected. Verification results used.
-06/19/2007. Verification event for 16WC1B and 16MW9 thallium Not detected in verification sample. Verification results used.

APPENDIX E

LABORATORY ANALYTICAL RESULTS – YEAR 2008
(CD-ROM)

APPENDIX F

FIELD NOTES

BC3201-06
D45/TAE

General Notes

Weather - Raining, 50's
PPE - Eye Protection, Nitrile gloves
Calibrations - YSI 650 MDS
pH - 4.00 = 4.00, 7.00 = 7.00, 10.00 = 9.96
Conductivity reads 447 us in 447 us std
DO% = 100

- Changed DO probe membrane
- Dedicated tubing and well skirts used at each well, and disposed of after each use.
- All equipment deconed between each well.
- Purged water contained and disposed of at dedicated location onsite.
- Samples collected, stored and transported on ice and in coolers

Static Water Level Table - Unit 5

WELL	DTW	Post Purge DTW	Notes
S5W7	10.85	11.00	
S5W5	7.36	7.75	
5W9A	2.12	2.12	
5W10A	14.58	15.65	
5W11A	11.09	11.98	
5W8B	14.46	14.98	
5W7B	8.93	9.16	Sign needs mounted
5W5B	8.81	9.23	
5WC22	8.87	8.93	
5WC23	8.35	8.56	
5WC21	8.89	8.96	
★ 5WCA	12.92		Water Level Only
★ S5W6	5.55		"
★ S5W8	11.68		"
★ 5WC11	15.93		"
★ 5WC12	15.63		"

4/28
5WC
DT
Post Pu
Time
12:02
12:05
12:10
12:15
12:20
12:25
12:30
12:35
12:35
1090
1305
5WC
DT
Post Pu
Time
1315
1320
1325
1330
1335
1340
1345
1350
1355
1400
1400

4/28/08 RAAP 5 Btls
BO3204-06
DAS/TGE

5WC23

DTW - 8.35 Begin Purge (12:00)

Post Purge DTW - 8.56 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO% mg/L	pH	ORP(mV)	Purge K	Desc
(12:02)	12.58	875	5.59	6.92	156.0	0.3 L/min	Clear
(12:05)	12.88	848	4.07	6.47	175.4	"	"
(12:10)	13.06	833	2.24	6.34	184.2	"	"
(12:15)	13.14	832	1.97	6.34	185.6	"	"
(12:20)	13.24	831	1.80	6.34	185.0	"	"
(12:25)	13.29	832	1.62	6.34	183.8	"	"
(12:30)	13.26	832	1.55	6.34	183.3	"	"
(12:35)	13.31	832	1.49	6.35	182.3	"	"

(12:35) Readings Stable

Sample Time (12:40)

Samples Collected: (2) 8270, (1) Cyanide, (1) Sulfide

(1) 4065, (3) 8260, (2) 8081, (1) TM-MERC, (2) 8151

(13:05)	13.67	841	1.52	6.43	185.4	"	Post Purge

5WC22

DTW - 8.87 Begin Purge (13:14)

Post Purge DTW - 8.93 Initial Purge - clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge K	Desc
(13:15)	13.54	815	1.66	6.42	194.7	0.3 L/min	clear
(13:20)	13.66	823	0.88	6.40	193.7	"	"
(13:25)	13.81	824	0.80	6.41	190.6	"	"
(13:30)	13.87	824	0.77	6.41	188.3	"	"
(13:35)	14.00	824	0.71	6.42	185.5	"	"
(13:40)	14.07	824	0.67	6.42	183.0	"	"
(13:45)	14.11	824	0.64	6.42	180.9	"	"
(13:50)	14.19	825	0.61	6.42	178.6	"	"
(13:55)	14.17	824	0.59	6.42	177.2	"	"
(14:00)	14.11	825	0.58	6.42	176.7	"	"

(14:00) Readings stable

4/28/09 RAAP FB# 8
B03204-06
DGS/TQE

SWC 22 - cont

Sample Time (1405)
Samples Collected: (2) 8270, (3) 8260, (1) CN, (1) Sulfide
(1) 9065, (2) 8081, (1) TM, (2) 8151

Time	Temp(C)	Cond(µs)	DO mg/L	pH	ORP(mV)	
(1425)	14.26	880	1.10	6.47	181.5	Post Purge

SWC 21

DTW - 8.89
Post Purge DTW - 8.96

Begin Purge (1435)
Initial Purge - Clear

Time	Temp(C)	Cond(µs)	DO mg/L	pH	ORP(mV)	Purge Rate	Desc.
(1435)	13.98	619	2.24	3.39	376.9	0.3 L/min	Clear
(1440)	13.88	610	2.05	3.38	388.6	"	"
(1445)	13.89	608	1.64	3.38	396.3	"	"
(1450)	13.89	610	1.28	3.37	406.7	"	"
(1455)	14.04	610	1.28	3.37	412.7	"	"
(1500)	14.08	610	1.22	3.37	418.3	"	"
(1505)	14.12	612	1.01	3.37	428.7	"	"
(1510)	14.18	613	0.79	3.35	447.0	"	"
(1515)	14.19	613	0.73	3.38	448.5	"	"
(1520)	14.21	613	0.67	3.37	449.6	"	"
(1525)	14.26	613	0.65	3.35	450.7	"	"
(1530)	14.31	614	0.64	3.35	454.6	"	"
(1530)	Readings Stable						
(1610)	14.45	617	1.27	3.39	420.3	Post Purge	Clear

Sample Time (1535)
Samples Collected: (2) 8270, (3) 8260, (1) CN, (1) Sulfide
(1) 9065, (2) 8081, (1) TM, (2) 8151

SW DUP

Sample Time (1550)
Samples Collected: (2) 8270, (3) 8260, (1) CN, (1) Sulfide
(1) 9065, (2) 8081, (1) TM (2) 8151
DUP Collected for SWC21 (10)

#8 4/29/08 RAAP FB#8

B03204-06
DAS/TQE

General Notes

Weather - Overcast, 30-40's

PPE - Eye Protection, Nitrile gloves,

Calibrations - YSI 650 MDS

pH - 4.00 = 4.00, 7.00 = 7.01, 10.00 = 9.98

Conductivity reads 447 us in 447 us std

DO % = 100

- Dedicated tubing and well skirts used at each well, and disposed of after each use.
- All equipment deconed between each well
- Purge water contained and disposed of at dedicated location onsite
- Samples collected, stored and transported in coolers on ice

5W8B

DTW - 14.46 Begin Purge (0934)

Post Purge DTW - 14.98 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge K	Desc
(0935)	11.87	71	7.33	4.18	254.3	0.3 L/min	Clear
(0940)	11.70	59	6.39	4.07	279.9	"	"
(0945)	11.84	58	6.28	4.10	288.8	"	"
(0950)	11.79	58	6.26	4.12	297.1	"	"
(0955)	11.81	57	6.25	4.11	303.5	"	"
(1000)	11.79	57	6.26	4.11	306.7	"	"
(1005)	11.79	54	6.25	4.14	311.5	"	"
(1005)	Readings Stable						
(1030)	11.78	55	7.10	4.04	323.4		Post Purge

Sample Time (1010)

Samples Collected: (3) 8260, (2) 8270, (1) CN, (1) Sulfide, (1) 9065
(2) 8081, (1) TM, (2) 8151

(11)

4/29/08 RAAP 303204-06 DAS/TOE FB#8

5WSB

DTW - 8.81 Begin Purge (1044)

Post Purge DTW - 9.23 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge K	Desc
(1045)	11.28	592	7.80	5.38	215.2	0.3 L/min	Clear
(1050)	11.00	588	6.11	5.30	236.3	"	"
(1055)	10.98	578	6.09	5.32	243.2	"	"
(1100)	10.90	576	6.07	5.33	246.7	"	"
(1105)	10.81	578	6.05	5.33	251.9	"	"
(1110)	10.79	579	6.04	5.33	254.4	"	"
(1115)	10.64	582	6.07	5.34	257.2	"	"
(1120)	10.61	583	6.10	5.34	259.0	"	"
(1120)	Readings Stable						
(1135)	11.04	590	~~7.03~~ 5.45 DS	5.45	263.8	Post Purge	

Sample Time (1125)

Samples Collected: (3)8260, (2)8270, (2)8081, (1)CN, (1)Sulfide, (1)9065, (1)TIM, (2)8151

5W7B

DTW - 8.93 Begin Purge (1153)

Post Purge DTW - 9.16 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge K	Desc
(1155)	11.71	210	7.83	4.14	330.2	0.3 L/min	Clear
(1200)	11.67	233	7.18	4.04	385.4	"	"
(1205)	11.55	234	7.06	4.06	397.9	"	"
(1210)	11.54	234	6.97	4.03	411.7	"	"
(1215)	11.58	233	6.92	3.99	425.8	"	"
(1220)	11.47	233	6.92	3.95	430.9	"	"
(1225)	11.51	233	6.91	3.96	432.1	"	"
(1230)	11.57	233	6.88	3.96	432.4	"	"
(1230)	Readings Stable						
(1300)	11.60	263	7.13	3.90	428.3	Post Purge	

S6W7B (Cont.)

Sample Time (1240)

Samples Collected: (9) 8260, (6) 8270, (6) 8081, (3) CN, (3) 9065 (3) Sulfide, (3) TOC, (6) 8151

S5W5

DTW - 7.36 Begin Purge (1328)

Post Purge DTW - 7.75 Initial Purge - Clear

Time	Temp (°C)	Cond (us)	DO mg/L	pH	ORP (mV)	Purge Rate	Desc
(1330)	12.10	279	4.68	5.92	346.2	0.3 L/min	Clear
(1335)	12.20	269	3.06	5.98	333.8	"	"
(1340)	12.47	269	2.08	5.97	321.2	"	"
(1345)	12.42	272	1.72	5.97	316.5	"	"
(1350)	12.56	275	1.59	5.99	311.0	"	"
(1355)	12.36	279	1.44	5.99	298.1	"	"
(1400)	12.21	282	1.30	5.98	298.0	"	"
(1405)	12.06	287	1.15	5.99	295.5	"	"
(1410)	12.19	288	1.10	6.00	293.2	"	"
(1415)	12.10	292	1.06	6.01	290.8	"	"
(1415)	Readings Stable						
(1429)	12.17	301	1.80	6.00	284.1		Post Purge

Sample Time (1420)

Samples Collected: (3) 8260, (2) 8270, (1) TOC

S5W7

DTW - 10.85 Begin Purge (1438)

Post Purge DTW - 11.00 Initial Purge - Clear

Time	Temp (°C)	Cond (us)	DO mg/L	pH	ORP (mV)	Purge Rate	Desc
(1440)	14.25	378	1.03	6.73	244.9	0.3 L/min	Clear
(1445)	14.40	377	0.83	6.74	240.4	"	"
(1450)	14.46	378	0.73	6.74	237.5	"	"
(1455)	14.32	379	0.58	6.75	235.4	"	"
(1500)	13.99	378	0.54	6.71	235.5	"	"

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5SW7 (Cont)

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge	Desc
(1505)	13.97	377	0.51	6.71	234.6	0.3 L/min	Clear
(1510)	13.89	377	0.49	6.70	234.4	"	"
(1510)	Readings Stable						
(1525)	13.74	378	0.53	6.74	228.6	Post Purge	

Sample Time (1515)
Samples Collected: (3) 8260, (2) 8270, (1) TM

5W9A

DTW - 2.12 Begin Purge (1533)
Post Purge DTW - 2.12 Initial Purge: Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge	Desc
(1535)	13.88	404	4.87	7.09	219.4	0.3 L/min	Clear
(1540)	13.88	391	4.88	7.21	215.4	"	"
(1545)	13.90	388	4.80	7.22	215.3	"	"
(1550)	13.91	388	4.79	7.23	215.1	"	"
(1555)	13.82	387	4.80	7.23	215.3	"	"
(1600)	13.85	387	4.79	7.23	215.6	"	"
(1605)	13.87	387	4.79	7.24	215.5	"	"
(1610)	13.86	387	4.78	7.23	216.0	"	"
(1610)	Readings Stable						
(1620)	13.92	390	4.88	7.23	218.3	Post Purge	

Sample Time (1615)
Samples Collected: (3) 8260, (2) 8270, (1) TM

4/30/08 RAAP FB#8

803204-06
DAS/TOE

General Notes

Weather - Sunny, 60s
PPE - Eye Protection, Nitrile gloves
Calibrations - YSI 650 MDS
pH - 4.00 = 4.00, 7.00 = 7.00, 10.00 = 9.99
Conductivity reads 447 us in 447 us std
DO% = 100

- Dedicated tubing and well skirts used at each well and disposed of after each use.
- All equipment deconed between each well
- Purge water contained and disposed of at dedicated area at treatment plant
- Samples collected, stored and transported on ice in coolers

5W10A

DTW - 14.58 Begin Purge (14.24)
Post Purge DTW - 15.65 Initial Purge Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge K	Desc
(1425)	14.85	982	3.70	7.33	188.6	0.3 L/min	Clear
(1430)	15.00	520	2.16	7.38	182.1	"	"
(1435)	15.14	396	1.76	7.43	175.2	"	"
(1440)	15.28	388	1.65	7.43	173.7	"	"
(1445)	15.36	387	1.63	7.44	171.5	"	"
(1450)	15.50	377	1.57	7.42	171.7	"	"
(1455)	15.53	381	1.56	7.43	170.8	"	"
(1455)	Readings Stable				~~174.7~~		
(1510)	15.34	389	2.51	7.63	174.7	Post Purge.	

