

# SEMIANNUAL GROUNDWATER MONITORING REPORT

**Hazardous Waste Management Units  
5, 7, 10 and 16  
SECOND QUARTER 2008**

**RADFORD ARMY AMMUNITION PLANT  
RADFORD, VIRGINIA**

**Submitted to:**

Virginia Department of Environmental Quality  
629 East Main Street  
Richmond, Virginia 23219  
(800) 592-5482

**Prepared for:**

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

**AUGUST 6, 2008**

**DAA PROJECT NO. B03204-06**



**Draper Aden Associates**  
*Engineering • Surveying • Environmental Services*

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MONITORING REPORT**

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August 2008  
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## TABLE OF CONTENTS

---

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	HWMU-5 .....	1
1.2	HWMU-7 .....	1
1.3	HWMU-10 .....	1
1.4	HWMU-16 .....	2
<b>2.0</b>	<b>HWMU-5 QUARTERLY GROUNDWATER MONITORING REPORT.....</b>	<b>3</b>
2.1	WASTE MANAGEMENT UNIT INFORMATION .....	3
2.2	GROUNDWATER MONITORING PLAN.....	3
2.3	GROUNDWATER ELEVATIONS .....	3
2.4	GROUNDWATER ANALYTICAL DATA EVALUATION .....	3
2.4.1	40 CFR Part 264 Appendix IX Constituent Detections .....	4
2.4.2	Comparison to Groundwater Protection Standards.....	4
2.4.3	Comparison to Background Concentrations .....	4
2.5	CONCLUSIONS .....	5
<b>3.0</b>	<b>HWMU-7 QUARTERLY GROUNDWATER MONITORING REPORT.....</b>	<b>6</b>
3.1	WASTE MANAGEMENT UNIT INFORMATION .....	6
3.2	GROUNDWATER MONITORING PLAN.....	6
3.3	GROUNDWATER ELEVATIONS .....	6
3.4	GROUNDWATER ANALYTICAL DATA EVALUATION .....	6
3.4.1	40 CFR Part 264 Appendix IX Constituent Detections .....	7
3.4.2	Comparison to Groundwater Protection Standards.....	7
3.4.3	Comparison to Background Concentrations .....	7
3.5	CONCLUSIONS .....	8
<b>4.0</b>	<b>HWMU-10 QUARTERLY GROUNDWATER MONITORING REPORT.....</b>	<b>10</b>
4.1	WASTE MANAGEMENT UNIT INFORMATION .....	10
4.2	GROUNDWATER MONITORING PLAN.....	10
4.3	GROUNDWATER ELEVATIONS .....	10
4.4	GROUNDWATER ANALYTICAL DATA EVALUATION .....	10
4.4.1	40 CFR Part 264 Appendix IX Constituent Detections .....	11
4.4.2	Comparison to Groundwater Protection Standards.....	11
4.4.3	Comparison to Background Concentrations .....	11
4.5	CONCLUSIONS .....	11
<b>5.0</b>	<b>HWMU-16 QUARTERLY GROUNDWATER MONITORING REPORT.....</b>	<b>12</b>
5.1	WASTE MANAGEMENT UNIT INFORMATION .....	12
5.2	GROUNDWATER MONITORING PLAN.....	12
5.3	GROUNDWATER ELEVATIONS .....	12
5.4	GROUNDWATER ANALYTICAL DATA EVALUATION .....	12
5.4.1	40 CFR Part 264 Appendix IX Constituent Detections .....	13
5.4.2	Comparison to Groundwater Protection Standards.....	13
5.4.3	Comparison to Background Concentrations .....	13
5.5	CONCLUSIONS .....	14
	<b>SIGNATURE/CERTIFICATION.....</b>	<b>15</b>

## TABLE OF CONTENTS

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### List of Appendices

- Appendix A Summary Tables - Second Quarter 2008 Analytical Data - Units 5, 7, 10, and 16
- Appendix B Laboratory Certificates of Analysis and Data Validation Reports (CD-ROM)
- Appendix C Tables
- Appendix D Figures

### List of Tables

- Table 1 HWMU-5 Groundwater Elevations - 2008
- Table 2 HWMU-5 - Second Quarter 2007 Summary of Detected Constituent Concentrations
- Table 3 HWMU-7 Groundwater Elevations - 2008
- Table 4 HWMU-7 - Second Quarter 2007 Summary of Detected Constituent Concentrations
- Table 5 HWMU-10 Groundwater Elevations - 2008
- Table 6 HWMU-10 - Second Quarter 2007 Summary of Detected Constituent Concentrations
- Table 7 HWMU-16 Groundwater Elevations - 2008
- Table 8 HWMU-16 - Second Quarter 2007 Summary of Detected Constituent Concentrations

### List of Figures

- Figure 1 HWMU-5 Potentiometric Surface Map (Second Quarter 2008)
- Figure 2 HWMU-7 Potentiometric Surface Map (Second Quarter 2008)
- Figure 3 HWMU-10 Potentiometric Surface Map (Second Quarter 2008)
- Figure 4 HWMU-16 Potentiometric Surface Map (Second Quarter 2008)

## 1.0 INTRODUCTION

This document presents the Semiannual Groundwater Monitoring Report for Second Quarter 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 Semiannual Groundwater Monitoring Report was compiled in accordance with the requirements specified in the Final Hazardous Waste Post-Closure Care Permit (October 4, 2002) for HWMUs 5, 7, 10, and 16. The Semiannual 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 table of groundwater elevations, an updated potentiometric surface map, a table of constituent concentrations detected during the monitoring event, and statistical evaluations of the analytical data. Summary tables of all Second Quarter 2008 analytical data for Units 5, 7, 10, and 16 are included in **Appendix A**. A list of quantitation limits and detection limits for the analyzed parameters for all Units is also included in **Appendix A**. **Appendix B** includes complete laboratory certificates of analysis and data validation reports in CD-ROM format.

Please note that the sampling frequency for HWMUs 5, 7, 10, and 16 was changed to a semiannual basis in the VDEQ-approved Class 1 Permit Modification dated June 14, 2007. The next sampling event is scheduled for October 2008 (Fourth Quarter 2008).

### 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 (GPS) 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.

### 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 GPS 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.

### 1.3 HWMU-10

HWMU-10 is a closed lined 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 GPS applies to HWMU-10 is 18 years, beginning on the effective date of the Final Hazardous Waste Post-Closure Care Permit for HWMUs 5, 7, 10, and 16 (October 4, 2002) and continuing until October 4, 2020.

## **1.4 HWMU-16**

HWMU-16 is a closed unlined 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 GPS applies to HWMU-16 is 13 years, beginning on the effective date of the Final Hazardous Waste Post-Closure Care Permit for HWMUs 5, 7, 10, and 16 (October 4, 2002) and continuing until October 4, 2015.

## **2.0 HWMU-5 SEMIANNUAL 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, 5WC12

**Monitoring Status:** Compliance Monitoring Program

**CY 2008 Monitoring Events:**

Second Quarter 2008: April 28-30, 2008

Fourth Quarter 2008:

### **2.3 GROUNDWATER ELEVATIONS**

The monitoring wells at HWMU-5 are screened entirely within either weathered carbonate bedrock residuum, alluvium, or across the weathered residuum/carbonate bedrock interface. The static water level measurements gathered during the Second Quarter 2008 monitoring event are summarized in **Table 1 (Appendix C)**. As shown on the HWMU-5 Potentiometric Surface Map (**Figure 1 in Appendix D**), groundwater movement beneath the site is generally to the northeast.

### **2.4 GROUNDWATER ANALYTICAL DATA EVALUATION**

The groundwater samples collected from the upgradient well and the point of compliance wells during Second Quarter 2008 were analyzed for the constituents listed in Appendix IX to 40 CFR Part 264 as presented in Appendix I of Attachment 1 of the Final Post-Closure Care Permit. The groundwater samples collected from the plume monitoring wells during the Second Quarter 2008 monitoring event 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). The constituents detected in the upgradient well and the point of

compliance wells at concentrations greater than their respective detection limits are summarized in **Table 2 (Appendix C)**. The constituents detected in plume wells at concentrations greater than their respective Permit-specified quantitation limits are also summarized in **Table 2 (Appendix C)**. The complete laboratory certificates of analysis and data validation reports for HWMU-5 are included in **Appendix B**.

#### **2.4.1 40 CFR Part 264 Appendix IX Constituent Detections**

No additional Appendix IX constituents, which are not listed in Appendix E of Permit Attachment 2 (Unit 5 – Groundwater Compliance Monitoring (Quarterly) 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.

#### **2.4.2 Comparison to Groundwater Protection Standards**

As specified in Permit Condition V.J.1.i, the Second Quarter 2008 groundwater analytical data for the upgradient well and the point of compliance wells were compared to the 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 the GPSs (**Table 2 in Appendix C**). As shown on **Table 2**, no inorganic constituents were detected at concentrations exceeding their respective GPSs. As also shown on **Table 2**, trichloroethene (TCE) was detected in point of compliance well 5W5B at a concentration of 7.8 µg/l, which exceeds the GPS of 5 µg/l. These results are consistent with previous monitoring events for HWMU-5. No other organic constituents were detected at concentrations exceeding their GPSs.

TCE has been detected repeatedly at concentrations exceeding the USEPA Maximum Contaminant Level (MCL) of 5 mg/l in point of compliance well 5W5B. As TCE has previously been detected in upgradient well 5W8B and is not present in the residual materials contained within HWMU-5, it is likely derived from a source located upgradient of the Unit. Radford AAP submitted an Alternate Source Demonstration (ASD) for TCE. VDEQ requested Radford AAP amend the ASD in order to identify the exact source of TCE. On July 30, 2008 Radford AAP presented the results of the most recent investigation to VDEQ. A resolution regarding the ASD status has not been determined at this time.

#### **2.4.3 Comparison to Background Concentrations**

As specified in Permit Condition V.O, the Second Quarter 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 (**Table 2**).

Initially, dichlorodifluoromethane was detected in plume monitoring well S5W7 at a concentration of 1.2 µg/l, which exceeded 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 exceeding the site-specific background concentration.

No other constituent concentrations detected in the plume monitoring wells exceeded their respective background concentrations.

## **2.5 CONCLUSIONS**

Based on an evaluation of the groundwater analytical data and additional information for HWMU-5, the GPSs have not been exceeded by any releases from the Unit. TCE detected at HWMU-5 in exceedance of the GPS will be addressed under the IRP.

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

### 3.0 HWMU-7 SEMIANNUAL 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:

#### 3.3 GROUNDWATER ELEVATIONS

The monitoring wells at HWMU-7 are screened entirely within either alluvium, weathered carbonate bedrock residuum, carbonate bedrock, or across the interfaces between two of the listed strata. The static water level measurements gathered during the Second Quarter 2008 monitoring event are summarized in **Table 3 (Appendix C)**. As shown on the HWMU-7 Potentiometric Surface Map (**Figure 2 in Appendix D**), 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.

#### 3.4 GROUNDWATER ANALYTICAL DATA EVALUATION

The groundwater samples collected from the upgradient well and the point of compliance wells during Second Quarter 2008 were analyzed for the constituents listed in Appendix IX to 40 CFR Part 264 as presented in Appendix I of Attachment 1 of the Final Post-Closure Care Permit. The groundwater samples collected from the plume monitoring wells during the Second Quarter 2008 monitoring event 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). The constituents detected in the upgradient well and

the point of compliance wells at concentrations greater than their respective detection limits are summarized in **Table 4 (Appendix C)**. The constituents detected at concentrations greater than their respective Permit-specified quantitation limits are summarized in **Table 4 (Appendix C)**. The complete laboratory certificates of analysis and data validation reports for HWMU-7 are included in **Appendix B**.

### **3.4.1 40 CFR Part 264 Appendix IX Constituent Detections**

Upon receipt of the Second Quarter 2008 analytical data, Radford AAP notified the VDEQ of the detection of an additional Appendix IX constituent that was not listed in Appendix E of Permit Attachment 3 (Unit 7 – Groundwater Compliance Monitoring (Quarterly Constituent List)). As shown on **Table 4**, chloroform was detected in point of compliance well 7MW6. 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

### **3.4.2 Comparison to Groundwater Protection Standards**

As specified in Permit Condition V.J.2.i, the Second Quarter 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 (**Table 4 in Appendix C**). As shown on **Table 4**, none of the constituent concentrations detected in the upgradient well and in the point of compliance wells exceeded their respective GPSs.

### **3.4.3 Comparison to Background Concentrations**

As specified in Permit Condition V.O, the Second Quarter 2008 groundwater analytical data for the plume monitoring wells were compared to the background concentrations for HWMU-7 listed in Appendix F of Permit Attachment 3. 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 (**Table 4**).

Initially, total arsenic was detected in plume monitoring well 7W13 at a concentration of 10.5 µg/l, which exceeded 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 exceeding the site-specific background concentration.

As shown on **Table 4**, total barium was detected in plume monitoring wells 7W10B and 7W10C at concentrations of 83.2 µg/l and 51.8 µg/l, respectively, which exceed the site-specific background concentration of 41 µg/l. However, these concentrations are more than an order of

magnitude below the USEPA MCL for barium of 2,000 µg/l. Exceedances of the background concentration for total barium in wells 7W10B and 7W10C are likely due to natural variations in trace element distribution in groundwater. In addition, these concentrations are consistent with previous barium concentrations detected in these wells.

Initially, total cobalt was detected in plume monitoring wells 7W9C and 7W13 at concentrations exceeding 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 verification sample for well 7W13 confirmed the initial total cobalt concentration of 5.8 µg/l. However, the total cobalt concentration detected in well 7W13 is more than an order of magnitude below the VDEQ ACL for cobalt of 156.65 µg/l. Exceedance of the background concentration for total cobalt in well 7W13 is likely due to natural variations in trace element distribution in groundwater. In addition, the total cobalt concentration detected in well 7W13 is consistent with previous cobalt concentrations detected in this well.

No other constituent concentrations detected in the plume monitoring wells exceeded their respective background concentrations.

### **3.5 CONCLUSIONS**

Based on an evaluation of the groundwater analytical data for HWMU-7, GPSs have not been exceeded by any releases from the Unit.

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 (Quarterly) 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.

The evaluation of the plume monitoring well data indicated that the concentrations of total barium in plume monitoring wells 7W10B and 7W10C exceeded the site-specific background concentration. As stated previously, exceedances of the background concentration for total barium in wells 7W10B and 7W10C are likely due to natural variations in trace element distribution in groundwater. In addition, the total barium concentrations detected in plume monitoring wells 7W10B and 7W10C are consistent with previous barium concentrations detected in these wells. Therefore, no further action regarding the Second Quarter 2008 total barium concentrations detected in plume monitoring wells 7W10B and 7W10C is recommended at this time.

The evaluation of the plume monitoring well data indicated that the concentration of total cobalt in plume monitoring well 7W13 exceeded the site-specific background concentration. As stated previously, exceedance of the background concentration for total cobalt in well 7W13 is likely due to natural variations in trace element distribution in groundwater. In addition, the total cobalt concentration detected in plume monitoring well 7W13 is consistent with previous cobalt

concentrations detected in this well. Therefore, no further action regarding the Second Quarter 2008 total cobalt concentration detected in plume monitoring well 7W13 is recommended at this time.

## **4.0 HWMU-10 SEMIANNUAL 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:

### **4.3 GROUNDWATER ELEVATIONS**

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 Second Quarter 2008 monitoring event are summarized in **Table 5 (Appendix C)**. As shown on the HWMU-10 Potentiometric Surface Map (**Figure 3 in Appendix D**), groundwater movement beneath the site is generally to the northeast toward the New River.

### **4.4 GROUNDWATER ANALYTICAL DATA EVALUATION**

The groundwater samples collected from the upgradient well and the point of compliance wells during the Second Quarter 2008 monitoring event were analyzed for the constituents listed in Appendix IX to 40 CFR Part 264 as presented in Appendix I of Attachment 1 of the Final Post-Closure Care Permit. The constituents detected at concentrations greater than their respective detection limits are summarized in **Table 6 (Appendix C)**. The laboratory certificates of analysis and data validation reports for HWMU-10 are included in **Appendix B**.

#### **4.4.1 40 CFR Part 264 Appendix IX Constituent Detections**

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 (Quarterly) 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.

#### **4.4.2 Comparison to Groundwater Protection Standards**

As specified in Permit Condition V.J.3.i, the Second Quarter 2008 groundwater analytical data for the upgradient well and the point of compliance wells were compared to the 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 (**Table 6 in Appendix C**). As shown on **Table 6**, none of the constituent concentrations detected in the upgradient well and in the point of compliance wells exceeded their respective GPSs.

#### **4.4.3 Comparison to Background Concentrations**

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

### **4.5 CONCLUSIONS**

Based on an evaluation of the groundwater analytical data for HWMU-10, GPSs have not been exceeded by any releases from 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.

The Appendix IX constituents chlordane and diethyl phthalate were 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 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.

## **5.0 HWMU-16 SEMIANNUAL 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 15-16, 2008

Fourth Quarter 2008:

### **5.3 GROUNDWATER ELEVATIONS**

The monitoring wells at HWMU-16 are screened entirely within either carbonate bedrock, weathered carbonate bedrock residuum, or across the residuum/bedrock interface. The static water level measurements gathered during the Second Quarter 2008 monitoring event are summarized in **Table 7 (Appendix C)**. As shown on the HWMU-16 Potentiometric Surface Map (**Figure 4 in Appendix D**), groundwater movement beneath the site is generally to the northeast.

### **5.4 GROUNDWATER ANALYTICAL DATA EVALUATION**

The groundwater samples collected from the upgradient well and the point of compliance wells during Second Quarter 2008 were analyzed for the constituents listed in Appendix IX to 40 CFR Part 264 as presented in Appendix I of Attachment 1 of the Final Post-Closure Care Permit. The groundwater samples collected from the plume monitoring wells during the Second Quarter 2008 monitoring event 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). The constituents detected in the upgradient

well and the point of compliance wells at concentrations greater than their respective detection limits are summarized in **Table 8 (Appendix C)**. The constituents detected at concentrations greater than their respective Permit-specified quantitation limits are summarized in **Table 8 (Appendix C)**. The complete laboratory certificates of analysis and data validation reports for HWMU-16 are included in **Appendix B**.

#### **5.4.1 40 CFR Part 264 Appendix IX Constituent Detections**

No additional Appendix IX constituents, which are not listed in Appendix E of Permit Attachment 5 (Unit 16 – Groundwater Compliance Monitoring (Quarterly) 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.

#### **5.4.2 Comparison to Groundwater Protection Standards**

As specified in Permit Condition V.J.4.i, the Second Quarter 2008 groundwater analytical data for the upgradient well and the point of compliance wells were compared to the 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 (**Table 8 in Appendix C**). As shown on **Table 8**, none of the constituent concentrations detected in the upgradient well and in the point of compliance wells exceeded their respective GPSs.

#### **5.4.3 Comparison to Background Concentrations**

As specified in Permit Condition V.O, the Second Quarter 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 (**Table 8**).

As shown on **Table 8**, total barium was detected in upgradient well 16C1 at a concentration of 201 µg/l and in plume monitoring wells 16-1, 16-2, 16-3, and 16-5 and spring sampling location 16SPRING at concentrations of 245 µg/l, 310 µg/l, 776 µg/l, 195 µg/l, and 319 µg/l, respectively, which exceed the site-specific background concentration of 175.4 µg/l. The total barium concentrations detected in plume monitoring locations 16-1, 16-2, 16-3, 16-5, and 16SPRING also exceeded the background concentration during previous monitoring events. However, the Second Quarter 2008 barium concentrations and the previous barium concentrations detected in the plume monitoring wells were well below the USEPA MCL for barium of 2,000 µg/l. Higher barium concentrations in downgradient plume monitoring wells relative to background at HWMU-16 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 different trace element distributions.

No other constituent concentrations detected in the plume monitoring wells exceeded their respective background concentrations.

## **5.5 CONCLUSIONS**

Based on an evaluation of the groundwater analytical data for HWMU-16, the GPSs have not been exceeded by any releases from 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.

The evaluation of the plume monitoring well data indicated that the concentration of total barium in plume monitoring locations 16-1, 16-2, 16-3, 16-5, and 16SPRING exceeded the site-specific background concentration. As stated previously, exceedances of the background concentration for barium in locations 16-1, 16-2, 16-3, 16-5, and 16SPRING 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 different trace element distributions. Therefore, no further action regarding the Second Quarter 2008 total barium concentrations detected in plume monitoring locations 16-1, 16-2, 16-3, 16-5, and 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

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**APPENDIX A**

**SUMMARY TABLES**

**SECOND QUARTER 2008 ANALYTICAL DATA – UNITS 5, 7, 10, AND 16**

# 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
<b>Antimony</b> CAS # 7440-36-0									
Second Quarter 2008	U	U	0.79 J	U	U	U	1	6	6020
<b>Arsenic</b> CAS # 7440-38-2									
Second Quarter 2008	U	U	U	U	U	U	10	50	6020
<b>Barium</b> CAS # 7440-39-3									
Second Quarter 2008	115	39.7	37.3	14.2	34.6	25.4	10	2000	6020
<b>Beryllium</b> CAS # 7440-41-7									
Second Quarter 2008	U	U	0.63 J	1.9	U	U	1	4	6020
<b>Cadmium</b> CAS # 7440-43-9									
Second Quarter 2008	U	U	U	0.56 J	0.37 J	0.23 J	1	5	6020
<b>Chromium</b> CAS # 7440-47-3									
Second Quarter 2008	U	U	3 J	7.4	U	U	5	100	6020
<b>Cobalt</b> 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
<b>Copper</b> CAS # 7440-50-8									
Second Quarter 2008	U	1.2 J	4.9 J	6.1	U	U	5	1300	6020
<b>Lead</b> CAS # 7439-92-1									
Second Quarter 2008	U	U	1.7	U	U	U	1	15	6020
<b>Mercury</b> CAS # 7439-97-6									
Second Quarter 2008	U	U	U	U	U	U	2	2	7470A
<b>Nickel</b> CAS # 7440-02-0									
Second Quarter 2008	U	U	11.6	39.5	10.5	4.4 J	10	313	6020
<b>Selenium</b> CAS # 7782-49-2									
Second Quarter 2008	U	11.2	U	U	U	U	10	50	6020
<b>Silver</b> CAS # 7440-22-4									
Second Quarter 2008	U	U	U	U	U	U	2	78.25	6020
<b>Thallium</b> CAS # 7440-28-0									
Second Quarter 2008	U	U	U	U	U	U	1	2	6020
<b>Tin</b> CAS # 7440-31-5									
Second Quarter 2008	U	U	U	U	U	U	5	-	6020
<b>Vanadium</b> CAS # 7440-62-2									
Second Quarter 2008	U	U	U	U	U	U	10	109.55	6020
<b>Zinc</b> CAS # 7440-66-6									
Second Quarter 2008	5 J	8.6 J	30.1	43.9	U	3.5 J	10	4695	6020
<b>Sulfide</b> CAS # 18496-25-8									
Second Quarter 2008	U	U	U	U	U	U	1000	-	9034
<b>Cyanide</b> CAS # 57-12-5									
Second Quarter 2008	U	U	U	U	U	U	20	-	9014
<b>Acenaphthene</b> CAS # 83-32-9									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Acenaphthylene</b> CAS # 208-96-8									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Acetone</b> CAS # 67-64-1									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	10	223.57	8260B
<b>Acetonitrile</b> CAS # 75-05-8									
Second Quarter 2008	U	U	U	U	U	U	100	-	8260B
<b>Acetophenone</b> CAS # 98-86-2									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C

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

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
<b>bis(2-Ethylhexyl)phthalate</b> CAS # 117-81-7									
Second Quarter 2008	U	U	U	U	U	U	6	10	8270C
<b>Bromobenzene</b> CAS # 108-86-1									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Bromochloromethane</b> CAS # 74-97-5									
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
<b>Bromodichloromethane</b> CAS # 75-27-4									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Bromoform</b> CAS # 75-25-2									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>4-Bromophenyl phenyl ether</b> CAS # 101-55-3									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>2-Butanone</b> CAS # 78-93-3									
Second Quarter 2008	U	U	U	U	U	U	10	691.08	8260B
<b>n-Butyl alcohol</b> CAS # 71-36-3									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	200	-	8260B
<b>tert-Butyl alcohol</b> CAS # 75-65-0									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	20	-	8260B
<b>n-Butylbenzene</b> CAS # 104-51-8									
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
<b>sec-Butylbenzene</b> CAS # 135-98-8									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>tert-Butylbenzene</b> CAS # 98-06-6									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Butyl benzyl phthalate</b> CAS # 85-68-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Carbon disulfide</b> CAS # 75-15-0									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Carbon tetrachloride</b> CAS # 56-23-5									
Second Quarter 2008	U	U	U	U	U	U	1	5	8260B
<b>Chlordane</b> CAS # 57-74-9									
Second Quarter 2008	U	U	U	U	U	U	0.25	-	8081A
<b>p-Chloroaniline</b> CAS # 106-47-8									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Chlorobenzene</b> CAS # 108-90-7									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Chlorobenzilate</b> CAS # 510-15-6									
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
<b>p-Chloro-m-cresol</b> CAS # 59-50-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Chloroethane</b> CAS # 75-00-3									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>2-Chloroethyl vinyl ether</b> CAS # 110-75-8									
Second Quarter 2008	U	U	U	U	U	U	5	-	8260B
<b>Chloroform</b> CAS # 67-66-3									
Second Quarter 2008	U	U	U	U	U	U	1	80	8260B
<b>Chloromethane</b> CAS # 74-87-3									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B

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
<b>2-Chloronaphthalene</b> CAS # 91-58-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>2-Chlorophenol</b> CAS # 95-57-8									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>4-Chlorophenyl phenyl ether</b> CAS # 7005-72-3									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Chloroprene</b> CAS # 126-99-8									
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
<b>2-Chlorotoluene</b> CAS # 95-49-8									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>4-Chlorotoluene</b> CAS # 106-43-4									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Chrysene</b> CAS # 218-01-9									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Cyclohexane</b> CAS # 110-82-7									
Second Quarter 2008	U	U	U	U	U	U	2	-	8260B
<b>2,4-Dichlorophenoxyacetic acid</b> CAS # 94-75-7									
Second Quarter 2008	U	U	U	U	U	U	5	-	8151A
<b>4,4'-DDD</b> CAS # 72-54-8									
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
<b>4,4'-DDE</b> CAS # 72-55-9									
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
<b>4,4'-DDT</b> CAS # 50-29-3									
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
<b>Diallate</b> CAS # 2303-16-4									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Dibenz(a,h)anthracene</b> CAS # 53-70-3									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Dibenzofuran</b> CAS # 132-64-9									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Dibromochloromethane</b> CAS # 124-48-1									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>1,2-Dibromo-3-chloropropane</b> CAS # 96-12-8									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>1,2-Dibromoethane</b> CAS # 106-93-4									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Di-n-butyl phthalate</b> CAS # 84-74-2									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>1,2-Dichlorobenzene</b> CAS # 95-50-1									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>1,3-Dichlorobenzene</b> CAS # 541-73-1									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>1,4-Dichlorobenzene</b> CAS # 106-46-7									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>3,3'-Dichlorobenzidine</b> CAS # 91-94-1									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>trans-1,4-Dichloro-2-butene</b> CAS # 110-57-6									
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B

See last page of this report for definitions.

Page 4 of 12

# 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
<b>Dichlorodifluoromethane</b> CAS # 75-71-8									
Second Quarter 2008	U	U	U	U	U	U	1	125.2	8260B
<b>1,1-Dichloroethane</b> CAS # 75-34-3									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>1,2-Dichloroethane</b> CAS # 107-06-2									
Second Quarter 2008	U	U	U	U	U	U	1	5	8260B
<b>1,1-Dichloroethene</b> CAS # 75-35-4									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>cis-1,2-Dichloroethene</b> CAS # 156-59-2									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>trans-1,2-Dichloroethene</b> CAS # 156-60-5									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>2,4-Dichlorophenol</b> CAS # 120-83-2									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>2,6-Dichlorophenol</b> CAS # 87-65-0									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>1,2-Dichloropropane</b> CAS # 78-87-5									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>1,3-Dichloropropane</b> CAS # 142-28-9									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>2,2-Dichloropropane</b> CAS # 594-20-7									
Second Quarter 2008	U	U	U	U J	U J	U J	1	-	8260B
<b>1,1-Dichloropropene</b> CAS # 563-58-6									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>cis-1,3-Dichloropropene</b> CAS # 10061-01-5									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>trans-1,3-Dichloropropene</b> CAS # 10061-02-6									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Dieldrin</b> CAS # 60-57-1									
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
<b>Diethyl ether</b> CAS # 60-29-7									
Second Quarter 2008	U J	U J	U J	U	U	U	12	-	8260B
<b>Diethyl phthalate</b> CAS # 84-66-2									
Second Quarter 2008	U	U	U	U	U	U	10	12,520	8270C
<b>O,O-Diethyl O-2-pyrazinyl</b> CAS # 297-97-2									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Dimethoate</b> CAS # 60-51-5									
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
<b>Dimethyl ether</b> CAS # 115-10-6									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	2	-	8260B
<b>p-(Dimethylamino)azobenzene</b> CAS # 60-11-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>7,12-Dimethylbenz[a]anthracene</b> CAS # 57-97-6									
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
<b>3,3'-Dimethylbenzidine</b> CAS # 119-93-7									
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
<b>a,a-Dimethylphenethylamine</b> CAS # 122-09-8									
Second Quarter 2008	U	U	U	U	U	U	50	-	8270C

See last page of this report for definitions.

Page 5 of 12

# 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
<b>2,4-Dimethylphenol</b> CAS # 105-67-9									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	10	-	8270C
<b>Dimethyl phthalate</b> CAS # 131-11-3									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>m-Dinitrobenzene</b> CAS # 99-65-0									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>4,6-Dinitro-o-cresol</b> CAS # 534-52-1									
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
<b>2,4-Dinitrophenol</b> CAS # 51-28-5									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>2,4-Dinitrotoluene</b> CAS # 121-14-2									
Second Quarter 2008	U	U	U	U	U	U	10	31.3	8270C
<b>2,6-Dinitrotoluene</b> CAS # 606-20-2									
Second Quarter 2008	U	U	U	U	U	U	10	15.65	8270C
<b>Dinoseb</b> CAS # 88-85-7									
Second Quarter 2008	U	U	U	U	U	U	2.5	-	8151A
<b>Di-n-octyl phthalate</b> CAS # 117-84-0									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>1,4-Dioxane</b> CAS # 123-91-1									
Second Quarter 2008	U	U	U	U	U	U	200	-	8260B
<b>Diphenylamine</b> CAS # 122-39-4									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Disulfoton</b> CAS # 298-04-4									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Endosulfan I</b> CAS # 959-98-8									
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
<b>Endosulfan II</b> CAS # 33213-65-9									
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
<b>Endosulfan sulfate</b> CAS # 1031-07-8									
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
<b>Endrin</b> CAS # 72-20-8									
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
<b>Ethyl acetate</b> CAS # 75-25-2									
Second Quarter 2008	U	U	U	U J	U J	U J	2	-	8260B
<b>Endrin aldehyde</b> CAS # 7421-93-4									
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
<b>Ethanol</b> CAS # 110-82-7									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	500	-	8260B
<b>Ethylbenzene</b> CAS # 100-41-4									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Ethyl methacrylate</b> CAS # 97-63-2									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Ethyl methanesulfonate</b> CAS # 62-50-0									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Ethylene oxide</b> CAS # 75-21-8									
Second Quarter 2008	U	U	U	U J	U J	U J	20	-	8260B
<b>Famphur</b> CAS # 52-85-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C

See last page of this report for definitions.

Page 6 of 12

# 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
<b>Fluoranthene</b> CAS # 206-44-0									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Fluorene</b> CAS # 86-73-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Heptachlor</b> CAS # 76-44-8									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	0.025	-	8081A
<b>Heptachlor epoxide</b> CAS # 1024-57-3									
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
<b>Hexachlorobenzene</b> CAS # 118-74-1									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Hexachlorobutadiene</b> CAS # 87-68-3									
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
<b>Hexachlorocyclopentadiene</b> CAS # 77-47-4									
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
<b>Hexachloroethane</b> CAS # 67-72-1									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Hexachlorophene</b> CAS # 70-30-4									
Second Quarter 2008	U	U	U	U	U	U	500	-	8270C
<b>Hexachloropropene</b> CAS # 1888-71-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>2-Hexanone</b> CAS # 591-78-6									
Second Quarter 2008	U	U	U	U	U	U	5	-	8260B
<b>Indeno[1,2,3-cd]pyrene</b> CAS # 193-39-5									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Isobutyl alcohol</b> CAS # 78-83-1									
Second Quarter 2008	U	U	U	U J	U J	U J	125	-	8260B
<b>Isodrin</b> CAS # 465-73-6									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Isophorone</b> CAS # 78-59-1									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Isopropylbenzene</b> CAS # 98-82-8									
Second Quarter 2008	U	U	U	U	U	U	200	-	8260B
<b>Isopropylether</b> CAS # 108-20-3									
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
<b>4-Isopropyltoluene</b> CAS # 99-87-6									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Isosafrole</b> CAS # 120-58-1									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Kepone</b> CAS # 143-50-0									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Methacrylonitrile</b> CAS # 126-98-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8260B
<b>Methapyrilene</b> CAS # 91-80-5									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Methoxychlor</b> CAS # 72-43-5									
Second Quarter 2008	U	U	U	U	U	U	0.025	-	8081A
<b>Bromomethane</b> CAS # 74-83-9									
Second Quarter 2008	U J	U J	U J	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
<b>3-Methylcholanthrene</b> CAS # 56-49-5									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Iodomethane</b> CAS # 74-88-4									
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
<b>Methyl methacrylate</b> CAS # 80-62-6									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Methyl methane sulfonate</b> CAS # 66-27-3									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>2-Methylnaphthalene</b> CAS # 91-57-6									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Methyl parathion</b> CAS # 298-00-0									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>4-Methyl-2-pentanone</b> CAS # 108-10-1									
Second Quarter 2008	U	U	U	U	U	U	5	-	8260B
<b>2-Methylphenol</b> CAS # 95-48-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>3 &amp; 4-Methylphenol</b> CAS # 106-44-5									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Methyl tert-butyl ether</b> CAS # 1634-04-4									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Dibromomethane</b> CAS # 74-95-3									
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
<b>Methylene chloride</b> CAS # 75-09-2									
Second Quarter 2008	U	U	U	U	U	U	1	5	8260B
<b>Naphthalene</b> CAS # 91-20-3									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	1	-	8260B
<b>1,4-Naphthoquinone</b> CAS # 130-15-4									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>1-Naphthylamine</b> CAS # 134-32-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>2-Naphthylamine</b> CAS # 91-59-8									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>o-Nitroaniline</b> CAS # 88-74-4									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>m-Nitroaniline</b> CAS # 99-09-2									
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
<b>p-Nitroaniline</b> CAS # 100-01-6									
Second Quarter 2008	U	U	U	U	U	U	20	20	8270C
<b>Nitrobenzene</b> CAS # 98-95-3									
Second Quarter 2008	U	U	U	U	U	U	10	10	8270C
<b>o-Nitrophenol</b> CAS # 88-75-5									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>p-Nitrophenol</b> CAS # 100-02-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>4-Nitroquinoline-1-oxide</b> CAS # 56-57-5									
Second Quarter 2008	U	U	U	U	U	U	50	-	8270C
<b>N-Nitrosodi-n-butylamine</b> CAS # 924-16-3									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C

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
<b>N-Nitrosodiethylamine</b> CAS # 55-18-5									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>N-Nitrosodimethylamine</b> CAS # 62-75-9									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>N-Nitrosodiphenylamine</b> CAS # 86-30-6									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>N-Nitrosodipropylamine</b> CAS # 621-64-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>N-Nitrosomethylethylamine</b> CAS # 10595-95-6									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>N-Nitrosomorpholine</b> CAS # 59-89-2									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>N-Nitrosopiperidine</b> CAS # 100-75-4									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>N-Nitrosopyrrolidine</b> CAS # 930-55-2									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>5-Nitroso-o-toluidine</b> CAS # 99-55-8									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Parathion</b> CAS # 56-38-2									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Pentachlorobenzene</b> CAS # 608-93-5									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Pentachloroethane</b> CAS # 76-01-7									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	1	-	8260B
<b>Pentachloronitrobenzene</b> CAS # 82-68-8									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Pentachlorophenol</b> CAS # 87-86-5									
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
<b>Phenacetin</b> CAS # 62-44-2									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Phenanthrene</b> CAS # 85-01-8									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Phenol</b> CAS # 108-95-2									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Total Recoverable Phenolics</b> CAS # C-020									
Second Quarter 2008	U	U	U	U	U	U	5	-	9065
<b>Phorate</b> CAS # 298-02-2									
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
<b>2-Picoline</b> CAS # 109-06-8									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Pronamide</b> CAS # 23950-58-5									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>1-Propanol</b> CAS # 71-23-8									
Second Quarter 2008	U J	U J	U J	U	U	U	1000	-	8260B
<b>2-Propanol</b> CAS # 67-63-0									
Second Quarter 2008	U	U	U	U	U	U	1000	-	8260B
<b>Propionitrile</b> CAS # 107-12-0									
Second Quarter 2008	U J	U J	U J	U	U	U	10	-	8260B

See last page of this report for definitions.