Sample Time (1500)
Samples Collected: (3) 8260, (2) 8270, (1) TM

4/30/08 RAAP 803209-06 TQE/DAS FB#8

SW11A

DTW- 11.09

Post Purge DTW- 11.98

Begin Purge (1522)

Initial Purge: Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge	Desc
(1525)	14.50	669	2.71	6.29	112.6	0.34/min	Clear
(1530)	14.78	675	1.13	6.24	126.9	"	"
(1535)	14.97	669	1.00	6.23	129.4	"	"
(1540)	14.80	670	0.96	6.24	129.0	"	"
(1545)	14.86	667	0.94	6.24	128.2	"	"
(1550)	14.90	670	0.94	6.25	124.1	"	"
(1555)	14.95	671	0.94	6.25	120.7	"	"
(1555)	Readings Stable						
(1610)	15.00	703	1.41	6.36	122.4	Post Purge	

Sample Time (1600)

Samples Collected: (3) 8260, (2) 8270, (1) TM

COMPLETED 5-5-08

5/21/08 RAAP FB#8

B032241-06

TOE/RFI

5WC23

DTW: 9.98 Begin Purge (1033)

Post Purge DTW: 10.03 Initial Purge: clear

Time	Temp(°)	Cond(µS)	DO mg/L	pH	ORP(mV)	Purge	Desc
(1035)	13.71	878	3.19	6.64	144.5	0.3 L/min	Clear
(1040)	13.82	884	1.77	6.51	152.1	"	clear
(1045)	13.87	886	1.65	6.52	151.2	"	clear
(1050)	14.07	884	1.82	6.52	151.1	"	clear
(1055)	14.15	888	2.00	6.57	132.5	"	clear
(1100)	14.11	887	2.21	6.53	138.5	"	clear
(1105)	14.09	884	2.39	6.50	146.5	"	clear
(1110)	14.04	889	2.49	6.52	146.5	"	clear
(1115)	14.09	887	2.52	6.52	147.0	"	clear
(1120)	14.11	887	2.56	6.52	147.3	"	clear
(1120)	Readings Stable						
Post Purge	14.02	885	2.86	6.60	148.4		

Sample Time (1125)

Samples Collected: (3) 8260

5WC22

DTW: 10.57 Begin Purge (1139)

Post Purge DTW: 10.63 Initial Purge: clear

Time	Temp(°)	Cond(µS)	DO mg/L	pH	ORP(mV)	Purge L	Desc
(1140)	14.43	870	2.59	6.54	152.9	0.3 L/min	clear
(1145)	14.45	875	2.29	6.53	154.6	"	clear
(1150)	14.58	878	2.45	6.53	155.8	"	clear
(1155)	14.62	877	2.64	6.53	155.6	"	clear
(1200)	14.70	878	2.69	6.53	155.6	"	clear
(1205)	14.72	876	2.75	6.54	155.3	"	clear
(1210)	14.74	878	2.78	6.53	155.1	"	clear
(1210)	Readings Stable						
Post Purge	14.79	880	2.78	6.59	164.9		

Sample Time (1215)

Samples Collected: (3) 8260

(82)

B#8

5/21/08

RAAP
B03204-06
TQE/KFL

FB#8

SWC21

DTW: 10.60

Post Purge DTW: 10.65

Begin Purge (1227)
Initial Purge: clear

Time	Temp(°C)	Cond (µs)	DO (mg/L)	pH	ORP(mV)	Purge Rate	Desc
(1230)	14.79	635	2.91	3.56	364.4	0.3 L/min	clear
(1235)	15.12	645	2.61	3.55	407.5	"	clear
(1240)	14.92	647	2.93	3.55	394.4	"	clear
(1245)	15.08	647	2.91	3.55	418.6	"	clear
(1250)	15.05	649	2.96	3.53	423.6	"	clear
(1255)	14.98	652	2.96	3.51	433.4	"	clear
(1300)	14.91	651	2.97	3.51	436.5	"	clear
(1305)	14.88	651	2.99	3.50	441.7	"	clear
(1305)	Readings Stable						
Post Purge	14.80	654	2.73	3.54	443.6		

Sample Time (1310)
Samples Collected: (3) 8260

SWDUP

Sample Time (1320)
Samples Collected: (3) 8260
*Samples Collected from SWC21

16-3

DTW: 58.56

Post Purge DTW: 64.11

Begin Purge (1342)
Initial Purge: clear

Time	Temp(°C)	Cond (µs)	DO (mg/L)	pH	ORP(mV)	Purge Rate	Desc
(1345)	14.27	239	9.28	7.30	206.6	0.3 L/min	clear
(1350)	14.52	239	6.43	7.61	202.9	"	clear
(1355)	14.50	239	5.95	7.73	195.1	"	clear
(1400)	14.33	238	5.65	7.78	191.3	"	clear
(1405)	14.41	238	5.52	7.82	187.6	"	clear
(1410)	14.37	238	5.47	7.82	187.4	"	clear
(1415)	14.32	237	5.44	7.82	186.9	"	clear

FB#8 7/17/08 RAAP FB#8
303204-06
DAS/TGE/TO

S5W7

DTW - 12.45 Begin Purge (1412)

Post Purge DTW - 12.53 Initial Purge - Clear

Time	Temp(C°)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge k	Desc
(1415)	18.73	427	2.36	6.57	156.2	0.3 l/min	Clear
(1420)	19.33	426	1.39	6.50	157.8	"	Clear
(1425)	19.86	426	1.27	6.53	156.4	"	Clear
(1430)	20.14	427	1.38	6.60	150.3	"	Clear
(1435)	20.20	428	1.64	6.64	146.6	"	Clear
(1440)	19.70	426	1.66	6.60	147.5	"	Clear
(1445)	19.66	426	1.73	6.61	141.3	"	Clear
(1450)	19.79	426	1.74	6.61	142.7	"	Clear
(1450) Readings Stable							
(Post Purge)	20.04	427	1.81	6.73	149.2		Clear

Sample Time (1455)

Samples Collected: (6) 8260

FB#8

10/27/08

RAAP
B03204-06
DAS/TQE

FB#8

General Notes

Weather- Partly Sunny, 40's
PPE- Eye Protection, Nitrile gloves,
Calibrations- YSI 650 MDS
pH- 4.00=4.00, 7.00=7.00, 10.00=9.99
Condactivity reads 1413 us in 1413 us std
DO% = 99.9

- Dedicated tubing and well skirts used at each well, and disposed of after each use.
- All equipment deconed between each well
- Purge water contained and disposed of at treatment plant onsite.
- All samples collected, stored and transported on ice in coolers.

Static Water Level Table - Unit 5

WELL	DTW	Post Purge DTW	Notes
S5W7	13.61	13.65	
S5W5	11.61	12.24	
5W9A	5.39	5.39	
5W10A	17.27	17.59	
5W11A	15.77	16.05	
5W8B	16.96	17.28	
5W7B	12.46	12.46	
5W5B	12.83	14.39	
5WC22	12.79	12.88	
5WC23	12.27	12.41	
5WC21	12.77	12.82	
• 5WCA	16.34		SWL ONLY
• S5W6	11.03		"
• S5W8	14.02		"
• 5WC11	17.88		"
• 5WC12	17.70		"

10/27/08 RAAP FB#8
B03204-06
DAS/TAE

SW8B

DTW -16.96 Begin Purge (1121)
Post Purge DTW -17.28 Initial Purge - Clear

Time	Temp(C°)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge Rate(gpm)	Desc
1125	12.83	69	~~7.97~~ 7.52 DS.	~~7.10~~ 4.56 DS	250.6	0.3 L/min	Clear
1130	12.61	73	6.72	4.22	265.3	"	Clear
1135	12.45	70	6.14	4.19	276.1	"	Clear
1140	12.42	68	6.05	4.18	280.2	"	Clear
1145	12.60	65	5.84	4.20	286.1	"	Clear
1150	12.68	65	5.78	4.22	289.3	"	Clear
1155	12.66	65	5.76	4.23	291.8	"	Clear
1155	Readings Stable						
1210	12.98	62	5.83	4.25	303.2	Post Purge	Clear

Sample Time (1200)
Samples Collected: (3)8260, (2)8270, (1)TM

SSW7

DTW -13.61 Begin Purge (1236)
Post Purge DTW -13.65 Initial Purge - Clear

Time	Temp(C°)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge Rate(gpm)	Desc
1237	15.25	380	2.55	6.79	114.0	0.3 L/min	Clear
1240	14.83	383	1.90	6.80	105.4	"	Clear
1245	14.73	383	1.43	6.78	102.3	"	Clear
1250	14.82	383	1.30	6.78	104.3	"	Clear
1255	15.00	383	1.15	6.79	108.2	"	Clear
1300	14.97	385	1.10	6.77	113.4	"	Clear
1305	14.86	386	1.08	6.76	118.5	"	Clear
1310	14.84	386	1.08	6.75	121.2	"	Clear
1310	Readings Stable					"	
1327	15.	386	1.10	6.77	124.4	Post Purge	Clear

Sample Time (1315)
Samples Collected: (3)8260, (2)8270, (1)TM

10/27/08

SSW5

DTW - 11
Post Purge DTW

Time	Temp
1355	17.4
1400	17.3
1405	17.4
1410	17.5
1415	17.5
1420	17.6
1425	17.6
1430	17.5
1435	17.4
1435	Rea
1450	17.12

Sa
Samp

SW7B

DTW - 12.
Post Purge DTW -

Time	Tem
1535	15.
1540	15.
1545	15.5
1550	15.5
1555	15.6
1600	15.6
1605	15.6
1605	Read
1633	15.93

Sam
Samples

FB#8 | 10/27/08 | RAAP 803204-06 DAS/TQE | FB#8

S5W5

DTW - 11.61 | Begin Purge (1354)

Post Purge DTW - 12.24 | Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge(l/gpm)	Desc
(1355)	17.43	325	3.92	6.09	185.4	0.34/min	Clear
(1400)	17.31	335	1.65	6.01	192.1	"	Clear
(1405)	17.40	342	1.26	5.99	193.5	"	Clear
(1410)	17.57	348	1.10	6.00	193.1	"	Clear
(1415)	17.55	354	1.02	5.99	193.2	"	Clear
(1420)	17.63	358	1.03	6.00	192.6	"	Clear
(1425)	17.62	362	1.09	6.01	190.8	"	Clear
(1430)	17.53	364	1.13	6.00	191.0	"	Clear
(1435)	17.47	368	1.16	6.02	188.9	"	Clear
(1435)	Readings Stable						
(1450)	17.12	396	1.25	6.02	177.6	Post Purge	Clear

Sample Time (1440)

Samples Collected: (3) 8260, (2) 8270, (1) TM

SW7B

DTW - 12.46 | Begin Purge (1534)

Post Purge DTW - 12.46 | Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge(l/gpm)	Desc
(1535)	15.86	280	6.57	3.93	302.8	0.34/min	Clear
(1540)	15.50	301	5.30	3.62	385.2	"	Clear
(1545)	15.50	314	4.98	3.55	428.9	"	Clear
(1550)	15.58	325	5.06	3.53	425.3	"	Clear
(1555)	15.63	328	4.87	3.54	450.6	"	Clear
(1600)	15.62	329	4.89	3.55	455.4	"	Clear
(1605)	15.67	329	4.90	3.55	459.1	"	Clear
(1605)	Readings Stable						
(1633)	15.93	332	4.94	3.50	468.6	Post Purge	Clear

Sample Time (1610)

Samples Collected: (9) 8260, (6) 8270, (3) TM

10/28/08 RAAP FB# 8
B03204-06
DAS/TQE/TD

General Notes

Weather - Partly Sunny, 30's
PPE - Eye Protection, Nitrile gloves
Calibrations - YSI 650 MDS
pH - 4.00 = 4.00, 7.00 = 7.00, 10.00 = 10.00
Conductivity reads 1412 us in 1413 us std
DO % = 100

- Dedicated tubing and well skirts used at each well, and disposed of after use.
- All equipment deconed between each well
- Purge water contained and disposed of at dedicated location onsite
- All samples collected, stored and transported on ice in coolers

5W5B

DTW - 12.83 Begin Purge (1013)
Post Purge DTW - 14.39 Initial Purge - Clear

Time	Temp (°C)	Cond (us)	DO mg/L	pH	ORP (MV)	Purge K (gpm)	Desc
(1015)	12.66	630	5.91	5.38	273.9	0.3 L/min	Clear
(1020)	12.37	614	4.03	5.21	291.9	"	Clear
(1025)	12.24	608	3.25	5.23	301.8	"	Clear
(1030)	12.25	618	2.88	5.24	303.5	"	Clear
(1035)	12.36	638	2.62	5.28	304.2	"	Clear
(1040)	12.40	653	2.48	5.29	305.3	"	Clear
(1045)	12.59	670	2.41	5.31	304.4	"	Clear
(1050)	12.68	673	2.39	5.31	304.9	"	Clear
(1050)	Readings Stable						
(1105)	13.24	665	2.26	5.26	301.2	Post Purge	Clear

Sample Time (1055)
Samples Collected: (3) 8260, (2) 8270, (1) TM

10/28/08

5WC22

DTW - 12.7
Post Purge DTW -
Time Temp
(1125) 13.66
(1130) 13.41
(1135) 13.36
(1140) 12.93
(1145) 12.85
(1150) 12.82
(1155) 12.78
(1200) 12.54
(1205) 12.36
(1205) Readi
(1224) 1198
Sam
Sample

5WC23

DTW - 12.
Post Purge DTW - 1
Time Temp
(1240) 12.7
(1245) 10.9
(1250) 10.8
(1255) 11.90
(1300) 11.78
(1305) 12.10
(1310) 12.34
(1315) 12.69
(1315) Readi
(1330) 12.81
Sample Time

FB# 8

10/28/08

RAAP
803204-06
DAS/TGE/TO

FB# 8

SWC22

DTW - 12.79 Begin Purge (1124)

Post Purge DTW - 12.88 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge(gpm)	Desc
(1125)	13.66	916	1.17	6.50	241.6	0.3 L/min	Clear
(1130)	13.41	912	1.01	6.47	237.0	"	Clear
(1135)	13.36	909	1.06	6.47	233.8	"	Clear
(1140)	12.93	912	1.20	6.47	228.8	"	Clear
(1145)	12.85	907	1.31	6.47	227.3	"	Clear
(1150)	12.82	906	1.38	6.48	225.2	"	Clear
(1155)	12.78	904	1.46	6.47	223.6	"	Clear
(1200)	12.54	906	1.52	6.47	223.0	"	Clear
(1205)	12.36	908	1.54	6.48	222.1	"	Clear
(1205)	Readings Stable						
(1224)	11.98	900	1.61	6.47	217.1	Post Purge	Clear

Sample Time (1210)

Samples Collected: (3) 8260, (2) 8270, (1) TM

SWC23

DTW - 12.27 Begin Purge (1239)

Post Purge DTW - 12.41 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge(gpm)	Desc
(1240)	12.77	920	2.60	6.69	221.0	0.3 L/min	Clear
(1245)	10.94	930	2.48	6.58	220.6	"	Clear
(1250)	10.86	916	2.07	6.51	223.1	"	Clear
(1255)	11.90	916	1.78	6.51	220.6	"	Clear
(1300)	11.78	922	1.73	6.51	219.3	"	Clear
(1305)	12.10	915	1.64	6.52	217.6	"	Clear
(1310)	12.34	918	1.62	6.52	216.2	"	Clear
(1315)	12.69	915	1.62	6.52	215.1	"	Clear
(1315)	Readings Stable						
(1330)	12.81	917	1.69	6.51	217.3	Post Purge	Clear

Sample Time (1320) Samples Collected: (3) 8260, (2) 8270, (1) TM

10/28/08

RAAP
B03204-06
DAS/TOE/TO

FB# 8

5WC21

DTW - 12.77

Post Purge DTW - 12.82

Begin Purge (1349)

Initial Purge - clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge-kt(gpm)	Desc
(1350)	13.22	652	2.27	3.50	450.9	0.3 L/min	Clear
(1355)	13.57	650	1.47	3.46	468.3	"	Clear
(1400)	13.36	648	1.53	3.44	475.0	"	Clear
(1405)	12.75	652	1.63	3.45	467.4	"	Clear
(1410)	13.00	647	1.75	3.45	466.1	"	Clear
(1415)	12.84	648	1.78	3.44	470.6	"	Clear
(1420)	12.88	644	1.82	3.44	475.0	"	Clear
(1425)	13.06	645	1.80	3.45	475.8	"	Clear
(1425)	Readings Stable						
(1500)	13.35	649	1.83	3.44	482.6	Post Purge	Clear

Sample Time (1430)

Samples Collected: (3)8260, (2)8270, (1)TM

5WD4P

Sample Time (1445)

Samples Collected: (3)8260, (2)8270, (1)TM

* Samples collected from 5WC21

(60)

10/28/08

5W9A

DTW - 5.39

Post Purge DTW - 5.

Time	Temp(C)
(1525)	14.57
(1530)	14.18
(1535)	14.25
(1540)	14.17
(1545)	14.27
(1550)	14.21
(1555)	14.21
(1555)	Reading
(1610)	13.89

Sampl

Sample:

FB#8

10/28/08

RAAP
B03204-06
DAS/TAE/TD

FB#8

5W9A

DTW - 5.39 Begin Purge (1523)

Post Purge DTW - 5.39 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(MV)	Purge(l/gpm)	Desc
(1525)	14.57	430	5.20	7.34	216.1	0.34/min	Clear
(1530)	14.18	427	4.61	7.35	220.3	"	Clear
(1535)	14.25	424	4.48	7.36	221.5	"	Clear
(1540)	14.17	424	4.44	7.36	222.2	"	Clear
(1545)	14.27	424	4.40	7.35	223.0	"	Clear
(1550)	14.21	424	4.40	7.36	223.4	"	Clear
(1555)	14.21	423	4.39	7.35	224.1	"	Clear
(1555)	Readings Stable						
(1610)	13.89	423	4.43	7.34	216.7	Post Purge	Clear

Sample Time (1600)

Samples Collected: (3) 8260, (2) 8270, (1) TM

Purge(l/gpm)	Desc
3.4/min	Clear
"	Clear
"	Clear
"	Clear
"	Clear
"	Clear
"	Clear
"	Clear
Purge	Clear

10/29/08

RAAP
B0320f-06
DAS/CJB

PB #8

General Notes

Weather - Sunny, 50's
PPE - Eye Protection, Nitrile gloves
Calibrations - YSI 650 MDS
pH - 4.00 = 4.00, 7.00 = 7.00, 10.00 = 9.98
Conductivity reads 1413 us in 1413 us std
DO% = 100

- Dedicated tubing and well skirts used at each well
- All equipment deconed between each well
- Purge water contained and disposed of at dedicated location onsite
- Samples collected, stored and transported on ice in coolers

5W10A

DTW - 17.27 Begin Purge (09:34)
Post Purge DTW - 17.59 Initial Purge - Clear

Time	Temp(°)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge k(gpm)	Desc
0935	13.14	770	7.88	7.57	145.9	0.3 L/min	clear
0940	13.40	627	4.10	7.56	150.4	"	Clear
0945	13.70	565	3.36	7.56	151.3	"	Clear
0950	13.90	510	2.78	7.56	152.5	"	Clear
0955	13.94	490	2.69	7.54	153.6	"	Clear
1000	13.93	468	2.55	7.54	155.0	"	Clear
1005	13.94	462	2.50	7.54	155.3	"	Clear
1010	14.08	459	2.48	7.53	155.7	"	Clear
1010	Readings Stable						
1028	14.15	442	2.55	7.45	164.3	Post Purge	Clear

Sample Time (1015)
Samples Collected: (3)8260, (2)8270, (1)TM

10/29/08

5W11A

DTW - 1
Post Purge DTW -

Time	Temp(°
1040	14.59
1045	14.47
1050	14.54
1055	14.69
1100	14.50
1105	14.68
1110	14.77
1115	14.70
1115	Reading
1130	14.56

Sampl
Samples

FB#8

10/29/08

RAAP
B03204-06
DAS/CJB

FB#8

5W11A

DTW - 15.77 Begin Purge (1040)

Post Purge DTW - 16.05 Initial Purge - Clear

Time	Temp(C°)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge k(gpm)	Desc
(1040)	14.59	752	2.44	6.52	-2.4	0.34/min	Clear
(1045)	14.47	822	1.59	6.53	14.3	"	Clear
(1050)	14.54	862	1.56	6.55	28.8	"	Clear
(1055)	14.69	884	1.60	6.56	42.3	"	Clear
(1100)	14.50	893	1.68	6.57	51.7	"	Clear
(1105)	14.68	897	1.76	6.57	65.5	"	Clear
(1110)	14.77	897	1.79	6.58	69.3	"	Clear
(1115)	14.70	898	1.81	6.58	72.6	"	Clear
(1115)	Readings Stable						
(1130)	14.56	891	1.88	6.58	68.4	Post Purge	Clear

Sample Time (1120)

Samples Collected: (3) 8260, (2) 8270, (1) TM

COMPLETED
ZJK 12-8-08

4/22/08 RAAP FB#7

B03204-06
DAS/TQE

7MW7

DTW - 25.48 Begin Purge (1322)

Post Purge DTW - 25.63 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(MV)	Purge k	Desc
(1325)	13.69	430	2.36	7.20	-18.3	0.37 mS	Clear
(1330)	13.69	379	0.81	7.25	-52.4	"	"
(1335)	13.88	371	0.68	7.27	-53.9	"	"
(1340)	13.77	366	0.62	7.29	-62.5	"	"
(1345)	13.68	364	0.60	7.30	-64.1	"	"
(1350)	13.54	363	0.58	7.30	-67.4	"	"
(1355)	13.51	361	0.61	7.31	-66.9	"	"
(1400)	13.57	361	0.63	7.32	-67.5	"	"

(1400) Readings Stable

Sample Time (1405)

Samples Collected: (3) 8260, (3) 8011, (1) T. Inorganics

Static Water Level Table - Unit 7

Well	DTW	Post Purge DTW	Notes
7W12B	24.86	24.89	
7W9C	13.79	15.53	
7W10B	15.30	15.79	
7W10C	18.88	24.49	
7W13	18.43	22.09	
7MW6	26.05	32.67	
7W11B	24.97	25.28	
7WCA	24.85	25.48	
7W9B	23.27		SWL ONLY
7W11	24.02		"
7MW5	24.81		"

COMPLETED 4-22-08

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DAS/TQE

Continued from field book #7 page 159

TW9C

DTW - 13.79 Begin Purge (1445)

Post Purge DTW - 15.53 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(MV)	Purge K	Desc
(1446)	13.33	1084	3.84	6.92	62.5	0.3 L/min	Clear
(1450)	13.57	1093	1.99	6.78	57.1	"	"
(1455)	13.53	1141	1.13	6.75	65.7	"	"
(1500)	13.83	1150	0.98	6.76	73.8	"	"
(1505)	13.85	1161	0.81	6.77	80.4	"	"
(1510)	13.89	1162	0.81	6.77	79.7	"	"
(1515)	14.09	1166	0.84	6.78	75.6	"	"

(1515) Readings Stable

Sample Time (1520)

Samples Collected: (2) 8270, (1) CN, (1) TM

TW10B

DTW - 15.30 Begin Purge (1530)

Post Purge DTW - 15.79 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(MV)	Purge K	Desc
(1531)	12.88	958	4.56	6.92	91.3	0.3 L/min	Clear
(1535)	13.25	920	2.86	6.80	96.7	"	"
(1540)	13.11	894	1.91	6.77	97.4	"	"
(1545)	12.96	887	1.54	6.77	97.1	"	"
(1550)	12.98	886	1.44	6.77	97.4	"	"
(1555)	12.96	887	1.37	6.78	98.2	"	"
(1600)	13.01	887	1.38	6.78	98.4	"	"

(1600) Readings Stable

Sample Time (1605)

Samples Collected: (2) 8270, (1) CN, (1) TM

4/22/08

RAAP
B03204-06
DAS/TGE

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7W10C

DTW - 18.88

Begin Purge (1609)

Post Purge DTW - 24.49

Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge k	Desc
(1610)	13.35	688	4.03	7.26	88.6	0.3 L/min	Clear
(1615)	13.35	728	1.75	7.17	96.9	"	"
(1620)	13.19	738	1.25	7.14	99.7	"	"
(1625)	13.03	744	0.72	7.13	98.3	"	"
(1630)	12.94	744	0.54	7.13	93.4	"	"
(1635)	12.95	744	0.51	7.13	88.9	"	"
(1640)	12.88	743	0.48	7.13	89.1	"	"

(1640) Readings Stable

Sample Time (1645)

Samples Collected: (2) 8270, (1) CN, (1) TM

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5-5-08

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B03204-06
DAS/TQE

13MW2

DTW - 21.71 Begin Purge (0935)

Post Purge DTW - 22.39 Initial Purge - Clear

Time	Temp(C°)	Cond(µs)	DO mg/L	pH	ORP(mV)	Purge L	Desc
(0936)	14.30	616	7.56	6.96	156.3	0.3 L/min	Clear
(0940)	14.15	620	5.16	6.77	173.1	"	"
(0945)	14.32	619	4.77	6.79	173.4	"	"
(0950)	14.41	619	4.63	6.84	172.7	"	"
(0955)	14.52	621	4.49	6.84	172.9	"	"
(1000)	14.50	622	4.45	6.85	174.0	"	"
(1005)	14.60	619	4.40	6.85	173.6	"	"

(1005) Readings Stable

Sample Time (1010)

Samples Collected: (2)8332, (2)8330, (1)314.0, (3)8260, (1)TM (2)8270

7W13

DTW - 18.43 Begin Purge (1114)

Post Purge DTW - 22.09 Initial Purge - Clear

Time	Temp(C°)	Cond(µs)	DO mg/L	pH	ORP(mV)	Purge L	Desc
(1115)	14.24	1250	6.24	7.40	132.4	0.3 L/min	Clear
(1120)	14.61	1252	4.65	7.24	112.3	"	"
(1125)	14.72	1262	3.98	7.18	85.4	"	"
(1130)	14.87	1284	3.37	7.16	63.1	"	"
(1135)	14.98	1291	2.53	7.18	40.5	"	"
(1140)	15.10	1292	2.54	7.22	39.4	"	"
(1145)	15.08	1300	2.59	7.28	40.8	"	"

(1145) Readings Stable

Sample Time (1150)

Samples Collected: (2)8270, (1)CN, (1)TM

4/23/08 RAAP FB#8

BCB204-06
DAS/TOE

TMW6

DTW-26.05 Begin Purge (1209)

Post Purge DTW-32.67 Initial Purge-Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge K	Desc
(1210)	14.18	1581	2.81	7.39	1.4	0.3 L/min	Clear
(1215)	14.43	1624	1.39	7.19	-57.8	"	"
(1220)	14.51	1642	0.95	7.14	-80.9	"	"
(1225)	14.69	1594	0.62	7.13	-104.3	"	"
(1230)	14.78	1606	0.62	7.18	-108.1	"	"
(1235)	14.56	1589	0.60	7.21	-100.1	"	"
(1240)	14.69	1581	0.67	7.24	-102.4	"	"

(1240) Readings Stable

Sample Time (1245)

Samples Collected: (2)8151, (1)TM, (2)8270, (1)CN, (1)Sulfide
(1)9065, (3)8260, (2)8081

TW1B

DTW-24.97 Begin Purge (1314)

Post Purge DTW-25.28 Initial Purge-Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge K	Desc
(1315)	14.22	836	5.50	6.44	64.6	0.3 L/min	Clear
(1320)	14.54	778	3.89	6.34	90.8	"	"
(1325)	14.29	722	2.04	6.37	96.5	"	"
(1330)	14.11	713	1.71	6.37	91.7	"	"
(1335)	14.02	718	1.29	6.39	74.1	"	"
(1340)	14.06	735	1.17	6.41	64.7	"	"
(1345)	14.10	750	1.14	6.43	59.4	"	"
(1350)	14.01	763	1.14	6.43	59.7	"	"
(1355)	13.98	771	1.14	6.42	62.1	"	"
(1400)	13.92	774	1.14	6.42	63.2	"	"

(1400) Readings Stable

Sample Time (1405)

Samples Collected: (6)8151, (3)TM, (6)8270, (3)CN, (3)Sulfide
(5) (3)9065, (9)8260, (6)8081

4/23/08 RAAP FB#8

B03204-06
DAS/TAE

7WCA

DTW - 24.85 Begin Purge (1448)

Post Purge DTW - 25.48 Initial Purge - Clear

Time	Temp (C)	Cond (us)	DO mg/L	pH	ORP (mV)	Purge K	Desc
(1450)	14.43	853	3.25	6.64	121.8	0.3 L/min	Clear
(1455)	13.94	819	0.76	6.58	137.3	"	"
(1500)	13.94	819	0.76	6.60	135.4	"	"
(1505)	13.93	821	0.74	6.64	132.8	"	"
(1510)	13.97	823	0.76	6.65	131.2	"	"
(1515)	14.01	823	0.75	6.66	131.9	"	"
(1520)	14.10	824	0.78	6.67	131.6	"	"

(1520) Readings Stable

Sample Time (1525)

Samples Collected: (2) 8270, (1) CN, (1) Sulfide, (1) 9065, (3) 8260, (2) 8081, (2) 8151, (1) TOC

7W DUP

Sample Time (1540)

Samples Collected: (2) 8270, (1) CN, (1) Sulfide, (1) 9065, (3) 8260 (2) 8081, (2) 8151, (1) TOC

Dup Collected for 7WCA.