Page 9 of 12

# 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
<b>n-Propylbenzene</b> CAS # 103-65-1									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Pyrene</b> CAS # 129-00-0									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Pyridine</b> CAS # 110-86-1									
Second Quarter 2008	U	U	U	U	U	U	20	-	8270C
<b>Safrole</b> CAS # 94-59-7									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Silvex</b> CAS # 93-72-1									
Second Quarter 2008	U	U	U	U	U	U	2.5	-	8151A
<b>Styrene</b> CAS # 100-42-5									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Sulfotep</b> CAS # 3689-24-5									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>2,4,5-Trichlorophenoxyacetic acid</b> CAS # 93-76-5									
Second Quarter 2008	U	U	U	U	U	U	2.5	-	8151A
<b>1,2,4,5-Tetrachlorobenzene</b> CAS # 95-94-3									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>1,1,1,2-Tetrachloroethane</b> CAS # 630-20-6									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>1,1,2,2-Tetrachloroethane</b> CAS # 79-34-5									
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
<b>Tetrachloroethene</b> CAS # 127-18-4									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	1	5	8260B
<b>Tetrahydrofuran</b> CAS # 109-99-9									
Second Quarter 2008	U	U	U	U	U	U	5	-	8260B
<b>2,3,4,6-Tetrachlorophenol</b> CAS # 58-90-2									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Toluene</b> CAS # 108-88-3									
Second Quarter 2008	U J	U J	U J	U	U	U	1	1000	8260B
<b>o-Toluidine</b> CAS # 95-53-4									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Toxaphene</b> CAS # 8001-35-2									
Second Quarter 2008	U	U	U	U	U	U	1	-	8081A
<b>1,2,3-Trichlorobenzene</b> CAS # 87-61-6									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	1	-	8260B
<b>1,2,4-Trichlorobenzene</b> CAS # 120-82-1									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>1,1,1-Trichloroethane</b> CAS # 71-55-6									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>1,1,2-Trichloroethane</b> CAS # 79-00-5									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>Trichloroethene</b> CAS # 79-01-6									
Second Quarter 2008	U	7.8	U	U	2.7	2.9	1	5	8260B
<b>Trichlorofluoromethane</b> CAS # 75-69-4									
Second Quarter 2008	U J	U J	U J	U	U	U	1	-	8260B
<b>2,4,5-Trichlorophenol</b> CAS # 95-95-4									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C

See last page of this report for definitions.

Page 10 of 12

# 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
<b>2,4,6-Trichlorophenol</b> CAS # 88-06-2									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>1,2,3-Trichloropropane</b> CAS # 96-18-4									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>1,1,2-Trichloro-1,2,2-Trifluoroethane</b> CAS # 76-13-1									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>O,O,O-Triethyl phosphorothioate</b> CAS # 126-68-1									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>1,2,4-Trimethylbenzene</b> CAS # 95-63-6									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>1,3,5-Trimethylbenzene</b> CAS # 108-67-8									
Second Quarter 2008	U	U	U	U	U	U	1	-	8260B
<b>sym-Trinitrobenzene</b> CAS # 99-35-4									
Second Quarter 2008	U	U	U	U	U	U	10	-	8270C
<b>Vinyl acetate</b> CAS # 108-05-4									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	5	-	8260B
<b>Vinyl chloride</b> CAS # 75-01-4									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	1	-	8260B
<b>Xylenes (Total)</b> CAS # 1330-20-7									
Second 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
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#### 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 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.

**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
<b>Antimony</b> CAS #7440-36-0									
Second Quarter 2008	U	U	U	U	U	U	1	3	6020
<b>Arsenic</b> CAS #7440-38-2									
Second Quarter 2008	U	U	U	U	U	U	10	1	6020
<b>Barium</b> CAS #7440-39-3									
Second Quarter 2008	115	61.5	52.5	108	26.6	72.8	10	172.87	6020
<b>Beryllium</b> CAS #7440-41-7									
Second Quarter 2008	U	U	U	U	U	U	1	0.7	6020
<b>Cadmium</b> CAS #7440-43-9									
Second Quarter 2008	U	U	U	U	U	U	1	1.45	6020
<b>Chromium</b> CAS #7440-47-3									
Second Quarter 2008	U	U	U	U	U	U	5	5	6020
<b>Cobalt</b> CAS #7440-48-4									
Second Quarter 2008	1.3 J	U	U	U	U	U	5	7	6020
<b>Copper</b> CAS #7440-50-8									
Second Quarter 2008	U	U	U	U	U	U	5	18	6020
<b>Lead</b> CAS #7439-92-1									
Second Quarter 2008	U	U	U	U	U	1.1	1	10	6020
<b>Mercury</b> CAS #7439-97-6									
Second Quarter 2008	U	U	U	U	U	U	2	0.9	7470A
<b>Nickel</b> CAS #7440-02-0									
Second Quarter 2008	U	U	U	U	U	U	10	106	6020
<b>Selenium</b> CAS #7782-49-2									
Second Quarter 2008	U	U	U	U	U	U	10	1	6020
<b>Silver</b> CAS #7440-22-4									
Second Quarter 2008	U	U	U	U	U	U	2	2.3	6020
<b>Thallium</b> CAS #7440-28-0									
Second Quarter 2008	U	U	U	U	U	U	1	2	6020
<b>Vanadium</b> CAS #7440-62-2									
Second Quarter 2008	U	U	U	U	U	U	10	17	6020
<b>Zinc</b> CAS #7440-66-6									
Second Quarter 2008	5 J	U	U	U	U	U	10	75	6020
<b>Acetone</b> CAS #67-64-1									
Second Quarter 2008	U J	U J	U J	U J	U J	U J	10	89	8260B
<b>bis(2-Ethylhexyl)phthalate</b> CAS #117-81-7									
Second Quarter 2008	U	U	U	U	U	U	6	10	8270C
<b>2-Butanone</b> CAS #78-93-3									
Second Quarter 2008	U	U	U J	U J	U	U	10	21.3	8260B
<b>Chloroform</b> CAS #67-66-3									
Second Quarter 2008	U	U	U J	U J	U	U	1	0.5	8260B
<b>Dichlorodifluoromethane</b> CAS #75-71-8									
Second Quarter 2008	U	U	U J	U J	U	U	1	1	8260B
<b>1,2-Dichloroethane</b> CAS #107-06-2									
Second Quarter 2008	U	U	U	U	U	U	1	0.1	8260B
<b>Diethyl ether</b> CAS #60-29-7									
Second Quarter 2008	U J	U J	U	U	U J	U J	12	12	8260B
<b>Diethyl phthalate</b> CAS #84-66-2									
Second Quarter 2008	U	U	U	U	U	U	10	5	8270C
<b>2,4-Dinitrotoluene</b> CAS #121-14-2									
Second Quarter 2008	U	U	U	U	U	U	10	0.18	8270C

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
<b>2,6-Dinitrotoluene</b> CAS #606-20-2									
Second Quarter 2008	U	U	U	U	U	U	10	0.08	8270C
<b>Methylene chloride</b> CAS #75-09-2									
Second Quarter 2008	U	U	U	U	U	U	1	0.7	8260B
<b>o-Nitroaniline</b> CAS #88-74-4									
Second Quarter 2008	U	U	U	U	U	U	10	20	8270C
<b>p-Nitroaniline</b> CAS #100-01-6									
Second Quarter 2008	U	U	U	U	U	U	20	20	8270C
<b>Nitrobenzene</b> CAS #98-95-3									
Second Quarter 2008	U	U	U	U	U	U	10	10	8270C
<b>Toluene</b> CAS #108-88-3									
Second Quarter 2008	U J	U J	U	U	U J	U J	1	0.1	8260B
<b>Trichloroethene</b> CAS #79-01-6									
Second Quarter 2008	U	U	U	U	U	U	1	0.8	8260B
<b>Xylenes (Total)</b> CAS #1330-20-7									
Second Quarter 2008	U	U	U	U	U	U	3	0.1	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 quantitation 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.

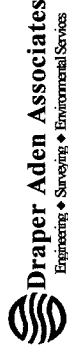
**NS** denotes not sampled.

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

# Comprehensive Data Validation Report

## Sample/Blind Field Duplicate Results Greater Than the Quantitation Limit

### Facility: HWMU-5 Monitoring Event: Second Quarter 2008



Analyte	Sample ID	Laboratory Result (ug/L)	Validated Result (ug/L)	Q	QL (ug/L)	Validation Notes
Method: 6020						
Laboratory: CompuChem, Cary, NC						
Barium	5WC21	14.2	14.2		10	No action taken.
	5WDUP	13.9	13.9		10	Blind field duplicate for 5WC21. No action taken.
Beryllium	5WC21	1.9	1.9		1	No action taken.
	5WDUP	1.8	1.8		1	Blind field duplicate for 5WC21. No action taken.
Chromium	5WC21	7.4	7.4		5	No action taken.
	5WDUP	7.3	7.3		5	Blind field duplicate for 5WC21. No action taken.
Cobalt	5WC21	62.7	62.7	J	5	No action taken. RPD <10%. Result estimated -ICP Serial dilution >10% (21).
	5WDUP	61.5	61.5	J	5	Blind field duplicate for 5WC21. Sample/field duplicate RPD <10%. Result estimated -ICP Serial dilution >10% (21).
Copper	5WC21	6.1	6.1		5	No action taken.
	5WDUP	6	6		5	Blind field duplicate for 5WC21. No action taken.
Nickel	5WC21	39.5	39.5		10	No action taken.
	5WDUP	38.4	38.4		10	Blind field duplicate for 5WC21. No action taken.
Zinc	5WC21	43.9	43.9		10	No action taken.
	5WDUP	42.6	42.6		10	Blind field duplicate for 5WC21. No action taken.

#### Definitions:

##### Data Validation Qualifiers:

QL Denotes permit quantitation limit. Q Denotes data qualifier.

J Denotes analyte reported at or above quantitation limit and associated result is estimated.

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

Analyte/Quarter	7W12B Q	7MW6 Q	7WCA Q	7W11B Q	QL	GPS	Background	Method
<b>Antimony</b>	CAS # 7440-36-0							
Second Quarter 2008	U	U	U	U N	1	8	1	6020
<b>Arsenic</b>	CAS # 7440-38-2							
Second Quarter 2008	U	U	U	U	10	10	10	6020
<b>Barium</b>	CAS # 7440-39-3							
Second Quarter 2008	39.7	21.4	28.6	45	10	2000	41	6020
<b>Beryllium</b>	CAS # 7440-41-7							
Second Quarter 2008	U	U	U	U	1	-		6020
<b>Cadmium</b>	CAS # 7440-43-9							
Second Quarter 2008	U	U	U	U	1	5	1	6020
<b>Chromium</b>	CAS # 7440-47-3							
Second Quarter 2008	8.5	U	U	U	5	100	9.9	6020
<b>Cobalt</b>	CAS # 7440-48-4							
Second Quarter 2008	U	U	5.8	U	5	158.65	5	6020
<b>Copper</b>	CAS # 7440-50-8							
Second Quarter 2008	1.7 J	U	1.6 J	2.2 J	5	1300	5	6020
<b>Lead</b>	CAS # 7439-92-1							
Second Quarter 2008	U	U	0.21 J	U	1	15	1	6020
<b>Mercury</b>	CAS # 7439-97-6							
Second Quarter 2008	U	U	U	U	0.2	2	2	7470A
<b>Nickel</b>	CAS # 7440-02-0							
Second Quarter 2008	U	U	15.8	2.1 J	10	313	10	6020
<b>Selenium</b>	CAS # 7782-49-2							
Second Quarter 2008	U	U	U	U	10	50	10	6020
<b>Silver</b>	CAS # 7440-22-4							
Second Quarter 2008	U	U	U	U	2	78.25	2	6020
<b>Thallium</b>	CAS # 7440-28-0							
Second Quarter 2008	U	U	U	U	1	2	1	6020
<b>Tin</b>	CAS # 7440-31-5							
Second Quarter 2008	U	U	U	U	5	-		6020
<b>Vanadium</b>	CAS # 7440-62-2							
Second Quarter 2008	U	U	U	U	10	-		6020
<b>Zinc</b>	CAS # 7440-66-6							
Second Quarter 2008	7.5 J	8.6 J	6.7 J	4.9 J	10	4695	10.9	6020
<b>Sulfide</b>	CAS # 18496-25-8							
Second Quarter 2008	U	U	U	U	1000	-		9034
<b>Cyanide</b>	CAS # 57-12-5							
Second Quarter 2008	U	U	U	U	20	200	20	9010B
<b>Acenaphthene</b>	CAS # 83-32-9							
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Acenaphthylene</b>	CAS # 208-96-8							
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Acetone</b>	CAS # 67-64-1							
Second Quarter 2008	U	U	U	U	5	-		8260B
<b>Acetonitrile</b>	CAS # 75-05-8							
Second Quarter 2008	U	U	U	U	100	-		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.

Analyte/Quarter	7W12B Q	7MW6 Q	7WCA Q	7W11B Q	QL	GPS	Background	Method
<b>Acetophenone</b>							CAS #	98-86-2
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>2-Acetylaminofluorene</b>							CAS #	53-96-3
Second Quarter 2008	U J	U J	U J	U J	30	-		8270C
<b>Acrolein</b>							CAS #	107-02-8
Second Quarter 2008	U J	U J	U J	U J	10	-		8260B
<b>Acrylonitrile</b>							CAS #	107-13-1
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Aldrin</b>							CAS #	309-00-2
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>Allyl chloride</b>							CAS #	107-05-1
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>4-Aminobiphenyl</b>							CAS #	92-67-1
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Aniline</b>							CAS #	62-53-3
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Anthracene</b>							CAS #	120-12-7
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Aramite</b>							CAS #	140-57-8
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Benzene</b>							CAS #	71-43-2
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Benzo[a]anthracene</b>							CAS #	56-55-3
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Benzo[b]fluoranthene</b>							CAS #	205-99-2
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Benzo[k]fluoranthene</b>							CAS #	207-08-9
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Benzo[ghi]perylene</b>							CAS #	191-24-2
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Benzo(a)pyrene</b>							CAS #	50-32-8
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>1,4-Benzenediamine</b>							CAS #	106-50-3
Second Quarter 2008	U	U	U	U	50	-		8270C
<b>Benzyl alcohol</b>							CAS #	100-51-6
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>alpha-BHC</b>							CAS #	319-84-6
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>beta-BHC</b>							CAS #	319-85-7
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>delta-BHC</b>							CAS #	319-86-8
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>gamma-BHC</b>							CAS #	58-89-9
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>bis(2-Chloroethoxy)methane</b>							CAS #	111-91-1
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.