4/23/08

RAAP
B03204-06
DAS/TQE

FB#8

DS 7W12B

Post Purge DTW - 24.89
DTW - 24.86

Begin Purge (1609)
Initial Purge: Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(MV)	Purge K	Desc
(1610)	15.83	646	8.16	6.88	122.0	0.3 L/min	Clear
(1615)	15.58	647	7.88	6.86	125.4	"	"
(1620)	15.14	640	7.33	6.85	131.5	"	"
(1625)	15.13	635	7.20	6.87	134.1	"	"
(1630)	15.20	634	7.18	6.88	135.9	"	"
(1635)	15.21	635	7.18	6.90	136.8	"	"
(1640)	15.30	635	7.17	6.91	137.6	"	"

(1640) Readings Stable

Sample Time (1645)

Samples Collected: (2)8270, (1)CN, (1)Sulfide, (1)9065, (3)8260
(2)8081, (2)8151, (1)TM

#8 7/17/08 RAAP FB#8
B03204-06
DAS/TQE/TO

General Notes

Weather - Sunny, 80's
PPE - Eye Protection, Nitrile gloves, Hard Hat
Calibrations - YSI 650 MDS
pH - 4.00 = 4.00, 7.00 = 7.00, 10.00 = 9.98
Conductivity reads 1413 us in 1413 us Std
DO % = 100

- Dedicated tubing and well skirts used at each well
- All equipment deconed between each well
- Purge water contained and disposed of at dedicated location onsite
- Samples collected, stored and transported in coolers on ice

7W13

TD - 38.00 Begin Purge (1034)
DTW 19.34 (PP DTW - 25.40) Initial Purge - Clear

Time	Temp(C°)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge k	Desc
(1035)	15.89	1662	5.99	7.10	147.1	0.3 L/min	Clear
(1040)	16.59	1595	4.12	7.03	-8.9	"	Clear
(1045)	16.93	1580	3.25	7.03	-26.8	"	Clear
(1050)	17.36	1560	2.79	7.03	-32.1	"	clear
(1055)	17.28	1560	2.61	7.03	-28.4	"	clear
(1100)	17.18	1554	2.50	7.03	-24.5	"	clear
(1105)	17.30	1548	2.49	7.03	-21.6	"	clear
(1105) Readings Stable							
Post Purge	14.24	1529	2.71	7.10	38.6	"	clear

Sample Time (1110)
Samples Collected: (2) TM, (2) TM
(1112) REP-2 - (2) TM
(1114) REP-3 - (2) TM
(1116) REP-4 - (2) TM

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DAS/TQE/TD

7W9C

DTW – 14.66 Begin Purge (1134)
Post Purge DTW – 16.96 Initial Purge – Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge K	Desc
(1135)	16.10	1353	2.18	6.72	25.9	0.3 L/min	Clear
(1140)	16.12	1364	1.90	6.66	31.6	"	Clear
(1145)	15.72	1386	1.33	6.59	44.4	"	Clear
(1150)	15.63	1390	0.99	6.52	70.2	"	Clear
(1155)	16.01	1390	0.88	6.50	76.3	"	Clear
(1200)	16.20	1389	0.86	6.52	76.9	"	Clear
(1205)	16.09	1396	0.86	6.50	76.7	"	Clear
(1210)	15.93	1395	0.80	6.49	75.6	"	Clear

(1210) Readings Stable
Sample Time (1215)
Samples Collected: (2) TM
(Post Purge) 14.98 1366 0.92 4.54 73.8 Clear

10MW1

DTW – 19.38 Begin Purge (1253)
Post Purge DTW – 19.56 Initial Purge – Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge K	Desc
(1255)	17.20	507	8.24	7.04	104.0	0.3 L/min	Clear
(1300)	17.53	492	7.96	6.83	120.7	"	Clear
(1305)	18.18	488	7.76	6.84	123.9	"	Clear
(1310)	18.51	484	7.67	6.86	125.6	"	Clear
(1315)	18.86	481	7.59	6.91	126.3	"	Clear
(1320)	18.84	484	7.56	6.96	128.4	"	Clear
(1325)	18.83	485	7.52	6.96	131.3	"	Clear

(1325) Readings Stable
Sample Time (1330)
Samples Collected: (4) 8081, (4) 8270
(Post Purge) 18.14 484 7.92 6.47 187.8 Clear

FB# 8

10/22/08

RAAP
B03204-06
DAS/TQE

FB# 8

General Notes

Weather - Sunny, 60's
PPE - Eye Protection, Nitrile gloves, Hard Hat
Calibrations - YSI 650 MDS
pH - 4.00 = , 7.00 = , 10.00 =
Conductivity reads 1413 us in 1413 us std
DO % = 100

- Dedicated tubing and well skirts used at each well, and discarded after use.
- All equipment deconed between each well
- Purge water contained and disposed of at treatment plant onsite.
- All samples collected, stored and transported on ice in coolers

Static Water Level Table - Unit 7

WELL	DTW	Post Purge DTW	Notes
7W12B			
7W9C	15.12	18.05	
7W10B	15.75	16.36	
7W10C	21.20	25.84	
7W13	19.45	22.95	
7MW6	26.91	34.24	
7W11B	25.23	25.30	
7WCA	25.04	27.56	
			SWL ONLY
7W9B	22.75		"
7W11	24.34		"
7MW5	25.05		"

COMPLETED
12-5-08

10/22/08 RAAP FB#8
B03204-06
DAS/TOC

7W13

DTW - 19.45 Begin Purge (1002)
Post Purge DTW - 22.95 Initial Purge - Clear

Time	Temp (C°)	Cond (µs)	DO mg/L	pH	ORP (mV)	Purge K (gpm)	Desc
(1005)	13.53	1473	4.87	7.28	9.8	0.3 L/min	Clear
(1010)	13.86	1483	2.47	7.19	-7.4	"	Clear
(1015)	13.96	1486	2.09	7.16	-4.2	"	Clear
(1020)	13.94	1482	1.98	7.15	2.5	"	Clear
(1025)	13.97	1470	1.93	7.14	11.3	"	Clear
(1030)	14.00	1465	2.03	7.14	16.5	"	Clear
(1035)	14.04	1460	2.10	7.13	19.7	"	Clear
(1040)	14.05	1456	2.12	7.12	20.3	"	Clear
(1040)	Readings Stable						
(1058)	14.29	1448	2.33	7.15	19.4	Post Purge	Clear

Sample Time (1045)
Samples Collected: (2) 8270, (1) CN, (1) TM

7W9C

DTW - 15.12 Begin Purge (1124)
Post Purge DTW - 18.05 Initial Purge - Clear

Time	Temp (C°)	Cond (µs)	DO mg/L	pH	ORP (mV)	Purge K (gpm)	Desc
(1125)	13.60	1332	2.25	6.81	19.4	0.3 L/min	Clear
(1130)	13.38	1346	1.73	6.77	27.1	"	Clear
(1135)	13.31	1357	1.24	6.74	39.6	"	Clear
(1140)	13.29	1369	1.02	6.73	50.7	"	Clear
(1145)	13.22	1376	0.89	6.72	65.3	"	Clear
(1150)	13.23	1383	0.78	6.72	74.2	"	Clear
(1155)	13.24	1385	0.73	6.71	73.4	"	Clear
(1200)	13.26	1387	0.70	6.71	69.8	"	Clear
(1200)	Readings Stable						
(1215)	13.27	1332	1.13	6.74	56.7	Post Purge	Clear

Sample Time (1205)
Samples Collected: (2) 8270, (1) CN, (1) TM

10/23/08

7W10B

DTW - /
Post Purge DT

Time	Te
(1230)	13.
(1235)	13.
(1240)	13.
(1245)	13.
(1250)	13.
(1255)	13.
(1300)	13.
(1305)	13.
(1305)	Re
(1323)	13

Sa

7W10C

DTW -
Post Purge DT

Time	T
(1355)	/
(1400)	1
(1405)	1.
(1410)	1.
(1415)	1
(1420)	1
(1425)	1.
(1430)	1.
(1430)	R
(1447)	1c

Sa

FB#8

10/22/08

RAAP
B03204-06
DAS/TQE

FB#8

7W10B

DTW - 15.75 Begin Purge (1227)

Post Purge DTW - 16.36 Initial Purge - Clear

Time	Temp(°C)	Cond(µs)	DO mg/L	pH	ORP(mV)	Purge k(gpm)	Desc
(1230)	13.33	1028	3.57	6.77	137.4	0.34/min	Clear
(1235)	13.41	1034	2.92	6.77	137.6	"	Clear
(1240)	13.72	1046	2.24	6.77	139.9	"	Clear
(1245)	13.78	1052	2.10	6.77	139.8	"	Clear
(1250)	13.62	1065	1.97	6.77	138.2	"	Clear
(1255)	13.65	1067	1.85	6.77	139.2	"	Clear
(1300)	13.77	1067	1.77	6.77	137.6	"	Clear
(1305)	13.92	1067	1.71	6.77	136.0	"	Clear
(1305)	Readings Stable						
(1323)	13.97	1067	1.82	6.79	136.5	Post Purge	Clear

Sample Time (1310)

Samples Collected: (2) 8270, (1) CN, (1) TM

7W10C

DTW - 21.20 Begin Purge (1354)

Post Purge DTW - 25.84 Initial Purge - Clear

Time	Temp(°C)	Cond(µs)	DO mg/L	pH	ORP(mV)	Purge k(gpm)	Desc
(1355)	13.36	874	1.87	7.07	-50.4	0.34/min	Clear
(1400)	13.34	872	1.33	7.05	-34.1	"	Clear
(1405)	13.34	873	1.01	7.07	-2.0	"	Clear
(1410)	13.23	872	0.70	7.04	17.4	"	Clear
(1415)	13.20	870	0.65	7.04	24.9	"	Clear
(1420)	13.12	867	0.53	7.04	37.6	"	Clear
(1425)	13.14	866	0.55	7.04	39.6	"	Clear
(1430)	13.20	866	0.57	7.04	40.8	"	Clear
(1430)	Readings Stable 0.59						
(1447)	12.94	868	DO ~~0.70~~	7.04	41.9	Post Purge	Clear

Sample Time (1435)

Samples Collected: (2) 8270, (1) CN, (1) TM

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7W12B

DTW - 24.86 Begin Purge (1514)

Post Purge DTW - 24.89 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge(gpm)	Desc
(1515)	15.26	746	8.48	7.05	114.1	0.3 L/min	Clear
(1520)	15.16	749	7.82	7.00	123.3	"	Clear
(1525)	15.15	750	7.43	6.98	125.4	"	Clear
(1530)	15.19	752	7.28	6.97	128.3	"	Clear
(1535)	15.21	755	7.22	6.96	130.3	"	Clear
(1540)	15.14	756	7.22	6.96	131.5	"	Clear
(1545)	15.10	758	7.22	6.94	133.1	"	Clear
(1545)	Readings Stable						
(1600)	15.13	760	7.30	6.97	135.4	Post Purge	Clear

Sample Time (1550)

Samples Collected: (2) 8270, (1) CN, (1) TM

10/23/08

General

Weat

PE-

Cal.

pH -

Cond

DO

- Dedicated
  dispose
- All equi
- Purged w
- All sample
  in co

7MW6

DTW -

Post Purge DT

Time	Te
(1110)	13
(1115)	13.
(1120)	13.
(1125)	13.
(1130)	14.
(1135)	14.
(1140)	13.
(1145)	13.
(1145)	Rea
(1200)	13.