Analyte/Quarter	7W12B Q	7MW6 Q	7WCA Q	7W11B Q	QL	GPS	Background	Method
<b>bis(2-Chloroethyl)ether</b>							CAS #	111-44-4
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>bis(2-Chloro-1-methylethyl)ether</b>							CAS #	108-60-1
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>bis(2-Ethylhexyl)phthalate</b>							CAS #	117-81-7
Second Quarter 2008	U	U	U	U	6	6	6	8270C
<b>Bromobenzene</b>							CAS #	108-86-1
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Bromochloromethane</b>							CAS #	74-97-5
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Bromodichloromethane</b>							CAS #	75-27-4
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Bromoform</b>							CAS #	75-25-2
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>4-Bromophenyl phenyl ether</b>							CAS #	101-55-3
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>n-Butyl alcohol</b>							CAS #	71-36-3
Second Quarter 2008	U	U	U	U	200	-		8260B
<b>tert-Butyl alcohol</b>							CAS #	75-65-0
Second Quarter 2008	U J	U J	U J	U J	20	-		8260B
<b>n-Butylbenzene</b>							CAS #	104-51-8
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>sec-Butylbenzene</b>							CAS #	135-98-8
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>tert-Butylbenzene</b>							CAS #	98-06-6
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Butyl benzyl phthalate</b>							CAS #	85-68-7
Second Quarter 2008	U	U	U	U	10	3130	10	8270C
<b>Carbon disulfide</b>							CAS #	75-15-0
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Carbon tetrachloride</b>							CAS #	56-23-5
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Chlordane</b>							CAS #	57-74-9
Second Quarter 2008	U	U	U	U	0.25	-		8081A
<b>p-Chloroaniline</b>							CAS #	106-47-8
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Chlorobenzene</b>							CAS #	108-90-7
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Chlorobenzilate</b>							CAS #	510-15-6
Second Quarter 2008	U	U	U	U	20	-		8270C
<b>p-Chloro-m-cresol</b>							CAS #	59-50-7
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Chloroethane</b>							CAS #	75-00-3
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Chloroform</b>							CAS #	67-66-3
Second Quarter 2008	U	1.5	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.

Analyte/Quarter	7W12B Q	7MW6 Q	7WCA Q	7W11B Q	QL	GPS	Background	Method
<b>2-Chloroethyl vinyl ether</b>							CAS #	110-75-8
Second Quarter 2008	U J	U J	U J	U J	5	-		8260B
<b>2-Chloronaphthalene</b>							CAS #	91-58-7
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>2-Chlorophenol</b>							CAS #	95-57-8
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>4-Chlorophenyl phenyl ether</b>							CAS #	7005-72-3
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Chloroprene</b>							CAS #	126-99-8
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>2-Chlorotoluene</b>							CAS #	95-49-8
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>4-Chlorotoluene</b>							CAS #	106-43-4
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Chrysene</b>							CAS #	218-01-9
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Cyclohexane</b>							CAS #	110-82-7
Second Quarter 2008	U	U	U	U	2	-		8260B
<b>2,4-Dichlorophenoxyacetic acid</b>							CAS #	94-75-7
Second Quarter 2008	U	U	U	U	5	-		8151
<b>4,4'-DDD</b>							CAS #	72-54-8
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>4,4'-DDE</b>							CAS #	72-55-9
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>4,4'-DDT</b>							CAS #	50-29-3
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>Diallate</b>							CAS #	2303-16-4
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Dibenz(a,h)anthracene</b>							CAS #	53-70-3
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Dibenzofuran</b>							CAS #	132-64-9
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Dibromochloromethane</b>							CAS #	124-48-1
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,2-Dibromo-3-chloropropane</b>							CAS #	96-12-8
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,2-Dibromoethane</b>							CAS #	106-93-4
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Di-n-butyl phthalate</b>							CAS #	84-74-2
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>1,2-Dichlorobenzene</b>							CAS #	95-50-1
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,3-Dichlorobenzene</b>							CAS #	541-73-1
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,4-Dichlorobenzene</b>							CAS #	106-46-7
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.

Analyte/Quarter	7W12B Q	7MW6 Q	7WCA Q	7W11B Q	QL	GPS	Background	Method
<b>3,3'-Dichlorobenzidine</b>							CAS #	91-94-1
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>trans-1,4-Dichloro-2-butene</b>							CAS #	110-57-6
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Dichlorodifluoromethane</b>							CAS #	75-71-8
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,1-Dichloroethane</b>							CAS #	75-34-3
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,2-Dichloroethane</b>							CAS #	107-06-2
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,1-Dichloroethene</b>							CAS #	75-35-4
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>cis-1,2-Dichloroethene</b>							CAS #	156-59-2
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>trans-1,2-Dichloroethene</b>							CAS #	156-60-5
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>2,4-Dichlorophenol</b>							CAS #	120-83-2
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>2,6-Dichlorophenol</b>							CAS #	87-65-0
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>1,2-Dichloropropane</b>							CAS #	78-87-5
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,3-Dichloropropane</b>							CAS #	142-28-9
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>2,2-Dichloropropane</b>							CAS #	594-20-7
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,1-Dichloropropene</b>							CAS #	563-58-6
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>cis-1,3-Dichloropropene</b>							CAS #	10061-01-5
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>trans-1,3-Dichloropropene</b>							CAS #	10061-02-6
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Dieldrin</b>							CAS #	60-57-1
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>Diethyl ether</b>							CAS #	60-29-7
Second Quarter 2008	U	U	U	U	2	-		8260B
<b>Diethyl phthalate</b>							CAS #	84-66-2
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>O,O-Diethyl O-2-pyrazinyl</b>							CAS #	297-97-2
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Dimethoate</b>							CAS #	60-51-5
Second Quarter 2008	U	U	U	U	20	-		8270C
<b>Dimethyl ether</b>							CAS #	115-10-6
Second Quarter 2008	U	U	U	U	2	-		8260B
<b>p-(Dimethylamino)azobenzene</b>							CAS #	60-11-7
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.

Analyte/Quarter	7W12B Q	7MW6 Q	7WCA Q	7W11B Q	QL	GPS	Background	Method
<b>7,12-Dimethylbenz[a]anthracene</b>							CAS #	57-97-6
Second Quarter 2008	U	U	U	U	20	-		8270C
<b>3,3'-Dimethylbenzidine</b>							CAS #	119-93-7
Second Quarter 2008	U	U	U	U	20	-		8270C
<b>a,a-Dimethylphenethylamine</b>							CAS #	122-09-8
Second Quarter 2008	U	U	U	U	50	-		8270C
<b>2,4-Dimethylphenol</b>							CAS #	105-67-9
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Dimethyl phthalate</b>							CAS #	131-11-3
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>m-Dinitrobenzene</b>							CAS #	99-65-0
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>4,6-Dinitro-o-cresol</b>							CAS #	534-52-1
Second Quarter 2008	U	U	U	U	20	-		8270C
<b>2,4-Dinitrophenol</b>							CAS #	51-28-5
Second Quarter 2008	U	U	U	U	10	31.3	10	8270C
<b>2,4-Dinitrotoluene</b>							CAS #	121-14-2
Second Quarter 2008	U	U	1.2 J	U	10	31.3	10	8270C
<b>2,6-Dinitrotoluene</b>							CAS #	606-20-2
Second Quarter 2008	U	U	U	U	10	15.65	10	8270C
<b>Dinoseb</b>							CAS #	88-85-7
Second Quarter 2008	U	U	U	U	2.5	-		8151
<b>Di-n-octyl phthalate</b>							CAS #	117-84-0
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>1,4-Dioxane</b>							CAS #	123-91-1
Second Quarter 2008	U	U	U	U	200	-		8260B
<b>Diphenylamine</b>							CAS #	122-39-4
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Disulfoton</b>							CAS #	298-04-4
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Endosulfan I</b>							CAS #	959-98-8
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>Endosulfan II</b>							CAS #	33213-65-9
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>Endosulfan sulfate</b>							CAS #	1031-07-8
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>Endrin</b>							CAS #	72-20-8
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>Ethyl acetate</b>							CAS #	141-78-6
Second Quarter 2008	U J	U J	U J	U J	2	-		8260B
<b>Endrin aldehyde</b>							CAS #	7421-93-4
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>Ethanol</b>							CAS #	64-17-5
Second Quarter 2008	U	U	U	U	200	-		8260B
<b>Ethylbenzene</b>							CAS #	100-41-4
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.

Analyte/Quarter	7W12B Q	7MW6 Q	7WCA Q	7W11B Q	QL	GPS	Background	Method
<b>Ethyl methacrylate</b>							CAS #	97-63-2
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Ethyl methanesulfonate</b>							CAS #	62-50-0
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Ethylene oxide</b>							CAS #	75-21-8
Second Quarter 2008	U	U	U	U	20	-		8260B
<b>Famphur</b>							CAS #	52-85-7
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Fluoranthene</b>							CAS #	206-44-0
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Fluorene</b>							CAS #	86-73-7
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Heptachlor</b>							CAS #	76-44-8
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>Heptachlor epoxide</b>							CAS #	1024-57-3
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>Hexachlorobenzene</b>							CAS #	118-74-1
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Hexachlorobutadiene</b>							CAS #	87-68-3
Second Quarter 2008	U J	U J	U J	U J	1	-		8260B
<b>Hexachlorocyclopentadiene</b>							CAS #	77-47-4
Second Quarter 2008	U J	U J	U J	U J	20	-		8270C
<b>Hexachloroethane</b>							CAS #	67-72-1
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Hexachlorophene</b>							CAS #	70-30-4
Second Quarter 2008	U	U	U	U	500	-		8270C
<b>Hexachloropropene</b>							CAS #	1888-71-7
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>2-Hexanone</b>							CAS #	591-78-6
Second Quarter 2008	U	U	U	U	5	-		8260B
<b>Indeno[1,2,3-cd]pyrene</b>							CAS #	193-39-5
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Isobutyl alcohol</b>							CAS #	78-83-1
Second Quarter 2008	U J	U J	U J	U J	125	-		8260B
<b>Isodrin</b>							CAS #	465-73-6
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Isophorone</b>							CAS #	78-59-1
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Isopropylbenzene</b>							CAS #	98-82-8
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Isopropylether</b>							CAS #	108-20-3
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>4-Isopropyltoluene</b>							CAS #	99-87-6
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Isosafrole</b>							CAS #	120-58-1
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.

Analyte/Quarter	7W12B Q	7MW6 Q	7WCA Q	7W11B Q	QL	GPS	Background	Method
<b>Kepone</b>							CAS #	143-50-0
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Methacrylonitrile</b>							CAS #	126-98-7
Second Quarter 2008	U	U	U	U	10	-		8260B
<b>Methapyrilene</b>							CAS #	91-80-5
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Methoxychlor</b>							CAS #	72-43-5
Second Quarter 2008	U	U	U	U	0.025	-		8081A
<b>Bromomethane</b>							CAS #	74-83-9
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Chloromethane</b>							CAS #	74-87-3
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>3-Methylcholanthrene</b>							CAS #	56-49-5
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>2-Butanone</b>							CAS #	78-93-3
Second Quarter 2008	U	U	U	U	5	-		8260B
<b>Iodomethane</b>							CAS #	74-88-4
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Methyl methacrylate</b>							CAS #	80-62-6
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Methyl methane sulfonate</b>							CAS #	66-27-3
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>2-Methylnaphthalene</b>							CAS #	91-57-6
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Methyl parathion</b>							CAS #	298-00-0
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>4-Methyl-2-pentanone</b>							CAS #	108-10-1
Second Quarter 2008	U	U	U	U	5	-		8260B
<b>2-Methylphenol</b>							CAS #	95-48-7
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>3 &amp; 4-Methylphenol</b>							CAS #	106-44-5
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Methyl tert-butyl ether</b>							CAS #	1634-04-4
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Dibromomethane</b>							CAS #	74-95-3
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Methylene chloride</b>							CAS #	75-09-2
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Naphthalene</b>							CAS #	91-20-3
Second Quarter 2008	U J	U J	U J	U J	1	-		8260B
<b>1,4-Naphthoquinone</b>							CAS #	130-15-4
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>1-Naphthylamine</b>							CAS #	134-32-7
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>2-Naphthylamine</b>							CAS #	91-59-8
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.

Analyte/Quarter	7W12B Q	7MW6 Q	7WCA Q	7W11B Q	QL	GPS	Background	Method
<b>o-Nitroaniline</b>							CAS #	88-74-4
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>m-Nitroaniline</b>							CAS #	99-09-2
Second Quarter 2008	U	U	U	U	20	-		8270C
<b>p-Nitroaniline</b>							CAS #	100-01-6
Second Quarter 2008	U J	U J	U J	U J	20	-		8270C
<b>Nitrobenzene</b>							CAS #	98-95-3
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>o-Nitrophenol</b>							CAS #	88-75-5
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>p-Nitrophenol</b>							CAS #	100-02-7
Second Quarter 2008	U	U	U	U	10	50	20	8270C
<b>4-Nitroquinoline-1-oxide</b>							CAS #	56-57-5
Second Quarter 2008	U	U	U	U	50	-		8270C
<b>N-Nitrosodi-n-butylamine</b>							CAS #	924-16-3
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>N-Nitrosodiethylamine</b>							CAS #	55-18-5
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>N-Nitrosodimethylamine</b>							CAS #	62-75-9
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>N-Nitrosodiphenylamine</b>							CAS #	86-30-6
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>N-Nitrosodipropylamine</b>							CAS #	621-64-7
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>N-Nitrosomethylethylamine</b>							CAS #	10595-95-6
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>N-Nitrosomorpholine</b>							CAS #	59-89-2
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>N-Nitrosopiperidine</b>							CAS #	100-75-4
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>N-Nitrosopyrrolidine</b>							CAS #	930-55-2
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>5-Nitroso-o-toluidine</b>							CAS #	99-55-8
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Parathion</b>							CAS #	56-38-2
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Pentachlorobenzene</b>							CAS #	608-93-5
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Pentachloroethane</b>							CAS #	76-01-7
Second Quarter 2008	U J	U J	U J	U J	1	-		8260B
<b>Pentachloronitrobenzene</b>							CAS #	82-68-8
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Pentachlorophenol</b>							CAS #	87-86-5
Second Quarter 2008	U	U	U	U	20	-		8270C
<b>Phenacetin</b>							CAS #	62-44-2
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.

Analyte/Quarter	7W12B Q	7MW6 Q	7WCA Q	7W11B Q	QL	GPS	Background	Method
<b>Phenanthrene</b>							CAS #	85-01-8
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Phenol</b>							CAS #	108-95-2
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Total Recoverable Phenolics</b>							CAS #	C-020
Second Quarter 2008	U	U	U	U	5	-		9065
<b>Phorate</b>							CAS #	298-02-2
Second Quarter 2008	U	U	U	U	20	-		8270C
<b>2-Picoline</b>							CAS #	109-06-8
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Pronamide</b>							CAS #	23950-58-5
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>1-Propanol</b>							CAS #	71-23-8
Second Quarter 2008	U	U	U	U	1000	-		8260B
<b>2-Propanol</b>							CAS #	67-63-0
Second Quarter 2008	U	U	U	U	1000	-		8260B
<b>Propionitrile</b>							CAS #	107-12-0
Second Quarter 2008	U	U	U	U	10	-		8260B
<b>n-Propylbenzene</b>							CAS #	103-65-1
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Pyrene</b>							CAS #	129-00-0
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Pyridine</b>							CAS #	110-86-1
Second Quarter 2008	U	U	U	U	20	-		8270C
<b>Safrole</b>							CAS #	94-59-7
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Silvex</b>							CAS #	93-72-1
Second Quarter 2008	U	U	U	U	2.5	-		8151
<b>Styrene</b>							CAS #	100-42-5
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Sulfotep</b>							CAS #	3689-24-5
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>2,4,5-Trichlorophenoxyacetic acid</b>							CAS #	93-76-5
Second Quarter 2008	U	U	U	U	2.5	-		8151
<b>1,2,4,5-Tetrachlorobenzene</b>							CAS #	95-94-3
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>1,1,1,2-Tetrachloroethane</b>							CAS #	630-20-6
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,1,2,2-Tetrachloroethane</b>							CAS #	79-34-5
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Tetrachloroethene</b>							CAS #	127-18-4
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Tetrahydrofuran</b>							CAS #	109-99-9
Second Quarter 2008	U	U	U	U	5	-		8260B
<b>2,3,4,6-Tetrachlorophenol</b>							CAS #	58-90-2
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.

Analyte/Quarter	7W12B Q	7MW6 Q	7WCA Q	7W11B Q	QL	GPS	Background	Method
<b>Toluene</b>							CAS #	108-88-3
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>o-Toluidine</b>							CAS #	95-53-4
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Toxaphene</b>							CAS #	8001-35-2
Second Quarter 2008	U	U	U	U	1	-		8081A
<b>1,2,3-Trichlorobenzene</b>							CAS #	87-61-6
Second Quarter 2008	U J	U J	U J	U J	1	-		8260B
<b>1,2,4-Trichlorobenzene</b>							CAS #	120-82-1
Second Quarter 2008	U J	U J	U J	U J	1	-		8260B
<b>1,1,1-Trichloroethane</b>							CAS #	71-55-6
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,1,2-Trichloroethane</b>							CAS #	79-00-5
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Trichloroethene</b>							CAS #	79-01-6
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Trichlorofluoromethane</b>							CAS #	75-69-4
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>2,4,5-Trichlorophenol</b>							CAS #	95-95-4
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>2,4,6-Trichlorophenol</b>							CAS #	88-06-2
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>1,2,3-Trichloropropane</b>							CAS #	96-18-4
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,1,2-Trichloro-1,2,2-Trifluoroethane</b>							CAS #	76-13-1
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>O,O,O-Triethyl phosphorothioate</b>							CAS #	126-68-1
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>1,2,4-Trimethylbenzene</b>							CAS #	95-63-6
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>1,3,5-Trimethylbenzene</b>							CAS #	108-67-8
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>sym-Trinitrobenzene</b>							CAS #	99-35-4
Second Quarter 2008	U	U	U	U	10	-		8270C
<b>Vinyl acetate</b>							CAS #	108-05-4
Second Quarter 2008	U	U	U	U	5	-		8260B
<b>Vinyl chloride</b>							CAS #	75-01-4
Second Quarter 2008	U	U	U	U	1	-		8260B
<b>Xylenes (Total)</b>							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.