S

Sa

7WDUP

Sample

FB#8 | 10/23/08 | RAAP B032044-06 DAS/TQE | FB#8

General Notes

Weather - Sunny, 50's
PPE - Eye Protection, Nitrile gloves
Calibrations - YSI 650 MDS
pH - 4.00 = 4.00, 7.00 = 7.00, 10.00 = 9.98
Conductivity reads 1413 us in 1413 us std
DO% = 100

- Dedicated tubing and wellskirts used at each well, and disposed of after use
- All equipment deconed between each well
- Purged water contained and disposed of at treatment plant onsite
- All samples collected, stored and transported on ice in coolers

7MW6

DTW - 26.91 Begin Purge (1107)
Post Purge DTW - 34.24 Initial Purge - clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge(gpm)	Desc
(1110)	13.72	1690	3.85	7.38	-20.4	0.3 L/min	Clear
(1115)	13.62	1780	2.16	7.28	-53.9	"	Clear
(1120)	13.83	1852	1.62	7.19	-84.5	"	Clear
(1125)	13.93	1858	1.45	7.17	-92.6	"	Clear
(1130)	14.02	1857	1.31	7.15	-102.1	"	Clear
(1135)	14.03	1841	1.20	7.14	-110.8	"	Clear
(1140)	13.97	1803	1.16	7.17	-114.9	"	Clear
(1145)	13.93	1786	1.13	7.18	-116.2	"	Clear
(1145)	Readings Stable						
(1200)	13.80	1781	1.33	7.27	-106.6	Post Purge	Clear

Sample Time (1150)
Samples Collected: (2) 8270, (1) CN, (1) TM

7WDUP (Collected at well location 7WCA)

Sample Time (1450) Samples Collected: (2) 8270, (1) CN, (1) TM

10/23/08 RAAP FB#8
BO3209-06
DAS/TQE

7W11B

DTW - 25.23 Begin Purge (1227)
Post Purge DTW - 25.30 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge K(gpm)	Desc
(1230)	13.71	937	3.82	6.44	66.8	0.3 L/min	Clear
(1235)	13.81	937	2.64	6.43	74.6	"	Clear
(1240)	13.86	942	1.61	6.43	80.5	"	Clear
(1245)	13.86	942	1.46	6.42	84.6	"	Clear
(1250)	13.82	942	1.37	6.44	88.8	"	Clear
(1255)	13.87	947	1.21	6.44	94.1	"	Clear
(1300)	13.77	951	1.20	6.44	97.3	"	Clear
(1305)	13.79	952	1.25	6.44	99.5	"	Clear
(1305)	Readings Stable						
(1334)	13.76	941	1.50	6.45	107.4	Post Purge	Clear

Sample Time (1310)
Samples Collected: (6) 8270, (3) CN, (3) TM

7WCA

DTW - 25.04 Begin Purge (1356)
Post Purge DTW - 27.56 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge K(gpm)	Desc
(1400)	13.59	964	2.43	6.72	121.2	0.3 L/min	Clear
(1405)	13.57	928	1.16	6.68	133.8	"	Clear
(1410)	13.58	913	0.90	6.67	139.1	"	Clear
(1415)	13.55	912	0.81	6.67	139.8	"	Clear
(1420)	13.50	909	0.74	6.69	138.7	"	Clear
(1425)	13.49	909	0.67	6.67	138.4	"	Clear
(1430)	13.48	908	0.65	6.67	138.1	"	Clear
(1430)	Readings Stable						
(1500)	13.26	923	0.73	6.68	129.7	Post Purge	Clear

Sample Time (1435)
Samples Collected: (2) 8270, (1) CN, COMPLETED
YPK 12-8-08

10/27/08

General N
Weath
PPE - E
Calibr
pH - 4
Conduct
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WEL
S5W
S5W
5W9
5W1
5W11
5W8
5W7
5W5
5WC
5WC
5WC
• 5WC
• S5W
• S5W
• 5WC
• 5WC

General Notes

- Weather: Overcast 50s
- PPE: Nitrile Gloves, Eye Protection
- Calibrations: YSI 650 MDS

  pH - 4.00 = 4.00, 7.00 = 6.99, 10.00 = 9.98

  Conductivity reads 1414 μs in 1413 μs std

  DO% = 100

- Dedicated tubing and well skirt used
- Purge Water contained and disposed of at dedicated location onsite.

7W13

DTW - 18.80 Begin Purge (1158)

Post Purge DTW - 23.70 Initial Purge - Clear

Time	Temp(°C)	Cond(μs)	DO mg/L	pH	ORP(mV)	Purge	Desc
(1200)	12.40	1309	8.51	7.04	56.8	0.3 L/min	Clear
(1205)	12.64	1333	1.72	7.00	-8.0	"	clear
(1210)	12.76	1324	1.20	6.98	0.9	"	clear
(1215)	12.86	1311	1.81 ~~9.6~~	6.97	8.3	"	Clear
(1220)	12.98	1293	1.13	6.97	14.9	"	Clear
(1225)	12.90	1288	1.53	6.97	17.3	"	clear
(1230)	12.83	1290	1.53	6.97	16.1	"	clear
(1235)	12.92	1298	1.25	6.97	5.9	"	clear
(1240)	12.93	1298	1.15	6.97	2.9	"	clear
(1245)	12.99	1296	1.16	6.92	0.6	"	clear
(1250)	12.98	1294	1.20	7.00	1.6	"	clear
(1255)	12.89	1293	1.25	7.01	3.4	"	clear

(1255) Readings Stable

(1312)	12.79	1289	1.41	7.02	5.9

Sample Time (1300)

Samples Collected: (1) TM - Cobalt only

FB#7 4/17/08 RAAP FB#7

B03204.06
DAS/ICFC

General Notes

Weather - Sunny, 70's
PPE - Eye Protection, Nitrile gloves
Calibrations - YSI 650 MDS
pH - 4.00 = 4.01, 7.00 = 7.00, 10.00 = 9.99
Conductivity reads 1500 us in 1500 us std
DO % = 100

- Dedicated tubing and well skirts used at each well, and disposed of after each use.
- All equipment deconed between each well
- Purge water contained and disposed at dedicated location onsite
- Samples Collected, stored and transported on ice and in coolers

Static Water Level Table - Unit 10

Well	DTW	Post Purge DTW	Notes
10MW1	18.94	19.10	
10D4	22.90	22.94	
10D3D	18.72	18.80	
10D3	18.85	18.98	
10DDH2R	20.34	21.53	

10MW1

DTW - 18.94 Begin Purge (1033)
Post Purge DTW - 19.10 Initial Purge - Clear

Time	Temp (C)	Cond (us)	DO mg/L	pH	ORP (mv)	Purge K	Desc
1035	15.36	485	8.71	7.27	162.8	0.3 L/min	Clear
1040	15.41	484	8.28	7.27	160.9	"	"
1045	15.70	487	8.08	7.26	159.8	"	"
1050	15.84	485	8.03	7.24	162.9	"	"
1055	15.93	488	8.01	7.26	162.3	"	"
1100	16.08	488	8.01	7.26	163.9	"	"

Desc
Cloudy
SI Cloudy
SI Cloudy
Clear
Clear
"
"

Desc
Clear
Clear
Clear
Clear
Clear
Clear

10MW1-(Cont.)

Time	Temp(°C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge R	Desc
(1105)	16.12	490	8.02	7.23	169.4	0.3 L/min	Clear
(1110)	15.94	488	8.03	7.22	170.3	"	"

(1110) Readings Stable

Sample Time (1115)

Samples Collected: (5)8260, (2)8270, (2)8081, (1)CN, (1)Sulfide
(1)9065, (2)8151, (1)TM

10D3D

DTW - 18.72 Begin Purge (1143)

Post Purge DTW-18.80 Initial Purge - Clear

Time	Temp(°C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge R	Desc
(1145)	14.66	720	4.20	7.21	-183.9	0.3 L/min	Clear
(1150)	14.69	761	2.96	6.99	-163.2	"	"
(1155)	14.68	782	3.33	7.00	-139.1	"	"
(1200)	14.69	785	3.19	7.02	-121.4	"	"
(1205)	14.56	785	3.20	7.06	-113.8	"	"
(1210)	14.73	786	3.08	7.09	-118.2	"	"
(1215)	14.71	786	2.91	7.11	-123.4	"	"
(1220)	14.72	785	2.87	7.12	-127.6	"	"
(1225)	14.72	787	2.95	7.15	-131.9	"	"

(1225) Readings Stable

Sample Time (1230)

Samples Collected: (9)8260, (6)8270, (6)8081, (3)CN, (3)Sulfide
(3)9065, (6)8151 (3)TM

* Water had rotten egg/sulfer odor.
* Purge tube at top of casing has small crack causing air bubbles. Have to watch DO, constant air bubbles in flow thru cell.
* After collecting samples, repaired discharge tubing.

4/17/08

RAAP
B03204-06
DAS/KFC
DS

10D3

DTW - 18.85 Begin Purge (1330)

Post Purge DTW - 18.98 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge K	Desc
(1335)	15.38	670	4.30	6.83	58.5	0.3 L/min	Clear
(1340)	14.92	667	3.67	6.82	72.2	"	Clear
(1345)	14.98	669	3.56	6.88	80.0	"	Clear
(1350)	1482	670	3.50	6.91	87.0	"	Clear
(1355)	15.04	676	3.47	6.95	91.8	"	Clear
(1400)	15.05	683	3.57	6.97	95.5	"	Clear
(1405)	15.11	691	3.62	6.99	98.2	"	Clear
(1410)	15.16	698	3.65	7.02	99.6	"	Clear

(1410) Readings Stable

Sample Time (1415)

Samples Collected: (3) 8260, (2) 8270, (2) 8081, (1) CN, (1) Sulfide, (1) 9065, (2) 8151, (1) TM

* 10DUP was collected for 10D3 *

Sample Time (1430)

Samples Collected: (3) 8260, (2) 8270, (2) 8081, (1) CN, (1) SULFIDE, (1) 9065, (2) 8151, (1) TM

10DDH2R

DTW - 20.34 Begin Purge (1444)

Post Purge DTW - 21.53 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge K	Desc
(1445)	15.65	677	5.22	6.78	99.7	0.3 L/min	Clear
(1450)	15.00	680	1.88	6.70	96.6	"	Clear
(1455)	14.73	680	1.35	6.71	93.8	"	"
(1500)	14.57	672	1.13	6.67	95.7	"	Clear
(1505)	14.29	674	1.26	6.61	98.8	"	Clear
(1510)	14.18	658	2.04	6.55	108.7	"	Clear

4/17/08

RAAP
BO32of-06
DAS/KFC

10DDHZR (Cont)

Time	Temp C°	Cond (ms)	DO mg/L	pH	ORP (MV)	Purge K	Desc
(1515)	14.21	655	2.32	6.55	110.9	0.3 L/min	Clear
(1520)	14.13	647	3.84	6.54	128.6	0.3 L/min	Clear
(1525)	13.98	646	3.90	6.55	128.2	"	"
(1530)	13.93	645	4.01	6.54	129.3	"	"

(1530) Readings Stable
Sample Time (1535)
Samples Collected: (3)8260, (2)8270, (2)8081, (1)CN, (1)Sulfide
(1)9065, (2)8151, (1)TM

10DH
DTW - 22.90
Post Purge DTW - 22.94

Begin Purge (1618)
Initial Purge - 5l Cloudy

TIME	Temp C°	Cond (ms)	DO mg/L	pH	ORP (MV)	Purge L	Desc
(1620)	15.24	377	7.30	6.46	138.0	0.3 L/min	5l Cloudy
(1625)	14.91	359	4.28	6.35	146.5	"	5l Cloudy
(1630)	14.73	353	3.87	6.39	148.6	"	Clear
(1635)	14.92	355	3.94	6.47	146.4	"	"
(1640)	14.70	355	3.97	6.52	144.7	"	"
(1645)	14.61	353	3.96	6.54	146.5	"	"
(1650)	14.53	352	3.92	6.55	148.2	"	"

(1650) Readings Stable
Sample Time (1655)
Samples Collected: (3)8260, (2)8270, (2)8081, (1)CN
(1)Sulfide, (1)9065, (2)8151, (1)TM

COMPLETED
4-5-08

B#8

5/19/08 RAAP 803204-06 DAS/TQE FB#8

General Notes

Weather - Sunny, 60's
PPE - Eye Protection, Nitrile gloves
Calibrations - YSI 650 MDS
pH - 4.00 = 4.00, 7.00 = 7.00, 10.00 = 9.99
Conductivity reads 447 us in 447 us std.
DO% = 100

- Dedicated tubing and well skirts used at each well, and disposed of after each use.
- All equipment deconed between each well
- Purge water contained and disposed of at dedicated location onsite
- Samples collected, stored and transported on ice and in coolers

Desc
clear
"
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Purge
ITM

10MW1

DTW - 18.79 Begin Purge (1000)
Post Purge DTW - 18.87 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge%	Desc
(1005)	14.65	450	7.14	7.13	155.7	0.3%/min	Clear
(1010)	14.70	450	8.29	7.15	157.9	"	Clear
(1015)	14.70	454	7.87	7.17	158.8	"	Clear
(1020)	14.83	454	7.39	7.14	162.5	"	Clear
(1025)	14.85	453	7.32	7.12	164.8	"	Clear
(1030)	14.90	454	7.28	7.12	165.6	"	Clear
(1035)	14.84	454	7.27	7.13	167.1	"	Clear

(1035) Readings Stable
Sample Time (1040)
Samples Collected - (3)2260, (2)8270

Post Purge

( )

~~AAW~~ DS 10D3D

DTW — 18.73 Begin Purge (1102)

Post Purge DTW - 18.75 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge R	Desc
(1105)	14.46	671	4.23	7.02	-194.4	0.3 L/min	Clear
(1110)	14.70	678	3.29	6.87	-181.1	"	Clear
(1115)	14.74	688	3.67	6.87	-170.8	"	Clear
(1120)	14.86	698	3.34	6.90	-155.3	"	Clear
(1125)	14.98	701	3.21	6.93	-149.2	"	Clear
(1130)	15.04	704	3.03	6.96	-141.0	"	Clear
(1135)	14.94	707	2.91	6.97	-132.9	"	Clear
(1140)	14.87	710	2.83	6.98	-127.1	"	Clear
(1145)	14.69	712	2.78	6.99	-125.9	"	Clear
(1150)	14.58	711	2.72	7.00	-127.0	"	Clear

(1150) Readings Stable

Sample Time (1155)

Samples Collected: (3)8260, (2)8270

Post Purge

(1200)	14.60	703	3.85	7.06	-148.1

10D3

DTW - 18.82 Begin Purge (1215)

Post Purge DTW - 19.03 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge R	Desc
(1220)	14.65	628	4.85	6.81	35.7	0.3 L/min	Clear
(1225)	14.73	627	4.43	6.76	47.5	"	Clear
(1230)	14.66	622	4.01	6.75	58.3	"	Clear
(1235)	14.56	621	3.71	6.77	67.8	"	Clear
(1240)	14.54	621	3.63	6.78	72.3	"	Clear
(1245)	14.51	621	3.58	6.79	75.1	"	Clear
(1250)	14.61	620	3.54	6.80	79.1	"	Clear
(1255)	14.73	623	3.53	6.82	81.0	"	Clear
Post Purge	14.63	640	3.44	6.84	81.5		

5/19/08 RAAP 2 FB#8
B03204-06
DAS/TAE

10D3 (cont)

~~DTW~~ - DS Begin Purge (DS)

~~Post Purge DTW~~ - Sample Time (1300)

Samples Collected: (3) 8260, (2) 8270

10DUP

Sample Time (1315)

Samples Collected - (3) 8260, (2) 8270

* Samples collected from well 10D3

10DDH2R

DTW - 20.19 Begin Purge (1348)

Post Purge DTW - 20.34 Initial Purge - Clear

Time	Temp (C°)	Cond (us)	DO mg/L	pH	ORP (MV)	Purge L	Desc
(1350)	14.44	581	3.82	6.67	96.6	0.3 gal/min	Clear
(1355)	14.42	588	1.78	6.67	86.7	"	Clear
(1400)	14.48	595	1.09	6.69	74.3	"	Clear
(1405)	14.55	597	1.08	6.69	72.6	"	Clear
(1410)	14.56	601	1.24	6.68	71.4	"	Clear
(1415)	14.52	600	1.39	6.66	71.8	"	Clear
(1420)	14.69	595	1.64	6.62	76.7	"	Clear
(1425)	14.72	589	1.67	6.58	79.9	"	Clear
(1430)	14.85	584	1.73	6.57	81.4	"	Clear
(1430) Readings Stable							
Post Purge	14.95	515	3.78	6.32	113.2	"	

Sample Time (1435)

Samples Collected: (9) 8260, (6) 8270

5/19/08 RHAP B03204-06 DAS/TRE FB# 8 5

10D4

DTW - 22.87 Begin Purge (1500)

Post Purge DTW - 22.88 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge K	Desc
(1505)	14.48	324	4.32	6.50	108.1	0.3 l/min	Clear
(1510)	14.77	317	3.79	6.41	115.8	"	"
(1515)	14.80	315	3.10	6.41	119.0	"	"
(1520)	14.14	315	2.94	6.42	124.6	"	"
(1525)	14.18	312	2.90	6.41	125.4	"	"
(1530)	14.56	311	3.01	6.43	125.8	"	"
(1535)	14.70	312	2.98	6.45	126.3	"	"
(1540)	14.71	312	3.05	6.46	127.1	"	"
(1540)	Readings Stable						
Post Purge	14.22	312	3.16	6.48	122.8		

Sample Time (1545)

Samples Collected: (3) 8260, (2) 8270

7/17/08 RAAP FB#8
B03204-06
DAS/TQE/TD

7W9C

DTW – 14.66 Begin Purge (1134)
Post Purge DTW – 16.96 Initial Purge – Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge L	Desc
(1135)	16.10	1353	2.18	6.72	25.9	0.3 L/min	Clear
(1140)	16.12	1364	1.90	6.66	31.6	"	Clear
(1145)	15.72	1386	1.33	6.59	44.4	"	Clear
(1150)	15.63	1390	0.99	6.52	70.2	"	Clear
(1155)	16.01	1390	0.88	6.50	76.3	"	Clear
(1200)	16.20	1389	0.86	6.52	76.9	"	Clear
(1205)	16.09	1396	0.86	6.50	76.7	"	Clear
(1210)	15.93	1395	0.80	6.49	75.6	"	Clear

(1210) Readings Stable
Sample Time (1215)
Samples Collected: (2) TMW

(Post Purge)	14.98	1366	0.92	4.54	73.6		Clear

10MW1

DTW – 19.38 Begin Purge (1253)
Post Purge DTW – 19.56 Initial Purge – Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge L	Desc
(1255)	17.20	507	8.24	7.04	104.0	0.3 L/min	Clear
(1300)	17.53	492	7.96	6.83	120.7	"	Clear
(1305)	18.18	488	7.76	6.84	123.9	"	Clear
(1310)	18.51	484	7.67	6.86	125.6	"	Clear
(1315)	18.86	481	7.59	6.91	126.3	"	Clear
(1320)	18.84	484	7.56	6.96	128.4	"	Clear
(1325)	18.83	485	7.52	6.96	131.3	"	Clear

(1325) Readings Stable
Sample Time (1330)
Samples Collected: (4) 8081, (4) 8270

(Post Purge)	18.14	484	7.92	6.47	187.8		Clear

10/30/08 RAAP FB# 8
803204-06
DAS/TQE/TO

General Notes

Weather - Sunny, 50's
PPE - Eye Protection, Nitrile gloves
Calibrations - YSI 650 MDS
pH - 4.00 = 4.00, 7.00 = 6.98, 10.00 = 10.00
Conductivity reads 1413 us in 1413 us std
DO% = 100

- Dedicated tubing and well skirts used at each well
- All equipment deconed between each well
- Purge water contained and disposed of at dedicated location onsite
- All samples collected, stored and transported on ice in coolers

Static Water Level Table - Unit 10

WELL	DTW	Post Purge DTW	Notes
10DDH2R	21.28	21.67	
10D3	20.08	20.26	
10D3D	19.86	19.89	
10MW1	19.73	20.15	
10D4	22.93	23.08	

10MW1

DTW - 19.73 Begin Purge (0948)
Post Purge DTW - 20.15 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge(gpm)	Desc
0950	13.72	560	8.73	7.26	148.7	0.3 L/min	Clear
0955	13.50	524	8.20	7.26	143.5	"	Clear
1000	13.67	526	7.88	7.22	172.3	"	Clear
1005	13.87	520	7.76	7.23	179.6	"	Clear
1010	14.53	506	7.43	7.23	182.9	"	Clear
1015	14.79	503	7.20	7.23	187.7	"	Clear
1020	14.87	500	7.16	7.23	189.9	"	Clear
1025	14.90	497	7.14	7.23	192.4	"	Clear

10/30/08

10MW1 - (Con

Time	Temp(C)
1025	Readings
1040	14.94
	Sample
	Samples Co

10D3D

DTW - 19.86
Post Purge DTW - 19

Time	Temp(C
1105	14.82
1110	14.54
1115	14.48
1120	14.61
1125	14.70
1130	14.70
1135	14.70
1140	14.82
1145	14.90
1145	Readinc
1200	14.63
	Samp
	Sample

10D3

DTW - 20.0
Post Purge DTW -

Time	Temp
1225	14.83
1230	15.13
1235	15.23
1240	15.49

FB# 8

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10

Notes

Purge Rt (gpm)	Desc
0.3 L/min	Clear
"	Clear
"	Clear
"	Clear
"	Clear
"	Clear
"	Clear
"	Clear

10MW1 - (Cont.)

Time	Temp (°C)	Cond (us)	DO mg/L	pH	ORP (mV)	Purge Rt (gpm)	Desc
(1025)	Readings Stable						
(1040)	14.94	488	7.21	7.24	198.3	Post Purge	Clear

Sample Time (1030)

Samples Collected: (3) 8260, (2) 8270, (1) TM, (1) CN

10D3D

DTW - 19.86 Begin Purge (1104)

Post Purge DTW - 19.89 Initial Purge - Clear

Time	Temp (°C)	Cond (us)	DO mg/L	pH	ORP (mV)	Purge Rt (gpm)	Desc
(1105)	14.82	717	3.34	7.25	-191.8	0.3 L/min	Clear
(1110)	14.54	713	2.05	7.23	-203.8	"	Clear
(1115)	14.48	713	1.42	7.17	-218.3	"	Clear
(1120)	14.61	725	1.89	7.13	-211.7	"	Clear
(1125)	14.70	767	2.01	7.12	-202.6	"	Clear
(1130)	14.70	786	2.29	7.14	-190.5	"	Clear
(1135)	14.70	795	2.34	7.13	-183.8	"	Clear
(1140)	14.82	798	2.41	7.15	-182.6	"	Clear
(1145)	14.90	798	2.46	7.15	-180.7	"	Clear
(1145)	Readings Stable				• Water had rotten egg odor		
(1200)	14.63	805	2.42	7.17	-170.6	Post Purge	

Sample Time (1150)

Samples Collected: (3) 8260, (2) 8270, (1) CN, (1) TM

10D3

DTW - 20.08 Begin Purge (1223)

Post Purge DTW - 20.26 Initial Purge - Clear

Time	Temp (°C)	Cond (us)	DO mg/L	pH	ORP (mV)	Purge Rt (gpm)	Desc
(1225)	14.83	721	4.42	6.94	-1.0	0.3 L/min	Clear
(1230)	15.13	722	4.33	6.94	15.7	"	Clear
(1235)	15.23	724	4.28	6.93	27.9	"	Clear
(1240)	15.49	725	4.29	6.93	32.2	"	Clear

10D3 (Cont.)

Time	Temp(°C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge(lpm)	Desc
(1245)	15.63	724	4.26	6.93	36.8	0.34/min	Clear
(1250)	15.72	726	4.19	6.93	41.0	"	Clear
(1255)	15.68	727	4.15	6.92	46.4	"	Clear
(1300)	15.77	728	4.08	6.91	53.3	"	Clear
(1300)	Readings Stable						
(1325) (1328)	15.70	727	4.04	6.94	59.1	Post Purge	

Sample Time (1305)

Samples Collected: (3)8260, (2)8270, (1)CN, (1)TM

10DUP - (Collected at well 10D3)

Sample Time (1320)

Samples Collected: (3)8260, (2)8270, (1)CN, (1)TM

10DDH2R

DTW - 21.28 Begin Purge (1348)

Post Purge DTW - 21.67 Initial Purge - Clear

Time	Temp(°C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge(lpm)	Desc
(1350)	14.72	623	3.41	6.81	84.5	0.3 l/min	Clear
(1355)	14.79	648	2.16	6.86	82.6	"	Clear
(1400)	15.03	677	1.69	6.92	73.7	"	Clear
(1405)	15.34	693	1.72	6.96	63.7	"	Clear
(1410)	15.56	700	1.77	6.96	62.1	"	Clear
(1415)	15.65	707	1.84	6.95	61.0	"	Clear
(1420)	15.68	713	1.92	6.94	59.7	"	Clear
(1420)	Readings Stable						
(1430)	15.55	729	1.94	6.87	61.8	Post Purge	

Sample Time (1425)

Samples Collected: (9)8260, (6)8270, (3)CN, (3)TM

10/30/08

10D4

DTW - 22.

Post Purge DTW - 2

Time	Temp(°C)
(1505)	16.25
(1510)	16.47
(1515)	16.49
(1520)	16.50
(1525)	16.57
(1530)	16.64
(1535)	16.69
(1535)	Readi
(1550)	16.33

Sam

Sample

FB # 8

10/30/08

RAAP
B03204-06
DAS/TAE/TD

FB # 8

10D4

DTW - 22.93 Begin Purge (1502)

Post Purge DTW - 23.08 Initial Purge - Clear

Time	Temp (C)	Cond (us)	DO mg/L	pH	ORP (mv)	Purge (gpm)	Desc
(1505)	16.25	363	5.08	6.77	70.8	0.3 l/min	Clear
(1510)	16.47	361	4.14	6.72	84.5	"	Clear
(1515)	16.49	355	3.71	6.65	98.2	"	Clear
(1520)	16.50	353	3.62	6.65	102.6	"	Clear
(1525)	16.57	349	3.56	6.65	108.5	"	Clear
(1530)	16.64	347	3.53	6.64	112.0	"	Clear
(1535)	16.69	345	3.53	6.65	113.6	"	Clear
(1535)	Readings Stable						
(1550)	16.33	339	3.64	6.65	117.8	Post Purge	

Sample Time (1540)

Samples Collected: (3) 8260, (2) 8270, (1) CN, (1) TM

COMPLETED
SDK 12-8-08

4/14/08 RAP FB#7

B03204-006
PAH/TQE

WELL-7 (cont.)