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

**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 #
<b>Antimony</b>										
Second Quarter 2008	U	U N	U	U	U	1	1	6	6020	7440-36-0
<b>Arsenic</b>										
Second Quarter 2008	U	U	U	U	U	10	10	10	6020	7440-38-2
<b>Barium</b>										
Second Quarter 2008	39.7	26.6	83.2	51.8	14.1	10	41	2000	6020	7440-39-3
<b>Cadmium</b>										
Second Quarter 2008	U	U	U	U	U	1	1	5	6020	7440-39-9
<b>Chromium</b>										
Second Quarter 2008	8.5	U	U	U	U	5	9.9	100	6020	7440-47-3
<b>Cobalt</b>										
Second Quarter 2008	U	U	U	U	5.8	5	5	156.65	6020	7440-48-4
<b>Copper</b>										
Second Quarter 2008	1.7 J	U	U	U	U	5	5	1300	6020	7440-50-8
<b>Lead</b>										
Second Quarter 2008	U	U	U	U	U	1	1	15	6020	7439-92-1
<b>Mercury</b>										
Second Quarter 2008	U	U	U	U	U	0.2	2	2	7470A	7439-97-6
<b>Nickel</b>										
Second Quarter 2008	U	U	U	U	U	10	10	313	6020	7440-02-0
<b>Selenium</b>										
Second Quarter 2008	U	U	U	U	U	10	10	50	6020	7782-49-2
<b>Silver</b>										
Second Quarter 2008	U	U	U	U	U	2	2	78.25	6020	7440-22-4
<b>Thallium</b>										
Second Quarter 2008	U	U	U	U	U	1	1	2	6020	7440-28-0
<b>Zinc</b>										
Second Quarter 2008	7.5 J	U	U	U	U	10	10.9	4695	6020	7440-66-6
<b>Cyanide</b>										
Second Quarter 2008	U	U	U	U	U	20	20	200	9010B	57-12-5
<b>bis(2-Ethylhexyl)phthalate</b>										
Second Quarter 2008	U	U	U J	U	U	6	6	6	8270C	117-81-7
<b>Butyl benzyl phthalate</b>										
Second Quarter 2008	U	U	U J	U	U	10	10	3130	8270C	85-68-7
<b>2,4-Dinitrophenol</b>										
Second Quarter 2008	U	U	U J	U	U	10	10	31.3	8270C	51-28-5
<b>2,4-Dinitrotoluene</b>										
Second Quarter 2008	U	U	U J	U	U	10	10	31.3	8270C	121-14-2
<b>2,6-Dinitrotoluene</b>										
Second Quarter 2008	U	U	U J	U	U	10	10	15.65	8270C	606-20-2
<b>p-Nitrophenol</b>										
Second Quarter 2008	U	U	U J	U	U	10	20	50	8270C	100-02-7

# 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 #
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#### 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 quantitation 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 2<sup>nd</sup> Quarter 2003 through 4<sup>th</sup> 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).

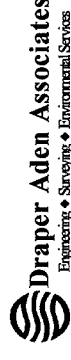
-Sept 2006: Verification sampling event for 7W12B 3Q2006 chloroform. Initial results reported in this table for chloroform (7W12B).

-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.

# Comprehensive Data Validation Report

## Sample/Blind Field Duplicate Results Greater Than the Quantitation Limit

### Facility: HWMU-7 Monitoring Event: Second Quarter 2008



Analyte	Sample ID	Laboratory Result (ug/L)	Validated Result (ug/L)	QL (ug/L)	Validation Notes
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Method: 6020

Laboratory: CompuChem, a Division of Liberty Analytical, Cary, NC

Barium	7WCA	28.6	28.6	10	No action taken.
	7WDUP	29.2	29.2	10	Blind sample duplicate for 7WCA. No action taken. RPD <10%.
Cobalt	7WCA	5.8	5.8	5	No action taken.
	7WDUP	6	6	5	Blind sample duplicate for 7WCA. No action taken. RPD <10%.
Nickel	7WCA	15.8	15.8	10	No action taken.
	7WDUP	16.3	16.3	10	Blind sample duplicate for 7WCA. No action taken. RPD <10%.

Definitions: QL Denotes permit quantitation limit. Q Denotes data qualifier. J Denotes analyte reported at or above QL limit and associated result is estimated.

# 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
<b>Antimony</b> CAS # 7440-36-0								
Second Quarter 2008	U	U	U	U	U	1	-	6020
<b>Arsenic</b> CAS # 7440-38-2								
Second Quarter 2008	U	U	U	U	U	10	50	6020
<b>Barium</b> CAS # 7440-39-3								
Second Quarter 2008	123 J	118 J	54.4 J	95.3 J	92.9 J	10	2000	6020
<b>Beryllium</b> CAS # 7440-41-7								
Second Quarter 2008	U	U	U	U	U	1	-	6020
<b>Cadmium</b> CAS # 7440-43-9								
Second Quarter 2008	U	U	U	U	U	1	-	6020
<b>Chromium</b> CAS # 7440-47-3								
Second Quarter 2008	3.5 J	1.8 J	U	4 J	2.4 J	5	100	6020
<b>Cobalt</b> CAS # 7440-48-4								
Second Quarter 2008	U	U	U	U	U	5	-	6020
<b>Copper</b> CAS # 7440-50-8								
Second Quarter 2008	1.2 J	1.1 J	U	U	U	5	1300	6020
<b>Lead</b> CAS # 7439-92-1								
Second Quarter 2008	0.38 J	U	U	U	U	1	15	6020
<b>Mercury</b> CAS # 7439-97-6								
Second Quarter 2008	U	U	U	U	U	2	2	7470A
<b>Nickel</b> CAS # 7440-02-0								
Second Quarter 2008	U	U	U	U	U	10	313	6020
<b>Selenium</b> CAS # 7782-49-2								
Second Quarter 2008	U	U	U	U	U	10	50	6020
<b>Silver</b> CAS # 7440-22-4								
Second Quarter 2008	U	U	U	U	U	2	78.25	6020
<b>Thallium</b> CAS # 7440-28-0								
Second Quarter 2008	U J	U J	U J	U J	U J	1	-	6020
<b>Tin</b> CAS # 7440-31-5								
Second Quarter 2008	U	U	U	U	U	5	-	6020
<b>Vanadium</b> CAS # 7440-62-2								
Second Quarter 2008	U	U	U	U	U	10	-	6020
<b>Zinc</b> CAS # 7440-66-6								
Second Quarter 2008	5 J	4.9 J	6.7 J	3.5 J	3.7 J	10	4695	6020
<b>Sulfide</b> CAS # 18496-25-8								
Second Quarter 2008	U	U	U	U	U	1000	-	9034
<b>Cyanide</b> CAS # 57-12-5								
Second Quarter 2008	U	U	U	U	U	20	200	9014
<b>Acenaphthene</b> CAS # 83-32-9								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Acenaphthylene</b> CAS # 208-96-8								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Acetone</b> CAS # 67-64-1								
Second Quarter 2008	U	U	18000	180 J	U	5	-	8260B
<b>Acetonitrile</b> CAS # 75-05-8								
Second Quarter 2008	U	U	U A	U	U	100	-	8260B
<b>Acetophenone</b> CAS # 98-86-2								
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
<b>2-Acetylaminofluorene</b>	CAS # 53-96-3							
Second Quarter 2008	U	U	U	U	U	30	-	8270C
<b>Acrolein</b>	CAS # 107-02-8							
Second Quarter 2008	U J	U J	U JA	U J	U J	10	-	8260B
<b>Acrylonitrile</b>	CAS # 107-13-1							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Aldrin</b>	CAS # 309-00-2							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Allyl chloride</b>	CAS # 107-05-1							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>4-Aminobiphenyl</b>	CAS # 92-67-1							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Aniline</b>	CAS # 62-53-3							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Anthracene</b>	CAS # 120-12-7							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Aramite</b>	CAS # 140-57-8							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Benzene</b>	CAS # 71-43-2							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Benzo[a]anthracene</b>	CAS # 56-55-3							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Benzo[b]fluoranthene</b>	CAS # 205-99-2							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Benzo[k]fluoranthene</b>	CAS # 207-08-9							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Benzo[ghi]perylene</b>	CAS # 191-24-2							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Benzo(a)pyrene</b>	CAS # 50-32-8							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,4-Benzenediamine</b>	CAS # 106-50-3							
Second Quarter 2008	U	U	U	U	U	50	-	8270C
<b>Benzyl alcohol</b>	CAS # 100-51-6							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>alpha-BHC</b>	CAS # 319-84-6							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>beta-BHC</b>	CAS # 319-85-7							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>delta-BHC</b>	CAS # 319-86-8							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>gamma-BHC</b>	CAS # 58-89-9							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>bis(2-Chloroethoxy)methane</b>	CAS # 111-91-1							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>bis(2-Chloroethyl)ether</b>	CAS # 111-44-4							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>bis(2-Chloro-1-methylethyl)ether</b>	CAS # 108-60-1							
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
<b>bis(2-Ethylhexyl)phthalate</b> CAS # 117-81-7								
Second Quarter 2008	U	U	U	U	U	6	-	8270C
<b>Bromobenzene</b> CAS # 108-86-1								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Bromochloromethane</b> CAS # 74-97-5								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Bromodichloromethane</b> CAS # 75-27-4								
Second Quarter 2008	U	U	U A	U	U	1	80	8260B
<b>Bromoform</b> CAS # 75-25-2								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>4-Bromophenyl phenyl ether</b> CAS # 101-55-3								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2-Butanone</b> CAS # 78-93-3								
Second Quarter 2008	U	U	U A	U	U	5	691.08	8260B
<b>n-Butyl alcohol</b> CAS # 71-36-3								
Second Quarter 2008	U	U	U A	U	U	200	-	8260B
<b>tert-Butyl alcohol</b> CAS # 75-65-0								
Second Quarter 2008	U J	U J	U JA	U J	U J	20	-	8260B
<b>n-Butylbenzene</b> CAS # 104-51-8								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>sec-Butylbenzene</b> CAS # 135-98-8								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>tert-Butylbenzene</b> CAS # 98-06-6								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Butyl benzyl phthalate</b> CAS # 85-68-7								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Carbon disulfide</b> CAS # 75-15-0								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Carbon tetrachloride</b> CAS # 56-23-5								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Chlordane</b> CAS # 57-74-9								
Second Quarter 2008	U	U	U	U	U A	0.25	-	8081A
<b>p-Chloroaniline</b> CAS # 106-47-8								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Chlorobenzene</b> CAS # 108-90-7								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Chlorobenzilate</b> CAS # 510-15-6								
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>p-Chloro-m-cresol</b> CAS # 59-50-7								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Chloroethane</b> CAS # 75-00-3								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Chloroform</b> CAS # 67-66-3								
Second Quarter 2008	17	1.5	U A	U	3.7	1	80	8260B
<b>2-Chloroethyl vinyl ether</b> CAS # 110-75-8								
Second Quarter 2008	U	U	U A	U	U	5	-	8260B
<b>2-Chloronaphthalene</b> CAS # 91-58-7								
Second Quarter 2008	U	U	U	U	U	10	-	8270C

See last page of this report for definitions.

Page 3 of 12

# 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
<b>2-Chlorophenol</b> CAS # 95-57-8								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>4-Chlorophenyl phenyl ether</b> CAS # 7005-72-3								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Chloroprene</b> CAS # 126-99-8								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>2-Chlorotoluene</b> CAS # 95-49-8								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>4-Chlorotoluene</b> CAS # 106-43-4								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Chrysene</b> CAS # 218-01-9								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Cyclohexane</b> CAS # 71-36-3								
Second Quarter 2008	U	U	U A	U	U	2	-	8260B
<b>2,4-Dichlorophenoxyacetic acid</b> CAS # 94-75-7								
Second Quarter 2008	U	U	U	U	U	5	-	8151A
<b>4,4'-DDD</b> CAS # 72-54-8								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>4,4'-DDE</b> CAS # 72-55-9								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>4,4'-DDT</b> CAS # 50-29-3								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Diallate</b> CAS # 2303-16-4								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Dibenz(a,h)anthracene</b> CAS # 53-70-3								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Dibenzofuran</b> CAS # 132-64-9								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Dibromochloromethane</b> CAS # 124-48-1								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,2-Dibromo-3-chloropropane</b> CAS # 96-12-8								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,2-Dibromoethane</b> CAS # 106-93-4								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Di-n-butyl phthalate</b> CAS # 84-74-2								
Second Quarter 2008	U	U	U	U	U N	10	-	8270C
<b>1,2-Dichlorobenzene</b> CAS # 95-50-1								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,3-Dichlorobenzene</b> CAS # 541-73-1								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,4-Dichlorobenzene</b> CAS # 106-46-7								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>3,3'-Dichlorobenzidine</b> CAS # 91-94-1								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>trans-1,4-Dichloro-2-butene</b> CAS # 110-57-6								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Dichlorodifluoromethane</b> CAS # 75-71-8								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B

See last page of this report for definitions.

Page 4 of 12

# 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
<b>1,1-Dichloroethane</b>	CAS # 75-34-3							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,2-Dichloroethane</b>	CAS # 107-06-2							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,1-Dichloroethene</b>	CAS # 75-35-4							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>cis-1,2-Dichloroethene</b>	CAS # 156-59-2							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>trans-1,2-Dichloroethene</b>	CAS # 156-60-5							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>2,4-Dichlorophenol</b>	CAS # 120-83-2							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2,6-Dichlorophenol</b>	CAS # 87-65-0							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,2-Dichloropropane</b>	CAS # 78-87-5							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,3-Dichloropropane</b>	CAS # 142-28-9							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>2,2-Dichloropropane</b>	CAS # 594-20-7							
Second Quarter 2008	U J	U J	U JA	U J	U J	1	-	8260B
<b>1,1-Dichloropropene</b>	CAS # 563-58-6							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>cis-1,3-Dichloropropene</b>	CAS # 10061-01-5							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>trans-1,3-Dichloropropene</b>	CAS # 10061-02-6							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Dieldrin</b>	CAS # 60-57-1							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Diethyl ether</b>	CAS # 60-29-7							
Second Quarter 2008	U	U	U A	U	U	2	-	8260B
<b>Diethyl phthalate</b>	CAS # 84-66-2							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>O,O-Diethyl O-2-pyrazinyl</b>	CAS # 297-97-2							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Dimethoate</b>	CAS # 60-51-5							
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>Dimethyl ether</b>	CAS # 115-10-6							
Second Quarter 2008	U	U	U A	U	U	2	-	8260B
<b>p-(Dimethylamino)azobenzene</b>	CAS # 60-11-7							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>7,12-Dimethylbenz[a]anthracene</b>	CAS # 57-97-6							
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>3,3'-Dimethylbenzidine</b>	CAS # 119-93-7							
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>a,a-Dimethylphenethylamine</b>	CAS # 122-09-8							
Second Quarter 2008	U	U	U	U	U	50	-	8270C
<b>2,4-Dimethylphenol</b>	CAS # 105-67-9							
Second Quarter 2008	U J	U J	U J	U J	U J	10	-	8270C

See last page of this report for definitions.

Page 5 of 12

# 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
<b>Dimethyl phthalate</b>	CAS # 131-11-3							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>m-Dinitrobenzene</b>	CAS # 99-65-0							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>4,6-Dinitro-o-cresol</b>	CAS # 534-52-1							
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>2,4-Dinitrophenol</b>	CAS # 51-28-5							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2,4-Dinitrotoluene</b>	CAS # 121-14-2							
Second Quarter 2008	U	U	U	U	U	10	31.3	8270C
<b>2,6-Dinitrotoluene</b>	CAS # 606-20-2							
Second Quarter 2008	U	U	U	U	U	10	15.65	8270C
<b>Dinoseb</b>	CAS # 88-85-7							
Second Quarter 2008	U	U	U	U	U	2.5	-	8151A
<b>Di-n-octyl phthalate</b>	CAS # 117-84-0							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,4-Dioxane</b>	CAS # 123-91-1							
Second Quarter 2008	U	U	U A	U	U	200	-	8260B
<b>Diphenylamine</b>	CAS # 122-39-4							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Disulfoton</b>	CAS # 298-04-4							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Endosulfan I</b>	CAS # 959-98-8							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Endosulfan II</b>	CAS # 33213-65-9							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Endosulfan sulfate</b>	CAS # 1031-07-8							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Endrin</b>	CAS # 72-20-8							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Ethyl acetate</b>	CAS # 75-25-2							
Second Quarter 2008	U	U	U A	U	U	2	-	8260B
<b>Endrin aldehyde</b>	CAS # 7421-93-4							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Ethanol</b>	CAS # 60-29-7							
Second Quarter 2008	U	U	U A	U	U	200	-	8260B
<b>Ethylbenzene</b>	CAS # 100-41-4							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Ethyl methacrylate</b>	CAS # 97-63-2							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Ethyl methanesulfonate</b>	CAS # 62-50-0							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Ethylene oxide</b>	CAS # 75-21-8							
Second Quarter 2008	U	U	U A	U	U	20	-	8260B
<b>Famphur</b>	CAS # 52-85-7							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Fluoranthene</b>	CAS # 206-44-0							
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
<b>Fluorene</b>	CAS # 86-73-7							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Heptachlor</b>	CAS # 76-44-8							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Heptachlor epoxide</b>	CAS # 1024-57-3							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Hexachlorobenzene</b>	CAS # 118-74-1							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Hexachlorobutadiene</b>	CAS # 87-68-3							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Hexachlorocyclopentadiene</b>	CAS # 77-47-4							
Second Quarter 2008	U J	U J	U J	U J	U J	20	-	8270C
<b>Hexachloroethane</b>	CAS # 67-72-1							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Hexachlorophene</b>	CAS # 70-30-4							
Second Quarter 2008	U	U	U	U	U	500	-	8270C
<b>Hexachloropropene</b>	CAS # 1888-71-7							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2-Hexanone</b>	CAS # 591-78-6							
Second Quarter 2008	U	U	U A	U	U	5	-	8260B
<b>Indeno[1,2,3-cd]pyrene</b>	CAS # 193-39-5							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Isobutyl alcohol</b>	CAS # 78-83-1							
Second Quarter 2008	U J	U J	U JA	U J	U J	125	-	8260B
<b>Isodrin</b>	CAS # 465-73-6							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Isophorone</b>	CAS # 78-59-1							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Isopropylbenzene</b>	CAS # 98-82-8							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Isopropylether</b>	CAS # 108-20-3							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>4-Isopropyltoluene</b>	CAS # 99-87-6							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Isosafrole</b>	CAS # 120-58-1							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Kepone</b>	CAS # 143-50-0							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Methacrylonitrile</b>	CAS # 126-98-7							
Second Quarter 2008	U	U	U A	U	U	10	-	8260B
<b>Methapyrilene</b>	CAS # 91-80-5							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Methoxychlor</b>	CAS # 72-43-5							
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Bromomethane</b>	CAS # 74-83-9							
Second Quarter 2008	U J	U J	U JA	U J	U J	1	-	8260B
<b>Chloromethane</b>	CAS # 74-87-3							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B

See last page of this report for definitions.