Time	Temp(C)	pH	Cond(us)	DO mg/L	ORP(mV)	Purge k	Desc
(1355)	11.82	6.15	1247	5.65	186.6	0.34/min	Clear
(1400)	11.80	6.17	1250	5.63	187.2	"	"

Sample Time (1405)

Samples Collected: (3)8260, (3)8011, (1) TM

16-3

DTW – 58.58 Begin Purge (1439)

Post Purge DTW – 69.72 Initial Purge - Clear

Time	Temp(C)	pH	Cond(us)	DO mg/L	ORP(mV)	Purge k	Desc
(1440)	11.83	7.24	229	8.34	144.3	0.34/min	Clear
(1445)	12.16	7.70	229	6.96	136.0	"	clear
(1450)	12.24	7.86	228	6.65	133.7	"	Clear
(1455)	12.77	7.95	227	6.36	131.1	"	clear
(1500)	12.45	7.91	227	6.34	134.0	"	clear
(1505)	12.73	7.95	226	6.29	131.5	"	clear
(1510)	12.69	7.91	225	6.32	133.4	"	clear
(1515)	12.71	7.88	225	6.36	133.4	"	clear
(1515)	Readings Stable						

Sample Time (1520)

Samples Collected: (3) 8011, (6) 8260, (1) TM

(2) 8270, (1) TM Mercury

Static Water Level Table - Unit 353

MW	DTW	Post Purge DTW
FALL 2	35.67	40.11
FALL 3	68.35	68.95
WELL 7	27.56	27.84
16-3	58.58	69.72

Completed
5-5-08

4/15/08 RAAP FB #7
B03204-06
DAS/TQE

General Notes
- Weather:
- PPE: Eye Protection, Nitrile Gloves
Calibrations - YSI 650 MDS
pH - 4.00 = 4.00, 7.00 = 7.00, 10.00 = 10.00
Conductivity reads 1500 us in 1500 us std
DO% = 100

- Dedicated tubing and well skirts used at each well, and disposed of after each well.
- All equipment deconed between each well location
- Purge water contained and disposed of at dedicated location onsite (treatment Plant).
- Samples Collected, stored and transported on ice in coolers

Static Water Level Table - UNIT 16

WELL	DTW	Post Purge DTW	Notes
16-1	53.32	DRY	
16-2	55.78	55.86	
16-3	52.58	69.72	
16-5	3.43	15.92	
16WC2B	55.77	64.96	
16MW8	73.71	DRY	
16MW9	65.48	65.64	
16WC1B	69.17	69.40	
16WC1A	68.93	71.33	
16C1			
16CDH3	DRY		
16C3	DRY		
16WC2A	DRY		

3#7

4/15/08 RAAP F-B#7

B03209-06
DAS/TQE

16-1

DTW - 53.32 Begin Purge (1025)

Post Purge DTW - DRY Initial Purge: sl cloudy

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge lt	Desc
(1030)	12.77	547	6.78	6.95	144.9	0.3 L/min	sl. cloudy
(1035)	12.91	552	6.53	7.01	145.2	"	sl. cloudy
(1040)	13.10	549	6.51	7.03	144.3	"	clear
(1045)	13.10	546	6.54	7.02	144.5	"	clear
(1050)	13.05	547	6.57	7.01	144.6	"	clear
(1055)	13.09	548	6.59	7.01	145.0	"	clear

(1055) Readings Stable

Sample Time (1100)

Samples Collected: (3) 8260, (2) 8270, (1) TM mercury

16-2

DTW - 55.78 Begin Purge (1137)

Post Purge DTW - 55.86 Initial Purge: clear

Time	Temp(C)	Cond(us)	DO(mg/L)	pH	ORP(mV)	Purge lt	Desc
(1140)	13.11	694	8.32	6.92	153.7	0.3 L/min	clear
(1145)	13.51	704	6.28	6.75	158.1	"	clear
(1150)	13.71	706	5.88	6.76	156.1	"	clear
(1155)	13.67	706	5.82	TF 6.75 5.82	155.1	"	clear
(1200)	13.71	703	5.86	6.75	154.1	"	clear
(1205)	14.01	705	5.93	6.78	151.2	"	clear
(1210)	14.15	704	5.98	6.77	151.7	"	clear
(1215)	14.16	702	6.00	6.77	151.3	"	clear
(1220)	14.19	700	6.01	6.77	151.0	"	clear

(1220) Readings Stable

Sample Time (1225)

Samples Collected: (3) 8260, (2) 8270, (1) TM

4/15/08 RAAP FB#7
603204-06
DAS/TOE

16-5

DTW -3.43 Begin Purge (1252)
Post Purge DTW = 15.92 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge K	Desc
(1255)	13.09	530	2.28	7.10	149.3	0.3 L/min	Clear
(1300)	12.89	523	1.53	7.10	148.7	"	"
(1305)	13.00	521	1.34	7.12	145.3	"	"
(1310)	13.10	521	1.15	7.16	141.2	"	"
(1315)	13.04	521	1.07	7.17	139.0	"	"
(1320)	12.96	520	1.00	7.18	137.2	"	"
(1325)	12.83	521	0.98	7.18	136.0	"	"
(1330)	12.80	519	0.94	7.18	134.4	"	"
(1335)	12.74	519	0.98	7.18	132.8	"	"

Sample Time (1340)
Samples Collected: (3) 8260, (2) 8270, (1) TPH

16Spring

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)
(1355)	12.34	733	8.82	7.09	130.0

Sample Time (1400)
Samples Collected: (3) 8260, (2) 8270, (1) TPH

16WC2B

DTW - 55.77 Begin Purge (1428)
Post Purge DTW - 64.96 Initial Purge = Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge K	Desc
(1430)	14.07	357	5.88	7.63	117.8	0.3 L/min	SI Cloudy
(1435)	13.85	332	2.01	7.66	120.5	"	Clear
(1440)	14.04	332	1.94	7.72	117.4	"	Clear
(1445)	14.09	329	1.39	7.70	102.1	"	Clear
(1450)	14.20	329	1.45	7.70	97.0	"	Clear

803204-06
DAS/TRE

16MW2B (Cont.)

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge L	Desc
(1455)	14.04	328	1.68	7.64	72.9	0.3 L/min	Clear
(1500)	14.00	329	1.87	7.63	72.5	"	"
(1505)	13.91	329	1.83	7.62	69.0	"	"
(1510)	13.97	327	1.90	7.61	66.8	"	"
(1510)	Readings Stable.						
	Sample Time (1515)						
	Samples - (3) 8260, (2) 8270, (1) TM						

16MW8

DTW - 73.71 Begin Purge (1540)

Post Purge DTW - DRY Initial Purge: Cloudy

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge L	Desc
(1545)	14.06	93	3.77	4.67	~~0.3 L/min~~ 191.1	0.3 L/min	sl cloudy
(1550)	13.82	95	0.65	4.67	199.5	"	clear
(1555)	13.84	100	0.50	4.72	205.7	"	clear
(1600)	13.68	107	0.45	4.75	210.2	"	clear
(1605)	13.60	109	0.51	4.74	216.0	"	clear
(1610)	13.57	106	0.49	4.73	211.1	"	cloudy
(1610)	well purged dry, collect samples tomorrow						

4/16/08 RAAP FB# 7
803204-06
D4S/TDE

General Notes
Weather - Sunny, 60's
PPE - Eye Protection, Nitrile gloves, Hard hat
Calibrations - YSI 650 MDS
pH - 4.00 = 4.00, 7.00 = 7.00, 10.00 = 10.00
Conductivity reads 1500 us in 1500 us Std
DO % = 100

- Dedicated tubing and well skirts used and disposed of at each well.
- All equipment deconed between wells
- Purge water contained and disposed of at designated location onsite.
- Samples collected, stored and transported on ice in coolers

16MW-8

Sample Time (1015)
Samples Collected: (3) 8260, (1) CN, (1) Sulfide, (1) 9065, (2) 8270
(2) 8081, (2) 8151, (1) TM-MER.

16MW-9

DTW - 65.48 Begin Purge (1121)
Post Purge DTW - 65.64 Initial Purge: Clear

Time	Temp(C)	Cond(us)	DO %	pH	ORP(MV)	Purge k	Desc
(1125)	13.58	607	3.59	6.17	202.7	0.3 L/min	Clear
(1130)	13.88	491	1.63	6.09	196.8	"	Clear
(1135)	13.85	608	1.18	6.13	177.0	"	clear
(1140)	13.91	533	0.97	6.18	153.1	"	Clear
(1145)	13.95	553	0.90	6.22	135.2	"	Clear
(1150)	13.96	568	0.86	6.24	124.0	"	Clear
(1155)	13.97	586	0.80	6.27	109.5	"	clear
(1200)	13.95	594	0.73	6.28	102.1	"	clear
(1205)	13.92	595	0.71	6.28	100.7	"	clear
(1210)	13.90	597	0.70	6.30	98.1	"	clear

(145)

4/16/08

16MW-9
(1210) K

16WC1A
DTW
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(1250)
(1255)
(1300)
(1305)
(1310)
(1315)
(1320)
(1325)
(1325) K

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16WDU

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FB# 7

4/16/08 RAAP FB#7
B03204-06
DAS/TQE

16MW-9 - cont
(1210) Readings Stable
Sample Time (1215)
Samples Collected: (3) 8260, (1) CN, (1) Sulfide
(1) 9065, (2) 8270, (2) 8081, (2) 8151, (1) TM-MER.

16WC1A
DTW: 68.93 Begin Purge (1246)
Post Purge DTW: 71.33 Initial Purge: clear

Time	Temp(°)	Cond(µs)	DO(mg)	pH	ORP(mV)	Purge lt	Desc
(1250)	14.97	631	6.84	7.01	139.2	0.3%m.i	Clear
(1255)	14.84	650	4.65	6.90	143.7	"	"
(1300)	14.40	698	1.41	6.83	143.1	"	"
(1305)	14.73	712	1.03	6.84	65.2	"	"
(1310)	14.75	732	0.86	6.78	21.0	"	"
(1315)	14.69	734	0.85	6.78	19.3	"	"
(1320)	14.55	739	0.82	6.76	18.4	"	"
(1325)	14.59	739	0.82	6.76	17.2	"	"

(1325) Readings Stable
Sample Time (1330)
Samples Collected: (3) TM, (6) 8151, (6) 8270, (3) CN, (3) Sulfide
(3) 9065, (3) 8260, (6) 8081

16WDUP
Sample Time (1345)
Samples Collected: (1) TM, (2) 8151, (2) 8270, (1) CN, (1) sulfide
(1) 9065, (3) 8260, (2) 8081
* Duplicate samples were collected at 16WC1A

disposed
on onsite.
in coolers
(2) 8270

Desc
Clear
Clear
clear
Clear
Clear
Clear
clear
clear
clear
clear

4/16/08 RAAP FB#7

B03204-06
DAS/TGE

16WC2B

DTW -69.17 Begin Purge (1450)

Post Purge DTW -69.40 Initial Purge: Cloudy

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(MV)	Purge K	Desc
(1455)	15.48	306	8.51	6.12	147.2	0.3 L/min	Cloudy
(1500)	15.77	299	7.79	6.03	153.8	"	SI Cloudy
(1505)	15.67	287	7.65	6.01	160.1	"	SI Cloudy
(1510)	15.59	262	7.46	6.01	174.0	"	Clear
(1515)	15.45	263	7.44	6.00	176.6	"	Clear
(1520)	15.50	264	7.32	6.01	178.0	"	"
(1525)	15.41	266	7.30	6.04	174.3	"	"

(1525) Readings Stable

Sample Time (1530)

Samples Collected: (3)8260, (1)CN, (1)Sulfide, (1)9065, (2)8270, (2)8081, (2)8151, (1)TM-MER

16C1

DTW -51.37 Begin Purge (1604)

Post Purge DTW -51.72 Initial Purge: Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(MV)	Purge K	Desc
(1605)	14.38	672	9.99	7.30	83.4	0.3 L/min	Clear
(1610)	14.40	726	4.45	6.51	52.7	"	Clear
(1615)	14.12	791	1.79	6.40	92.1	"	Clear
(1620)	13.98	796	1.32	6.42	104.5	"	Clear
(1625)	13.94	800	1.30	6.42	110.1	"	Clear
(1630)	13.89	798	1.28	6.45	101.2	"	Clear
(1635)	13.96	800	1.26	6.47	102.9	"	Clear

(1635) Readings Stable

Sample Time (1640)

Samples Collected: (3)8260, (1)CN, (1)Sulfide (1)9065, (2)8270, (2)8081, (2)8151, (1)TM-MER

COMPLETED

(142)

B#8

5/21/08

RAAP
B03204-06
TQE/KFL

FB#2

5WC21

DTW: 10.60

Begin Purge (1227)

Post Purge DTW: 10.65

Initial Purge: clear

Time	Temp(°C)	Cond (µs)	DO mg/L	pH	ORP(mV)	Purge L	Desc
(1230)	14.79	635	2.91	3.56	364.4	0.3 L/min	clear
(1235)	15.12	645	2.61	3.55	407.5	"	clear
(1240)	14.92	647	2.93	3.55	394.4	"	clear
(1245)	15.02	647	2.91	3.55	418.6	"	clear
(1250)	15.05	649	2.96	3.53	423.6	"	clear
(1255)	14.98	652	2.96	3.51	433.4	"	clear
(1300)	14.91	651	2.97	3.51	436.5	"	clear
(1305)	14.88	651	2.99	3.50	441.7	"	clear
(1305) Readings Stable							
Post Purge	14.80	654	2.73	3.54	443.6		

Sample Time (1310)

Samples Collected: (3) 8260

5WDUP

Sample Time (1320)

Samples Collected: (3) 8260

*Samples Collected from 5WC21

16-3

DTW: 58.56

Begin Purge (1342)

Post Purge DTW: 64.11

Initial Purge: clear

Time	Temp(°C)	Cond (µs)	DO (mg/L)	pH	ORP(mV)	Purge L	Desc
(1345)	14.27	239	9.28	7.30	206.6	0.3 L/min	clear
(1350)	14.52	239	6.43	7.61	202.9	"	clear
(1355)	14.50	239	5.95	7.73	195.1	"	clear
(1400)	14.33	238	5.65	7.78	191.3	"	clear
(1405)	14.41	238	5.52	7.82	187.6	"	clear
(1410)	14.37	238	5.47	7.82	187.4	"	clear
(1415)	14.32	237	5.44	7.82	186.9	"	clear

16-3 cont

(1415) Readings Stable

	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)
Post Purge	14.08	236	5.50	7.81	184.3

Sample Time (1420)
Samples Collected: (3) 8260

16WC1A

DTW: 69.10
Post Purge DTW: 70.56

Begin Purge (1637)
Initial Purge

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge	Desc
(1440)	1413	678	7.08	7.15	196.6	0.3 L/min	Clear
(1445)	13.90	677	2.24	6.78	211.3	"	Clear
(1450)	13.65	678	1.59	6.75	93.5	"	clear
(1455)	13.61	688	1.36	6.74	36.2	"	Clear
(1500)	13.81	696	1.63	6.74	20.7	"	Clear
(1505)	13.80	695	1.62	6.69	5.6	"	Clear
(1510)	13.77	695	1.69	6.69	1.0	"	Clear
(1515)	13.86	694	1.72	6.69	-3.8	"	Clear

(1515) Readings Stable

	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)
Post Purge	13.72	689	1.82	6.69	5.7

Sample Time (1520)
Samples Collected: (3) 8260

16DUP

Sample Time (1530)
Samples Collected: (3) 8260
* Samples Collected from 16WC1A

COMPLETED
[signature] 5-27-08

10/14/08 RAAP FB# 8
B03204-06
DAS/TRE

10/15/08

Well-7 cont

Time	Temp(C)	Cond(µs)	DO mg/L	pH	ORP(mV)	Purge	Desc
(1415)	14.72	708	5.65	5.83	230.7	0.3 L/min	clear
(1428)	14.75	704	5.61	5.83	230.9	"	clear
(1420)	Readings Stable						
(1432)	14.80	723	5.79	5.94	235.8	Post Purge	

Sample Time (1425)
Samples Collected: (3) 8260, (2) 8011, (1) TM

16-3

DTW: 58.51
Post Purge DTW:
Begin Purge (1447)
Initial Purge: clear

Time	Temp(C)	Cond(µs)	DO mg/L	pH	ORP(mV)	Purge	Desc
(1450)	17.46	225	9.01	7.29	205.8	0.3 L/min	clear
(1455)	17.70	224	8.42	7.28	206.4	"	clear
(1500)	17.89	223	7.94	7.39	202.6	"	clear
(1505)	17.53	224	7.21	7.51	197.3	"	clear
(1510)	16.63	224	7.01	7.58	195.6	"	clear
(1515)	16.48	224	6.81	7.59	196.9	"	clear
(1520)	16.31	223	6.29	7.61	197.5	"	clear
(1525)	16.22	222	6.34	7.61	199.0	"	clear
(1530)	16.20	223	6.41	7.62	200.1	"	clear
(1530)	Readings Stable						
(1545)	16.01	225	6.69	7.71	199.9	post purge	

Sample Time (1535)
Samples Collected: (2) 8270, (2) TM, (6) 8260
(2) 8011

COMPLETED
10-25-08

FB#8 | 10/15/08 | RAAP B03201-06 DAS/TQE/TD | FB#8

General Notes

- Weather: Sunny, 70's
- PPE: Nitrile Gloves, Eye Protection
- Calibrations: YSI 650 MDS
  pH: 4.00 = 4.00, 7.00 = 7.00, 10.00 = 9.97
  Conductivity reads 1413 µs in 1413 µs std
  DO% = 100
- Dedicated tubing and well skirts used @ each well, and disposed of after each use
- All equipment deconed between each well
- Purged water contained and disposed of at dedicated location on-site.
- Samples collected, stored, and transported on ice in coolers

Static Water Level Table - Unit 16

Well	DTW	Post Purge DTW	Notes
16-1	60.0	DRY	
16-2	55.17	55.79	
16-3	58.51	67.34	
16-5	5.43		
16WC2B	55.42	60.40	
16 MW8	74.16	75.76	
16WC1B	71.16	71.83	
16WC1A	70.66	71.11	
16 MW9	67.25	67.68	
16 C1	50.56	56.84	
16CDH3	DRY		
16C3	DRY		
16WC2A	DRY		

16-1 = DTW - 60.0, Well dry (No samples collected)
Pump was pulled (33) to measure water level

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16-2

DTW -55.17 Begin Purge (1037)
Post Purge DTW -55.79 Initial Purge - Clear

Time	Temp(C°)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge(L/gpm)	Desc
(1040)	16.01	459	6.98	6.84	168.3	0.3 L/min	Clear
(1045)	15.47	458	6.24	6.55	184.9	"	Clear
(1050)	15.00	477	4.82	6.50	197.8	"	Clear
(1055)	14.94	482	4.43	6.51	202.1	"	Clear
(1100)	14.75	484	4.25	6.50	207.8	"	Clear
(1105)	14.70	484	4.21	6.50	210.0	"	Clear
(1110)	14.66	480	4.18	6.49	212.5	"	Clear

(1110) Readings Stable
Sample Time (1115)
Samples Collected: (3)8260, (2)8270, (1)TM

(1130)	14.60	480	4.39	6.49	201.4	post purge	Clear

16MW8

DTW -74.16 Begin Purge (1149)
Post Purge DTW -75.76 Initial Purge - Clear

Time	Temp(C°)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge(L/gpm)	Desc
(1150)	16.55	89	~~4.98~~ 1.13	4.98	233.2	≤0.3 L/min	Clear
(1155)	17.18	90	1.18	4.92	231.8	"	Clear
(1200)	17.57	80	0.95	4.94	222.3	"	Clear
(1205)	17.41	78	0.75	4.88	226.4	"	Clear
(1210)	17.16	71	0.69	4.88	228.2	"	Clear
(1215)	16.90	66	0.66	4.85	230.1	"	Clear
(1220)	16.97	68	0.68	4.83	231.7	"	Clear

(1220) Readings Stable

(1232)	17.14	61	0.82	4.98	227.7	post purge	Clear

Sample Time (1225)
Samples Collected: (3)8260, (2)8270, (1)TM

10/15/08

16WC2B
DTW -
Post Purge D

Time	T
(1250)	
(1255)	16
(1300)	16
(1305)	17
(1310)	16
(1315)	16
(1320)	16
(1325)	17
(1330)	17
(1330)	R
(1345)	16

Sa

16MW9
DTW -
Post Purge D

Time	Te
(1425)	16
(1430)	17
(1435)	16
(1440)	15
(1445)	16
(1450)	16
(1455)	16
(1455)	R
(1512)	16

Sam

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16WC2B

DTW-55.42 | Begin Purge (1248)

Post Purge DTW-60.40 | Initial Purge-Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(MV)	Purge(Kgpm)	Desc
(1250)	17.10	208	7.78	7.30	170.3	0.3 L/min	Clear
(1255)	16.77	209	4.63	7.16	179.1	"	Clear
(1300)	16.92	209	3.43	7.20	175.9	"	Clear
(1305)	17.03	209	2.24	7.29	168.4	"	Clear
(1310)	16.94	209	1.60	7.33	158.9	"	Clear
(1315)	16.71	210	1.01	7.36	144.7	"	Clear
(1320)	16.62	208	1.01	7.34	146.0	"	Clear
(1325)	17.08	208	1.04	7.34	142.7	"	Clear
(1330)	17.16	208	1.02	7.36	139.3	"	Clear
(1330)	Readings Stable						
(1345)	16.83	210	1.45	7.35	74.5	post purge	Clear

Sample Time (1335)

Samples Collected: (3) 8260, (2) 8270, (1) TM

16MW9

DTW-67.25 | Begin Purge (1421)

Post Purge DTW-67.68 | Initial Purge-Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(MV)	Purge(Kgpm)	Desc
(1425)	16.70	446	5.33	6.44	141.5	0.3 L/min	Clear
(1430)	17.57	521	2.82	6.44	113.1	"	Clear
(1435)	16.53	563	2.20	6.45	91.3	"	Clear
(1440)	15.86	566	1.46	6.43	86.9	"	Clear
(1445)	16.03	564	1.54	6.43	85.0	"	Clear
(1450)	16.54	560	1.49	6.45	81.4	"	Clear
(1455)	16.77	558	1.52	6.49	79.5	"	Clear
(1455)	Readings Stable						
(1512)	16.49	547	1.67	6.51	41.8	post purge	Clear

Sample Time (1500)

Samples Collected: (3) 8260, (2) 8270, (1) TM

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603204-06
DAS/TRE/TD

16C1

DTW – 50.56 Begin Purge (1533)
Post Purge DTW - 56.84 Initial Purge - Clear

Time	Temp (°)	Cond (us)	DO mg/L	pH	ORP (mv)	Purge k (gpm)	Desc
(1535)	17.03	480	5.90	6.72	121.2	0.34/min	Clear
(1540)	17.16	484	5.58	6.63	126.2	"	Clear
(1545)	17.44	502	3.02	6.48	131.9	"	Clear
(1550)	17.03	513	2.42	6.45	134.8	"	Clear
(1555)	16.89	516	1.82	6.41	140.0	"	Clear
(1600)	16.90	514	1.73	6.41	141.1	"	Clear
(1605)	17.27	517	1.62	6.46	139.7	"	Clear
(1610)	16.95	520	1.29	6.44	142.3	"	Clear
(1615)	16.85	520	1.16	6.41	144.5	"	Clear
(1620)	16.76	519	1.13	6.40	145.6	"	Clear
(1625)	16.58	519	1.10	6.40	145.8	"	Clear
(1625)	Readings Stable						
(1638)	16.73	522	1.08	6.40	153.5	post purge	clear

Sample Time (1630)
Samples Collected: (3) 8260, (2) 8270, (1) TM

10/16/08

General /
Weathe
PPE - /
Calibr
pH =
Condu
DO %
• Dedicated
• All equ
• Purge wa
• Samples

16WC1A
DTW -
Post Purge DTW -

Time	Tem
(0920)	16.
(0925)	14.
(0930)	14.
(0935)	14.
(0940)	14.
(0945)	14.
(0950)	14.
(0955)	14.
(0955)	Re
(1028)	14

S
Sa

16W DUP
Sa
Sa
* Coll

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General Notes

Weather -

PPE - Nitrile gloves, Eye Protection

Calibrations - YSI 650 MDS

pH = 4.00 = 4.00, 7.00 = 7.00, 10.00 = 9.99

Conductivity reads 1413 us in 1413 us std

DO% = 100

- Dedicated tubing and well skirts used at each well
- All equipment deconed between each well
- Purge water contained and disposed of at dedicated location onsite
- Samples collected, stored and transported on ice and in coolers

16WC1A

DTW - 70.66 Begin Purge (0919)

Post Purge DTW - 71.11 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO%	pH	ORP(mV)	Purge Rate (gpm)	Desc
(0920)	16.08	545	9.04	7.35	175.9	0.3 L/min	Clear
(0925)	14.90	649	5.35	6.78	170.1	"	Clear
(0930)	14.43	675	3.30	6.69	154.3	"	Clear
(0935)	14.42	688	2.68	6.70	153.9	"	Clear
(0940)	14.54	692	2.64	6.71	155.6	"	Clear
(0945)	14.70	693	2.72	6.74	155.5	"	Clear
(0950)	14.73	696	2.70	6.76	155.8	"	Clear
(0955)	14.57	696	2.67	6.77	149.3	"	Clear
(0955)	Readings Stable						
(1028)	14.67	698	1.50	6.90	138.2	post purge	Clear

Sample Time (1000)

Samples Collected: (9) 8260, (6) 8270, (3) TM

16WDUP

Sample Time (1015)

Samples Collected: (3) 8260, (2) 8270, (1) TM

* Collected on monitoring well 16WC1A

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16WC1B

DTW – 71.16 Begin Purge (1047)

Post Purge DTW – 71.83 Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge(gpm)	Desc
(1050)	15.06	420	5.80	6.69	135.2	0.34/min	Clear
(1055)	15.08	485	2.84	6.72	138.5	"	Clear
(1100)	15.32	511	2.67	6.64	140.6	"	Clear
(1105)	15.67	502	2.74	6.64	141.1	"	Clear
(1110)	15.98	465	2.94	6.58	145.0	"	Clear
(1115)	16.36	446	3.07	6.49	150.2	"	Clear
(1120)	16.13	435	3.17	6.42	156.9	"	Clear
(1125)	15.93	417	3.05	6.35	168.9	"	Clear
(1130)	15.69	406	2.95	6.32	170.1	"	Clear
(1135)	15.93	405	2.94	6.32	172.3	"	Clear
(1140)	16.05	401	2.95	6.33	176.2	"	Clear
(1140)	Readings Stable						
(1207)	15.61	385	2.96	6.23	199.1	post Purge	Clear

Sample Time (1145)

Samples Collected: (3) 8260, (2) 8270, (1) TPH

16-5

DTW – 5.43 Begin Purge (1233)

Post Purge DTW – Initial Purge - Clear

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mv)	Purge(gpm)	Desc
(1235)	15.62	481	3.05	7.15	193.0	0.34/min	Clear
(1240)	16.09	490	2.57	7.08	193.2	"	Clear
(1245)	15.76	500	1.92	7.07	192.4	"	Clear
(1250)	15.53	505	1.85	7.07	190.8	"	Clear
(1255)	15.42	509	2.14	7.07	187.7	"	Clear
(1300)	15.43	509	2.18	7.05	188.6	"	Clear
(1305)	15.30	511	2.14	7.04	191.5	"	Clear
(1310)	15.04	511	2.06	7.02	194.8	"	Clear

DS

10/16/08

16-5 (co

Time	Tem
(1315)	14.
(1320)	14.
(1320)	Rea
(1335)	15.
	San
	Samp

16 Spring

Time	Te
(1340)	15
(1410)	15
	Sa
	Sam

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16-5 (cont)

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)	Purge Rate(gpm)	Desc
(1315)	14.85	509	2.00	7.01	196.9	0.34/min	Clear
(1320)	14.76	509	1.98	6.99	197.3	"	Clear
(1320)	Readings Stable						
(1335)	15.15	509	2.29	7.10	201.8	postpurge	Clear

Sample Time (1325)

Samples Collected: (3) 8260, (2) 8270, (1) TM

16 Spring

Time	Temp(C)	Cond(us)	DO mg/L	pH	ORP(mV)
(1340)	15.56	604	8.84	7.13	38.1
(1410)	1547	604	7.74	7.05	33.7

Sample Time (1345)

Samples Collected: (3) 8260, (2) 8270, (1) TM

COMPLETED

~~DK 12-5-08~~