Page 7 of 12

# 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
<b>3-Methylcholanthrene</b>	CAS # 56-49-5							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Iodomethane</b>	CAS # 74-88-4							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Methyl methacrylate</b>	CAS # 80-62-6							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Methyl methane sulfonate</b>	CAS # 66-27-3							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2-Methylnaphthalene</b>	CAS # 91-57-6							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Methyl parathion</b>	CAS # 298-00-0							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>4-Methyl-2-pentanone</b>	CAS # 108-10-1							
Second Quarter 2008	U	U	U A	U	U	5	-	8260B
<b>2-Methylphenol</b>	CAS # 95-48-7							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>3 &amp; 4-Methylphenol</b>	CAS # 106-44-5							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Methyl tert-butyl ether</b>	CAS # 1634-04-4							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Dibromomethane</b>	CAS # 74-95-3							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Methylene chloride</b>	CAS # 75-09-2							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Naphthalene</b>	CAS # 91-20-3							
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,4-Naphthoquinone</b>	CAS # 130-15-4							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1-Naphthylamine</b>	CAS # 134-32-7							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2-Naphthylamine</b>	CAS # 91-59-8							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>o-Nitroaniline</b>	CAS # 88-74-4							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>m-Nitroaniline</b>	CAS # 99-09-2							
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>p-Nitroaniline</b>	CAS # 100-01-6							
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>Nitrobenzene</b>	CAS # 98-95-3							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>o-Nitrophenol</b>	CAS # 88-75-5							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>p-Nitrophenol</b>	CAS # 100-02-7							
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>4-Nitroquinoline-1-oxide</b>	CAS # 56-57-5							
Second Quarter 2008	U	U	U	U	U	50	-	8270C
<b>N-Nitrosodi-n-butylamine</b>	CAS # 924-16-3							
Second Quarter 2008	U	U	U	U	U	10	-	8270C

See last page of this report for definitions.

Page 8 of 12

# 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
<b>N-Nitrosodiethylamine</b> CAS # 55-18-5								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosodimethylamine</b> CAS # 62-75-9								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosodiphenylamine</b> CAS # 86-30-6								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosodipropylamine</b> CAS # 621-64-7								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosomethylethylamine</b> CAS # 10595-95-6								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosomorpholine</b> CAS # 59-89-2								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosopiperidine</b> CAS # 100-75-4								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosopyrrolidine</b> CAS # 930-55-2								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>5-Nitroso-o-toluidine</b> CAS # 99-55-8								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Parathion</b> CAS # 56-38-2								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Pentachlorobenzene</b> CAS # 608-93-5								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Pentachloroethane</b> CAS # 76-01-7								
Second Quarter 2008	U J	U J	U JA	U J	U J	1	-	8260B
<b>Pentachloronitrobenzene</b> CAS # 82-68-8								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Pentachlorophenol</b> CAS # 87-86-5								
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>Phenacetin</b> CAS # 62-44-2								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Phenanthrene</b> CAS # 85-01-8								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Phenol</b> CAS # 108-95-2								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Total Recoverable Phenolics</b> CAS # C-020								
Second Quarter 2008	U	U	U	U	U	5	-	9065
<b>Phorate</b> CAS # 298-02-2								
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>2-Picoline</b> CAS # 109-06-8								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Pronamide</b> CAS # 23950-58-5								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1-Propanol</b> CAS # 71-23-8								
Second Quarter 2008	U	U	U A	U	U	1000	-	8260B
<b>2-Propanol</b> CAS # 67-63-0								
Second Quarter 2008	U	U	40000	6300	U	1000	-	8260B
<b>Propionitrile</b> CAS # 107-12-0								
Second Quarter 2008	U	U	U A	U	U	10	-	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
<b>n-Propylbenzene</b> CAS # 103-65-1								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Pyrene</b> CAS # 129-00-0								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Pyridine</b> CAS # 110-86-1								
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>Safrole</b> CAS # 94-59-7								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Silvex</b> CAS # 93-72-1								
Second Quarter 2008	U	U	U	U	U	2.5	-	8151A
<b>Styrene</b> CAS # 100-42-5								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Sulfotep</b> CAS # 3689-24-5								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2,4,5-Trichlorophenoxyacetic acid</b> CAS # 93-76-5								
Second Quarter 2008	U	U	U	U	U	2.5	-	8151A
<b>1,2,4,5-Tetrachlorobenzene</b> CAS # 95-94-3								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,1,1,2-Tetrachloroethane</b> CAS # 630-20-6								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,1,2,2-Tetrachloroethane</b> CAS # 79-34-5								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Tetrachloroethene</b> CAS # 127-18-4								
Second Quarter 2008	U J	U J	U JA	U J	U J	1	-	8260B
<b>Tetrahydrofuran</b> CAS # 109-99-9								
Second Quarter 2008	U	U	U A	U	U	5	-	8260B
<b>2,3,4,6-Tetrachlorophenol</b> CAS # 58-90-2								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Toluene</b> CAS # 108-88-3								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>o-Toluidine</b> CAS # 95-53-4								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Toxaphene</b> CAS # 8001-35-2								
Second Quarter 2008	U	U	U	U	U	1	-	8081A
<b>1,2,3-Trichlorobenzene</b> CAS # 87-61-6								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,2,4-Trichlorobenzene</b> CAS # 120-82-1								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,1,1-Trichloroethane</b> CAS # 71-55-6								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,1,2-Trichloroethane</b> CAS # 79-00-5								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>Trichloroethene</b> CAS # 79-01-6								
Second Quarter 2008	U	U	U A	U	U	1	5	8260B
<b>Trichlorofluoromethane</b> CAS # 75-69-4								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>2,4,5-Trichlorophenol</b> CAS # 95-95-4								
Second Quarter 2008	U	U	U	U	U	10	-	8270C

See last page of this report for definitions.

Page 10 of 12

# 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
<b>2,4,6-Trichlorophenol</b> CAS # 88-06-2								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,2,3-Trichloropropane</b> CAS # 96-18-4								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,1,2-Trichloro-1,2,2-Trifluoroethane</b> CAS # 76-13-1								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>O,O,O-Triethyl phosphorothioate</b> CAS # 126-68-1								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,2,4-Trimethylbenzene</b> CAS # 95-63-6								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>1,3,5-Trimethylbenzene</b> CAS # 108-67-8								
Second Quarter 2008	U	U	U A	U	U	1	-	8260B
<b>sym-Trinitrobenzene</b> CAS # 99-35-4								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Vinyl acetate</b> CAS # 108-05-4								
Second Quarter 2008	U J	U J	U JA	U J	U J	5	-	8260B
<b>Vinyl chloride</b> CAS # 75-01-4								
Second Quarter 2008	U J	U J	U JA	U J	U J	1	-	8260B
<b>Xylenes (Total)</b> CAS # 1330-20-7								
Second Quarter 2008	U	U	U A	U	U	3	10000	8260B

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

### Radford Army Ammunition Plant, Radford, Virginia

Upgradient well = 10D4

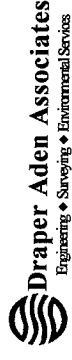
All Results in ug/L.

Analyte/Quarter	10D4 Q	10D3 Q	10D3D Q	10DDH2R Q	10MW1 Q	QL	GPS	Method
<b>Definitions:</b>								
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 quantitation 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).								
<b>Appendix IX Monitoring Events:</b>								
<b>First Quarter 2003, Second Quarter 2004, Second Quarter 2005, Third Quarter 2006, Second Quarter 2007, Second Quarter 2008</b>								
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.								

# Comprehensive Data Validation Report

## Sample/Blind Field Duplicate Results Greater Than the Quantitation Limit

### Facility: HWMU-10 Monitoring Event: Second Quarter 2008



Analyte	Sample ID	Laboratory Result (ug/L)	Validated Result (ug/L)	Q	QL (ug/L)	Validation Notes
Method: 6020						
Laboratory: CompuChem, a Division of Liberty Analytical, Cary, NC						
Barium	10D3	118	118	J	10	No action taken. RPD<20. Result qualified as estimated due to serial dilution %D>10% (20).
	10DUP	120	120	J	10	RPD<20. Blind field duplicate for 10D3. Result qualified as estimated due to serial dilution %D>10% (20).
Method: 8260B						
Laboratory: ProChem Analytical, Elliston, VA						
Chloroform	10D3	1.5	1.5	1	1	No action taken. Sample recollected on 5/19 due to laboratory error.
	10DUP	1.5	1.5	1	1	No action taken. Blind field duplicate for 10D3. RPD<10. Sample recollected on 5/19 due to laboratory error.

#### Definitions:

QL Denotes permit quantitation limit.

Q Denotes data qualifier.

J Denotes analyte reported at or above QL and associated result is estimated.

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

*All Results in ug/L.*

Analyte/Quarter	16C1	16MW8	16MW9	16WC1A	16WC1B	OL	GPS	Method
<b>Antimony</b> CAS # 7440-36-0								
Second Quarter 2008	U	U	U	U N	U	1	6	6020
<b>Arsenic</b> CAS # 7440-38-2								
Second Quarter 2008	U	U	U	U	U	10	50	6020
<b>Barium</b> CAS # 7440-39-3								
Second Quarter 2008	201 J	109 J	305 J	244 J	178 J	10	2000	6020
<b>Beryllium</b> CAS # 7440-41-7								
Second Quarter 2008	U	0.29 J	U	U	U	1	4	6020
<b>Cadmium</b> CAS # 7440-43-9								
Second Quarter 2008	U	0.25 J	U	U	U	1	5	6020
<b>Chromium</b> CAS # 7440-47-3								
Second Quarter 2008	U	1.4 J	U	U	2 J	5	100	6020
<b>Cobalt</b> CAS # 7440-48-4								
Second Quarter 2008	U J	U J	1.8 J	28.8 J	U J	5	313	6020
<b>Copper</b> CAS # 7440-50-8								
Second Quarter 2008	U	3 J	U	2 J	U	5	1300	6020
<b>Lead</b> CAS # 7439-92-1								
Second Quarter 2008	U	0.64 J	U	0.38 J	0.24 J	1	15	6020
<b>Mercury</b> CAS # 7439-97-6								
Second Quarter 2008	U	U	U	U	0.66 J	0.2	2	7470A
<b>Nickel</b> CAS # 7440-02-0								
Second Quarter 2008	U J	6.6 J	7.2 J	8.8 J	U J	10	313	6020
<b>Selenium</b> CAS # 7782-49-2								
Second Quarter 2008	U	U	U	U	U	10	50	6020
<b>Silver</b> CAS # 7440-22-4								
Second Quarter 2008	U	2.2	U	U	U	2	78.25	6020
<b>Thallium</b> CAS # 7440-28-0								
Second Quarter 2008	U	U	U	U	U	1	-	6020
<b>Tin</b> CAS # 7440-31-5								
Second Quarter 2008	U	U	U	U	U	5	-	6020
<b>Vanadium</b> CAS # 7440-62-2								
Second Quarter 2008	U	U	U	U	1 J	10	109.55	6020
<b>Zinc</b> CAS # 7440-66-6								
Second Quarter 2008	U	24.1	U	8.8 J	7 J	10	4695	6020
<b>Sulfide</b> CAS # 18496-25-8								
Second Quarter 2008	U	U	U	U	U	1000	-	9034
<b>Cyanide</b> CAS # 57-12-5								
Second Quarter 2008	U	U	U	U	U	20	-	9014
<b>Acenaphthene</b> CAS # 83-32-9								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Acenaphthylene</b> CAS # 208-96-8								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Acetone</b> CAS # 67-64-1								
Second Quarter 2008	U	U	U	U	U	5	223.57	8260B
<b>Acetonitrile</b> CAS # 75-05-8								
Second Quarter 2008	U	U	U	U	U	100	-	8260B
<b>Acetophenone</b> CAS # 98-86-2								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2-Acetylaminofluorene</b> CAS # 53-96-3								
Second Quarter 2008	U	U	U	U	U	30	-	8270C
<b>Acrolein</b> CAS # 107-02-8								
Second Quarter 2008	U J	U J	U J	U J	U J	10	-	8260B
<b>Acrylonitrile</b> CAS # 107-13-1								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Aldrin</b> CAS # 309-00-2								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A

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.*

Analyte/Quarter	16C1	16MW3	16MW9	16WC1A	16WC1B	OL	GPS	Method
<b>Allyl chloride</b>								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>4-Aminobiphenyl</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Aniline</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Anthracene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Aramite</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Benzene</b>								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Benzo[a]anthracene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Benzo[b]fluoranthene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Benzo[k]fluoranthene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Benzo[ghi]perylene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Benzo[a]pyrene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,4-Benzenediamine</b>								
Second Quarter 2008	U	U	U	U	U	50	-	8270C
<b>Benzyl alcohol</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>alpha-BHC</b>								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>beta-BHC</b>								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>delta-BHC</b>								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>gamma-BHC</b>								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>bis(2-Chloroethoxy)methane</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>bis(2-Chloroethyl)ether</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>bis(2-Chloro-1-methylethyl)ether</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>bis(2-Ethylhexyl)phthalate</b>								
Second Quarter 2008	U	U	U	U	U	6	10	8270C
<b>Bromobenzene</b>								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Bromochloromethane</b>								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Bromodichloromethane</b>								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Bromoform</b>								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>4-Bromophenyl phenyl ether</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2-Butanone</b>								
Second Quarter 2008	U	U	U	U	U	10	691.08	8260B
<b>n-Butyl alcohol</b>								
Second Quarter 2008	U	U	U	U	U	200	-	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.

Analyte/Quarter	16C1	16MW8	16MW9	16WC1A	16WC1B	OL	GPS	Method
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
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
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
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

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.*

Analyte/Quarter	16C1	16MW8	16MW9	16WC1A	16WC1B	OL	GPS	Method
<b>Dibenz(a,h)anthracene</b>					CAS # 53-70-3			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Dibenzofuran</b>					CAS # 132-84-9			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Dibromochloromethane</b>					CAS # 124-48-1			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>1,2-Dibromo-3-chloropropane</b>					CAS # 96-12-8			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>1,2-Dibromoethane</b>					CAS # 106-93-4			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Di-n-butyl phthalate</b>					CAS # 84-74-2			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,2-Dichlorobenzene</b>					CAS # 95-50-1			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>1,3-Dichlorobenzene</b>					CAS # 541-73-1			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>1,4-Dichlorobenzene</b>					CAS # 106-46-7			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>3,3'-Dichlorobenzidine</b>					CAS # 91-94-1			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>trans-1,4-Dichloro-2-butene</b>					CAS # 110-57-6			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Dichlorodifluoromethane</b>					CAS # 75-71-8			
Second Quarter 2008	U	U	U	U	U	1	46.5	8260B
<b>1,1-Dichloroethane</b>					CAS # 75-34-3			
Second Quarter 2008	6.6	U	2.2	1.4	1.6	1	296.08	8260B
<b>1,2-Dichloroethane</b>					CAS # 107-06-2			
Second Quarter 2008	U	U	U	U	U	1	5	8260B
<b>1,1-Dichloroethene</b>					CAS # 75-35-4			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>cis-1,2-Dichloroethene</b>					CAS # 156-59-2			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>trans-1,2-Dichloroethene</b>					CAS # 156-60-5			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>2,4-Dichlorophenol</b>					CAS # 120-83-2			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2,6-Dichlorophenol</b>					CAS # 87-65-0			
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,2-Dichloropropane</b>					CAS # 78-87-5			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>1,3-Dichloropropane</b>					CAS # 142-28-9			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>2,2-Dichloropropane</b>					CAS # 594-20-7			
Second Quarter 2008	U	U	U	U J	U	1	-	8260B
<b>1,1-Dichloropropene</b>					CAS # 563-58-6			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>cis-1,3-Dichloropropene</b>					CAS # 10061-01-5			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>trans-1,3-Dichloropropene</b>					CAS # 10061-02-6			
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Dieldrin</b>					CAS # 60-57-1			
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Diethyl ether</b>					CAS # 60-29-7			
Second Quarter 2008	U	U	U	U J	U	12.5	-	8260B
<b>Diethyl phthalate</b>					CAS # 84-66-2			
Second Quarter 2008	U	U	U	U	U	10	12,520	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.

Analyte/Quarter	16C1	16MW8	16MW9	16WC1A	16WC1B	OL	GPS	Method
<b>O,O-Diethyl O-2-pyrazinyl</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Dimethoate</b>								
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>Dimethyl ether</b>								
Second Quarter 2008	8.1 J	U	2.7 J	1.6 J	U	12.5	-	8260B
<b>p-(Dimethylamino)azobenzene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>7,12-Dimethylbenz[a]anthracene</b>								
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>3,3'-Dimethylbenzidine</b>								
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>a,a-Dimethylphenethylamine</b>								
Second Quarter 2008	U	U	U	U	U	50	-	8270C
<b>2,4-Dimethylphenol</b>								
Second Quarter 2008	U J	U J	U J	U J	U J	10	-	8270C
<b>Dimethyl phthalate</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>m-Dinitrobenzene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>4,6-Dinitro-o-cresol</b>								
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>2,4-Dinitrophenol</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2,4-Dinitrotoluene</b>								
Second Quarter 2008	U	U	U	U	U	10	31.3	8270C
<b>2,6-Dinitrotoluene</b>								
Second Quarter 2008	U	U	U	U	U	10	15.65	8270C
<b>Dinoseb</b>								
Second Quarter 2008	U	U	U	U	U	2.5	-	8151A
<b>Di-n-octyl phthalate</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,4-Dioxane</b>								
Second Quarter 2008	U	U	U	U	U	200	-	8260B
<b>Diphenylamine</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Disulfoton</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Endosulfan I</b>								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Endosulfan II</b>								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Endosulfan sulfate</b>								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Endrin</b>								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Ethyl acetate</b>								
Second Quarter 2008	U	U	U	U	U	2	-	8260B
<b>Endrin aldehyde</b>								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Ethanol</b>								
Second Quarter 2008	U	U	U	U J	U	200	-	8260B
<b>Ethylbenzene</b>								
Second Quarter 2008	U	U	U	U	U	1	70	8260B
<b>Ethyl methacrylate</b>								
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.

Analyte/Quarter	16C1	16MW8	16MW9	16WC1A	16WC1B	OL	GPS	Method
<b>Ethyl methanesulfonate</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Ethylene oxide</b>								
Second Quarter 2008	U	U	U	U	U	20	-	8260B
<b>Famphur</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Fluoranthene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Fluorene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Heptachlor</b>								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Heptachlor epoxide</b>								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Hexachlorobenzene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Hexachlorobutadiene</b>								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Hexachlorocyclopentadiene</b>								
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>Hexachloroethane</b>								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Hexachlorophene</b>								
Second Quarter 2008	U	U	U	U	U	500	-	8270C
<b>Hexachloropropene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2-Hexanone</b>								
Second Quarter 2008	U	U	U	U	U	5	-	8260B
<b>Indeno[1,2,3-cd]pyrene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Isobutyl alcohol</b>								
Second Quarter 2008	U	U	U	U	U	125	-	8260B
<b>Isodrin</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Isophorone</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Isopropylbenzene</b>								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Isopropylether</b>								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>4-Isopropyltoluene</b>								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Isosafrole</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Kepone</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Methacrylonitrile</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8260B
<b>Methapyrilene</b>								
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Methoxychlor</b>								
Second Quarter 2008	U	U	U	U	U	0.025	-	8081A
<b>Bromomethane</b>								
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Chloromethane</b>								
Second Quarter 2008	U	U	U	U	U	1	2.11	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.*

Analyte/Quarter	16C1	16MW8	16MW9	16WC1A	16WC1B	OL	GPS	Method
<b>3-Methylcholanthrene</b>								CAS # 56-49-5
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Iodomethane</b>								CAS # 74-88-4
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Methyl methacrylate</b>								CAS # 80-62-6
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Methyl methane sulfonate</b>								CAS # 66-27-3
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2-Methylnaphthalene</b>								CAS # 91-57-6
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Methyl parathion</b>								CAS # 298-00-0
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>4-Methyl-2-pentanone</b>								CAS # 108-10-1
Second Quarter 2008	U	U	U	U	U	5	-	8260B
<b>2-Methylphenol</b>								CAS # 95-48-7
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>3 &amp; 4-Methylphenol</b>								CAS # m 108-39-4 p 106-44-
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Methyl tert-butyl ether</b>								CAS # 1634-04-4
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Dibromomethane</b>								CAS # 74-95-3
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Methylene chloride</b>								CAS # 75-09-2
Second Quarter 2008	5.3	U	U	U	U	1	-	8260B
<b>Naphthalene</b>								CAS # 91-20-3
Second Quarter 2008	U J	U J	U J	U J	U J	1	-	8260B
<b>1,4-Naphthoquinone</b>								CAS # 130-15-4
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1-Naphthylamine</b>								CAS # 134-32-7
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2-Naphthylamine</b>								CAS # 91-59-8
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>o-Nitroaniline</b>								CAS # 88-74-4
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>m-Nitroaniline</b>								CAS # 99-09-2
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>p-Nitroaniline</b>								CAS # 100-01-6
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>Nitrobenzene</b>								CAS # 98-95-3
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>o-Nitrophenol</b>								CAS # 88-75-5
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>p-Nitrophenol</b>								CAS # 100-02-7
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>4-Nitroquinoline-1-oxide</b>								CAS # 56-57-5
Second Quarter 2008	U	U	U	U	U	50	-	8270C
<b>N-Nitrosodi-n-butylamine</b>								CAS # 924-16-3
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosodiethylamine</b>								CAS # 55-18-5
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosodimethylamine</b>								CAS # 62-75-9
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosodiphenylamine</b>								CAS # 86-30-6
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosodipropylamine</b>								CAS # 621-64-7
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.*

Analyte/Quarter	16C1	16MW8	16MW9	16WC1A	16WC1B	OL	GPS	Method
<b>N-Nitrosomethylethylamine</b>								CAS # 10595-95-6
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosomorpholine</b>								CAS # 59-89-2
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosopiperidine</b>								CAS # 100-75-4
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>N-Nitrosopyrrolidine</b>								CAS # 930-55-2
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>5-Nitroso-o-toluidine</b>								CAS # 99-55-8
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Parathion</b>								CAS # 56-38-2
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Pentachlorobenzene</b>								CAS # 608-93-5
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Pentachloroethane</b>								CAS # 76-01-7
Second Quarter 2008	U J	U J	U J	U J	U J	1	-	8260B
<b>Pentachloronitrobenzene</b>								CAS # 82-68-8
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Pentachlorophenol</b>								CAS # 87-86-5
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>Phenacetin</b>								CAS # 62-44-2
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Phenanthrene</b>								CAS # 85-01-8
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Phenol</b>								CAS # 108-95-2
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Total Recoverable Phenolics</b>								CAS # C-020
Second Quarter 2008	U	U	U	U	U	20	-	9065
<b>Phorate</b>								CAS # 298-02-2
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>2-Picoline</b>								CAS # 931-19-1
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Pronamide</b>								CAS # 23950-58-5
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1-Propanol</b>								CAS # 71-23-8
Second Quarter 2008	U	U	U	U	U	1000	-	8260B
<b>2-Propanol</b>								CAS # 67-63-0
Second Quarter 2008	U N	U	U	U	U	1000	-	8260B
<b>Propionitrile</b>								CAS # 107-12-0
Second Quarter 2008	U	U	U	U	U	10	-	8260B
<b>n-Propylbenzene</b>								CAS # 103-65-1
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Pyrene</b>								CAS # 129-00-0
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Pyridine</b>								CAS # 110-86-1
Second Quarter 2008	U	U	U	U	U	20	-	8270C
<b>Safrole</b>								CAS # 94-59-7
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Silvex</b>								CAS # 93-72-1
Second Quarter 2008	U	U	U	U	U	2.5	-	8151A
<b>Styrene</b>								CAS # 100-42-5
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Sulfotep</b>								CAS # 3689-24-5
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2,4,5-Trichlorophenoxyacetic acid</b>								CAS # 93-76-5
Second Quarter 2008	U	U	U	U	U	5	-	8151A

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.*

Analyte/Quarter	16C1	16MW8	16MW9	16WC1A	16WC1B	OL	GPS	Method
<b>1,2,4,5-Tetrachlorobenzene</b>								CAS # 95-94-3
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,1,1,2-Tetrachloroethane</b>								CAS # 630-20-6
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>1,1,2,2-Tetrachloroethane</b>								CAS # 79-34-5
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Tetrachloroethene</b>								CAS # 127-18-4
Second Quarter 2008	U	U	U	U	U	1	5	8260B
<b>Tetrahydrofuran</b>								CAS # 109-99-9
Second Quarter 2008	U	U	U	U J	U	5	-	8260B
<b>2,3,4,6-Tetrachlorophenol</b>								CAS # 58-90-2
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Toluene</b>								CAS # 108-88-3
Second Quarter 2008	U	U	U	U	U	1	1000	8260B
<b>o-Toluidine</b>								CAS # 95-53-4
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Toxaphene</b>								CAS # 8001-35-2
Second Quarter 2008	U	U	U	U	U	1	-	8081A
<b>1,2,3-Trichlorobenzene</b>								CAS # 87-61-6
Second Quarter 2008	U J	U J	U J	U J	U J	1	-	8260B
<b>1,2,4-Trichlorobenzene</b>								CAS # 120-82-1
Second Quarter 2008	U J	U J	U J	U J	U J	1	-	8260B
<b>1,1,1-Trichloroethane</b>								CAS # 71-55-6
Second Quarter 2008	U	U	U	U	U	1	200	8260B
<b>1,1,2-Trichloroethane</b>								CAS # 79-00-5
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Trichloroethene</b>								CAS # 79-01-6
Second Quarter 2008	U	U	U	U	U	1	5	8260B
<b>Trichlorofluoromethane</b>								CAS # 75-69-4
Second Quarter 2008	U	U	U	U	U	1	469.5	8260B
<b>2,4,5-Trichlorophenol</b>								CAS # 95-95-4
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>2,4,6-Trichlorophenol</b>								CAS # 88-06-2
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,2,3-Trichloropropane</b>								CAS # 96-18-4
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>1,1,2-Trichloro-1,2,2-Trifluoroethane</b>								CAS # 76-13-1
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>O,O,O-Triethyl phosphorothioate</b>								CAS # 126-68-1
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>1,2,4-Trimethylbenzene</b>								CAS # 95-63-6
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>1,3,5-Trimethylbenzene</b>								CAS # 108-67-8
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>sym-Trinitrobenzene</b>								CAS # 99-35-4
Second Quarter 2008	U	U	U	U	U	10	-	8270C
<b>Vinyl acetate</b>								CAS # 108-05-4
Second Quarter 2008	U	U	U	U J	U	5	-	8260B
<b>Vinyl chloride</b>								CAS # 75-01-4
Second Quarter 2008	U	U	U	U	U	1	-	8260B
<b>Xylenes (Total)</b>								CAS # 1330-20-7
Second Quarter 2008	U	U	U	U	U	3	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.

Analyte/Quarter	16C1	16MW8	16MW9	16WC1A	16WC1B	OL	GPS	Method
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**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).

**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**

Analyte/Quarter	16C1 Q	16-1 Q	16-2 Q	16-3 Q	16-5 Q	16WC2B Q	16SPRING Q	QL	Background	Method
<b>Antimony</b> CAS #7440-36-0										
Second Quarter 2008	U	U	U	U	U	1.4	U	1	3	6020
<b>Arsenic</b> CAS #7440-38-2										
Second Quarter 2008	U	U	U	U	U	U	U	10	1	6020
<b>Barium</b> CAS #7440-39-3										
Second Quarter 2008	201 J	245	310	776	195	134	319	10	175.4	6020
<b>Beryllium</b> CAS #7440-41-7										
Second Quarter 2008	U	U	U	U	U	U	U	1	0.7	6020
<b>Cadmium</b> CAS #7440-43-9										
Second Quarter 2008	U	U	U	U	U	U	U	1	0.2	6020
<b>Chromium</b> CAS #7440-47-3										
Second Quarter 2008	U	U	U	5	5.9	U	U	5	6.2	6020
<b>Cobalt</b> CAS #7440-48-4										
Second Quarter 2008	U J	U J	U J	U J	U J	U J	U J	5	5	6020
<b>Copper</b> CAS #7440-50-8										
Second Quarter 2008	U	U	U	U	U	U	U	5	13	6020
<b>Lead</b> CAS #7439-92-1										
Second Quarter 2008	U	U	U	U	U	U	U	1	10	6020
<b>Mercury</b> CAS #7439-97-6										
Second Quarter 2008	U	U	U	U	U	U	U	0.2	0.2	7470A
<b>Nickel</b> CAS #7440-02-0										
Second Quarter 2008	U J	U	U	U	U	U	U	10	16	6020
<b>Selenium</b> CAS #7782-49-2										
Second Quarter 2008	U	U	U	U	U	U	U	10	1	6020
<b>Silver</b> CAS #7440-22-4										
Second Quarter 2008	U	U	U	U	U	U	U	2	0.5	6020
<b>Vanadium</b> CAS #7440-62-2										
Second Quarter 2008	U	U	U	U	U	U	U	10	151	6020
<b>Zinc</b> CAS #7440-66-6										
Second Quarter 2008	U	U	U	U	U	12.2	U	10	51	6020
<b>2-Butanone</b> CAS #78-93-3										
Second Quarter 2008	U	U	U	U	U	U	U	10	1.1	8260B
<b>Carbon tetrachloride</b> CAS #56-23-5										
Second Quarter 2008	U	U	U	U	U	U	U	1	0.2	8260B
<b>Chloroethane</b> CAS #75-00-3										
Second Quarter 2008	4.6	U	U	U	U	U	U	1	20.7	8260B
<b>Dichlorodifluoromethane</b> CAS #75-71-8										
Second Quarter 2008	U	U	U	U	U	U	U	1	46.5	8260B
<b>1,1-Dichloroethane</b> CAS #75-34-3										
Second Quarter 2008	6.6	U	U	U	U	U	U	1	9.5	8260B
<b>Diethyl ether</b> CAS #60-29-7										
Second Quarter 2008	U	U	U	U J	U	U	U	12.5	75.5	8260B
<b>Dimethyl ether</b> CAS #115-10-6										
Second Quarter 2008	8.1 J	U	U	U J	1.9 J	U	U	12.5	17.0	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**

Analyte/Quarter	16C1 Q	16-1 Q	16-2 Q	16-3 Q	16-5 Q	16WC2B Q	16SPRING Q	QL	Background	Method
<b>2,4-Dinitrotoluene</b> CAS # 121-14-2										
Second Quarter 2008	U	U	U	U	U	U	U	10	0.1	8270C
<b>2,6-Dinitrotoluene</b> CAS # 606-20-2										
Second Quarter 2008	U	U	U	U	U	U	U	10	0.11	8270C
<b>Ethylbenzene</b> CAS # 100-41-4										
Second Quarter 2008	U	U	U	U	U	U	U	1	0.1	8260B
<b>Chloromethane</b> CAS # 74-87-3										
Second Quarter 2008	U	U	U	U	U	U	U	1	0.3	8260B
<b>Methylene chloride</b> CAS # 75-09-2										
Second Quarter 2008	5.3	U	U	U	U	U	U	1	13.95	8260B
<b>Tetrachloroethene</b> CAS # 127-18-4										
Second Quarter 2008	U	U	U	U	U	U	U	1	0.7	8260B
<b>Toluene</b> CAS # 108-88-3										
Second Quarter 2008	U	U	U	U	U	U	U	1	0.1	8260B
<b>1,1,1-Trichloroethane</b> CAS # 71-55-6										
Second Quarter 2008	U	U	U	U	U	U	U	1	9.2	8260B
<b>Trichloroethene</b> CAS # 79-01-6										
Second Quarter 2008	U	U	U	U	U	U	U	1	0.1	8260B
<b>Trichlorofluoromethane</b> CAS # 75-69-4										
Second Quarter 2008	U	U	U	U	U	U	U	1	11.3	8260B
<b>1,1,2-Trichloro-1,2,2-Trifluoroethane</b> CAS # 76-13-1										
Second Quarter 2008	U	U	U	U	U	U	U	1	1.2	8260B
<b>Xylenes (Total)</b> CAS # 1330-20-7										
Second Quarter 2008	U	U	U	U	U	U	U	3	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 quantitation 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.

**Notes:**

4Q2004. No data for 16-1 8270C-semivolatiles. Well dry-insufficient sample volume.

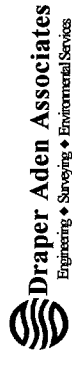
NS denotes not sampled. NA denotes not analyzed. "--"denotes not detected (pre-2nd Quarter 2003) or not available / not sampled (beginning 2nd Quarter 2003).

Note: 4Q2006 - No data for 16-1; well dry.

# Comprehensive Data Validation Report

## Sample/Blind Field Duplicate Results Greater Than the Quantitation Limit

### Facility: HWMU-16 Monitoring Event: Second Quarter 2008



Analyte	Sample ID	Laboratory Result (ug/L)	Validated Result (ug/L)	Q (ug/L)	QL (ug/L)	Validation Notes
<b>Method: 6020</b>						
<b>Laboratory: ConpuChem, a Division of Liberty Analytical, Cary, NC</b>						
Barium	16WC1A	244	244	J	10	Result estimated. Serial dilution RPD > 10%
	16WDUP	256	256	J	10	Result estimated. Serial dilution RPD > 10% Blind field sample duplicate for 16WC1A.
	16WC1A	28.8	28.8	J	5	Result estimated. Serial dilution RPD > 10%. Sample/blind field duplicate RPD>10%. Sample/field duplicate RPD >20 (27.2).
Cobalt	16WDUP	21.8	21.8	J	5	Result estimated. Serial dilution RPD > 10%. Blind field sample duplicate for 16WC1A.
						Sample/blind field duplicate RPD>10%.
<b>Method: 8260B</b>						
<b>Laboratory: ProChem Analytical, Inc., Elliston, VA</b>						
1,1-Dichloroethane	16WC1A	1.4	1.4		1	No action taken. Sample recollected on 5/21 due to lab error.
	16WDUP	1.5	1.5		1	No action taken. Blind field sample duplicate for 16WC1A. Sample recollected on 5/21 due to lab error.

#### Definitions:

##### Data Validation Qualifiers:

QL Denotes permit quantitation limit. Q Denotes data qualifier.

J Denotes analyte reported at or above quantitation limit and associated result is estimated.

# Summary of Quantitation Limits and Detection Limits

## Appendix IX Monitoring Event

### Monitoring Event: Second Quarter 2008

Analyte	Quantitation Limit/QL (ug/L)	Detection Limit/DL (ug/L)
<b>Method: 6020</b>		
<b>Laboratory: CompuChem, a Division of Liberty Analytical, Cary, NC</b>		
Antimony	1	0.4
Arsenic	10	2
Barium	10	1
Beryllium	1	0.2
Cadmium	1	0.2
Chromium	5	1
Cobalt	5	1
Copper	5	1
Lead	1	0.2
Nickel	10	2
Selenium	10	3
Silver	2	0.2
Thallium	1	0.2
Tin	5	1
Vanadium	10	1
Zinc	10	3
<b>Method: 7470A</b>		
<b>Laboratory: CompuChem, a Division of Liberty Analytical, Cary, NC</b>		
Mercury	2	0.2
<b>Method: 8081A</b>		
<b>Laboratory: ProChem Analytical, Elliston, VA</b>		
Aldrin	0.03	0.01
alpha-BHC	0.03	0.01
beta-BHC	0.03	0.01
delta-BHC	0.03	0.01
gamma-BHC	0.03	0.01
Chlordane	0.25	0.1
4,4'-DDD	0.03	0.01
4,4'-DDE	0.03	0.01
4,4'-DDT	0.03	0.01
Dieldrin	0.03	0.01
Endosulfan I	0.03	0.01
Endosulfan II	0.03	0.01
Endosulfan sulfate	0.03	0.01
Endrin	0.03	0.01
Endrin aldehyde	0.03	0.01
Heptachlor	0.03	0.01
Heptachlor epoxide	0.03	0.01
Methoxychlor	0.03	0.01
Toxaphene	1	0.5

# Summary of Quantitation Limits and Detection Limits

## Appendix IX Monitoring Event

### Monitoring Event: Second Quarter 2008

Analyte	Quantitation Limit/QL (ug/L)	Detection Limit/DL (ug/L)
Method: 8151A		
Laboratory: CompuChem, a Division of Liberty Analytical, Cary, NC		
2,4-Dichlorophenoxyacetic acid	5	1
Dinoseb	2.5	0.5
Silvex	2.5	0.2
2,4,5-Trichlorophenoxyacetic acid	2.5	0.2

# Summary of Quantitation Limits and Detection Limits

## Appendix IX Monitoring Event

### Monitoring Event: Second Quarter 2008

Analyte	Quantitation Limit/QL (ug/L)	Detection Limit/DL (ug/L)
<b>Method: 8260B</b>		
<b>Laboratory: ProChem Analytical, Elliston, VA</b>		
Acetone	5	2.6
Acetonitrile	100	21
Acrolein	10	2.6
Acrylonitrile	1	0.6
Allyl chloride	1	0.6
Benzene	1	0.2
Bromobenzene	1	0.3
Bromochloromethane	1	0.6
Bromodichloromethane	1	0.3
Bromoform	1	0.5
2-Butanone	5	5.1
n-Butyl alcohol	200	38.4
tert-Butyl alcohol	20	1
n-Butylbenzene	1	0.3
sec-Butylbenzene	1	0.2
tert-Butylbenzene	1	0.3
Carbon disulfide	1	0.3
Carbon tetrachloride	1	0.2
Chlorobenzene	1	0.2
Chloroethane	1	0.2
Chloroform	1	0.1
2-Chloroethyl vinyl ether	5	0.9
Chloroprene	1	0.3
2-Chlorotoluene	1	0.4
4-Chlorotoluene	1	0.3
Cyclohexane	2	1
Dibromochloromethane	1	0.2
1,2-Dibromo-3-chloropropane	1	1.4
1,2-Dibromoethane	1	0.2
1,2-Dichlorobenzene	1	0.3
1,3-Dichlorobenzene	1	0.3
1,4-Dichlorobenzene	1	0.2
trans-1,4-Dichloro-2-butene	1	0.7
Dichlorodifluoromethane	1	0.3
1,1-Dichloroethane	1	0.7
1,2-Dichloroethane	1	0.2
1,1-Dichloroethene	1	0.4
cis-1,2-Dichloroethene	1	0.1
trans-1,2-Dichloroethene	1	0.8
1,2-Dichloropropane	1	0.2
1,3-Dichloropropane	1	0.3
2,2-Dichloropropane	1	0.3
1,1-Dichloropropene	1	0.3
cis-1,3-Dichloropropene	1	0.1
trans-1,3-Dichloropropene	1	0.1
Diethyl ether	2	0.39
Dimethyl ether	2	0.3
1,4-Dioxane	200	160
Ethyl acetate	2	1

# Summary of Quantitation Limits and Detection Limits

## Appendix IX Monitoring Event

### Monitoring Event: Second Quarter 2008

Analyte	Quantitation Limit/QL (ug/L)	Detection Limit/DL (ug/L)
Method: 8260B		
Laboratory: ProChem Analytical, Elliston, VA		
Ethanol	200	1
Ethylbenzene	1	0.2
Ethyl methacrylate	1	1.1
Ethylene oxide	20	5.4
Hexachlorobutadiene	1	0.6
Hexachloroethane	1	0.3
2-Hexanone	5	0.8
Isobutyl alcohol	125	11
Isopropylbenzene	1	0.2
Isopropylether	1	1.1
4-Isopropyltoluene	1	0.3
Methacrylonitrile	10	1.8
Bromomethane	1	0.5
Chloromethane	1	0.3
Iodomethane	1	0.3
Methyl methacrylate	1	0.8
4-Methyl-2-pentanone	5	2.7
Methyl tert-butyl ether	1	0.5
Dibromomethane	1	0.2
Methylene chloride	1	0.5
Naphthalene	1	0.4
Pentachloroethane	1	0.8
1-Propanol	1000	289
2-Propanol	1000	229
Propionitrile	10	4.9
n-Propylbenzene	1	0.2
Styrene	1	0.1
1,1,1,2-Tetrachloroethane	1	0.3
1,1,2,2-Tetrachloroethane	1	0.3
Tetrachloroethene	1	0.7
Tetrahydrofuran	5	1.41
Toluene	1	0.5
1,2,3-Trichlorobenzene	1	0.6
1,2,4-Trichlorobenzene	1	0.3
1,1,1-Trichloroethane	1	0.3
1,1,2-Trichloroethane	1	0.3
Trichloroethene	1	0.3
Trichlorofluoromethane	1	0.7
1,2,3-Trichloropropane	1	0.9
1,1,2-Trichloro-1,2,2-Trifluoroethane	1	0.7
1,2,4-Trimethylbenzene	1	0.2
1,3,5-Trimethylbenzene	1	0.2
Vinyl acetate	5	1.3
Vinyl chloride	1	0.1
Xylenes (Total)	3	0.2

# Summary of Quantitation Limits and Detection Limits

## Appendix IX Monitoring Event

### Monitoring Event: Second Quarter 2008

Analyte	Quantitation Limit/QL (ug/L)	Detection Limit/DL (ug/L)
<b>Method: 8270C</b>		
<b>Laboratory: ProChem Analytical, Elliston, VA</b>		
Acenaphthene	10	0.2
Acenaphthylene	10	0.2
Acetophenone	10	0.2
2-Acetylaminofluorene	30	2
4-Aminobiphenyl	10	2
Aniline	10	0.2
Anthracene	10	0.1
Aramite	10	1
Benzo[a]anthracene	10	0.1
Benzo[b]fluoranthene	10	0.1
Benzo[k]fluoranthene	10	0.1
Benzo[ghi]perylene	10	0.5
Benzo(a)pyrene	10	0.1
1,4-Benzenediamine	50	33
Benzyl alcohol	10	0.5
bis(2-Chloroethoxy)methane	10	0.2
bis(2-Chloroethyl)ether	10	0.2
bis(2-Chloro-1-methylethyl)ether	10	0.2
bis(2-Ethylhexyl)phthalate	6	1
4-Bromophenyl phenyl ether	10	0.2
Butyl benzyl phthalate	10	0.3
p-Chloroaniline	10	0.2
Chlorobenzilate	20	0.2
p-Chloro-m-cresol	10	0.2
2-Chloronaphthalene	10	0.5
2-Chlorophenol	10	0.2
4-Chlorophenyl phenyl ether	10	0.2
Chrysene	10	0.2
Diallate	10	0.2
Dibenz(a,h)anthracene	10	0.2
Dibenzofuran	10	0.1
Di-n-butyl phthalate	10	0.4
3,3'-Dichlorobenzidine	10	2
2,4-Dichlorophenol	10	0.2
2,6-Dichlorophenol	10	0.2
Diethyl phthalate	10	0.3
O,O-Diethyl O-2-pyrazinyl	10	0.3
Dimethoate	20	0.3
p-(Dimethylamino)azobenzene	10	2
7,12-Dimethylbenz[a]anthracene	20	0.2
3,3'-Dimethylbenzidine	20	2
a,a-Dimethylphenethylamine	50	3
2,4-Dimethylphenol	10	0.3
Dimethyl phthalate	10	0.2
m-Dinitrobenzene	10	0.3
4,6-Dinitro-o-cresol	20	0.5
2,4-Dinitrophenol	10	0.4

# Summary of Quantitation Limits and Detection Limits

## Appendix IX Monitoring Event

### Monitoring Event: Second Quarter 2008

Analyte	Quantitation Limit/QL (ug/L)	Detection Limit/DL (ug/L)
<b>Method: 8270C</b>		
<b>Laboratory: ProChem Analytical, Elliston, VA</b>		
2,4-Dinitrotoluene	10	0.2
2,6-Dinitrotoluene	10	0.2
Di-n-octyl phthalate	10	0.2
Diphenylamine	10	0.2
Disulfoton	10	1
Ethyl methanesulfonate	10	0.2
Famphur	10	0.3
Fluoranthene	10	0.2
Fluorene	10	0.2
Hexachlorobenzene	10	0.1
Hexachlorocyclopentadiene	20	0.5
Hexachlorophene	500	88
Hexachloropropene	10	0.1
Indeno[1,2,3-cd]pyrene	10	0.3
Isodrin	10	0.2
Isophorone	10	0.2
Isosafrole	10	0.1
Kepone	10	0.3
Methapyrilene	10	2
3-Methylcholanthrene	10	0.1
Methyl methane sulfonate	10	0.2
2-Methylnaphthalene	10	0.2
Methyl parathion	10	0.3
2-Methylphenol	10	1
3 & 4-Methylphenol	10	1
1,4-Naphthoquinone	10	0.1
1-Naphthylamine	10	1.6
2-Naphthylamine	10	1
o-Nitroaniline	10	0.8
m-Nitroaniline	20	0.8
p-Nitroaniline	20	1
Nitrobenzene	10	0.2
o-Nitrophenol	10	0.2
p-Nitrophenol	10	1
4-Nitroquinoline-1-oxide	50	0.5
N-Nitrosodi-n-butylamine	10	2
N-Nitrosodiethylamine	10	2
N-Nitrosodimethylamine	10	0.3
N-Nitrosodiphenylamine	10	0.2
N-Nitrosodipropylamine	10	0.2
N-Nitrosomethylethylamine	10	2
N-Nitrosomorpholine	10	2
N-Nitrosopiperidine	10	2
N-Nitrosopyrrolidine	10	2
5-Nitroso-o-toluidine	10	2
Parathion	10	0.4
Pentachlorobenzene	10	0.2
Pentachloronitrobenzene	10	0.4
Pentachlorophenol	20	1

# Summary of Quantitation Limits and Detection Limits

## Appendix IX Monitoring Event

### Monitoring Event: Second Quarter 2008

Analyte	Quantitation Limit/QL (ug/L)	Detection Limit/DL (ug/L)
<b>Method: 8270C</b>		
<b>Laboratory: ProChem Analytical, Elliston, VA</b>		
Phenacetin	10	0.2
Phenanthrene	10	0.2
Phenol	10	0.3
Phorate	20	0.7
2-Picoline	10	2
Pronamide	10	0.2
Pyrene	10	0.2
Pyridine	20	1
Safrole	10	0.2
Sulfotep	10	0.2
1,2,4,5-Tetrachlorobenzene	10	0.1
2,3,4,6-Tetrachlorophenol	10	0.3
o-Toluidine	10	2.2
2,4,5-Trichlorophenol	10	0.8
2,4,6-Trichlorophenol	10	0.2
O,O-Triethyl phosphorothioate	10	0.2
sym-Trinitrobenzene	10	0.2
<b>Method: 9014</b>		
<b>Laboratory: ProChem Analytical, Elliston, VA</b>		
Cyanide	20	1.5
<b>Method: 9034</b>		
<b>Laboratory: ProChem Analytical, Elliston, VA</b>		
Sulfide	1000	5
<b>Method: 9065</b>		
<b>Laboratory: ProChem Analytical, Elliston, VA</b>		
Total Recoverable Phenolics	5	1.48

## **APPENDIX B**

### **LABORATORY CERTIFICATES OF ANALYSIS AND DATA VALIDATION REPORTS (CD-ROM)**

## **APPENDIX C**

### **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		
5W5B	1775.13	8.81	1766.32		
5W7B	1774.78	8.93	1765.85		
5WC21	1774.43	8.89	1765.54		
5WC22	1774.45	8.87	1765.58		
5WC23	1773.84	8.35	1765.49		
S5W5	1772.31	7.36	1764.95		
S5W7	1776.08	10.85	1765.23		
5W9A	1762.20	2.12	1760.08		
5W10A	1771.40	14.58	1756.82		
5W11A	1766.20	11.09	1755.11		
5WC11	1788.92	15.93	1772.99		
5WC12	1788.96	15.63	1773.33		
5WCA	1779.05	12.92	1766.13		
S5W6	1771.43	5.55	1765.88		
S5W8	1783.68	11.68	1772.00		

**NOTES:**

DTW: Depth to water from top of casing.

GW ELEV: Groundwater elevation.

All elevations in feet above mean sea level.

NM: Not measured.

**TABLE 2**  
**HWMU-5**  
**SECOND QUARTER 2008 SUMMARY OF DETECTED CONSTITUENT CONCENTRATIONS**  
**RADFORD ARMY AMMUNITION PLANT**  
**RADFORD, VIRGINIA**

CONSTITUENT	SW8B (upgradient)	SW5B (compliance)	SW7B (compliance)	SWC21 (compliance)	SWC22 (compliance)	SWC23 (compliance)	GPS	QL	SW-846 METHOD
Antimony	nd	nd	0.79 J	nd	nd	nd	6	1	6020
Barium	115	39.7	37.3	14.2	34.6	25.4	2,000	10	6020
Beryllium	nd	nd	0.63 J	1.9	nd	nd	4	1	6020
Cadmium	nd	nd	nd	0.56 J	0.37 J	0.23 J	5	1	6020
Chromium	nd	nd	3 J	7.4	nd	nd	100 *	5	6020
Cobalt	1.3 J	nd	11 J	62.7 J	16.9 J	3 J	313	5	6020
Copper	nd	1.2 J	4.9 J	6.1	nd	nd	1,300	5	6020
Lead	nd	nd	1.7	nd	nd	nd	15	1	6020
Nickel	1.5 J	nd	11.6	39.5	10.5	4.4 J	313	10	6020
Selenium	nd	11.2	nd	nd	nd	nd	50	10	6020
Zinc	5 J	8.6 J	30.1	43.9	nd	3.5 J	4,695	10	6020
Trichloroethene	nd	7.8	nd	nd	2.7	2.9	5	1	8260B

CONSTITUENT	SSW5 (plume well)	SSW7 (plume well)	SW9A (plume well)	SW10A (plume well)	SW11A (plume well)	BACKGROUND	QL	SW-846 METHOD
Barium	26.6	72.8	61.5	52.5	108	172.87	10	6020
Lead	~	~	~	~	1.1	10	1	6020

**NOTES:**

All Units in ug/l.

GPS: Groundwater Protection Standards. Listed in Appendix G to Attachment 2 of the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Management Units 5, 7, 10, and 16 (October 4, 2002).

\*: Chromium was added to the Groundwater Monitoring List for HWMU-5 beginning in First Quarter 2004. The GPS for Chromium was established in accordance with the procedures specified in Permit Condition V.J.1.g.

Background: Site-specific background concentrations. Listed in Appendix F to Attachment 2 of the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Management Units 5, 7, 10, and 16 (October 4, 2002).

QL: Permit-specified Quantitation Limit.

SW-846 Method: Permit-specified analytical method.

nd: Not detected above the Detection Limit (upgradient and compliance wells). Detection limits are summarized in Appendix A of this report.

~: Not detected above the Permit-specified Quantitation Limit.

J: Associated result is estimated.

**TABLE 3**  
**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		
7WCA	1715.40	24.85	1690.55		
7MW6	1715.30	26.05	1689.25		
7W11B	1715.90	24.97	1690.93		
7W9C	1704.45	13.79	1690.66		
7W10B	1706.65	15.30	1691.35		
7W10C	1709.30	18.88	1690.42		
7W13	1705.42	18.43	1686.99		
7W9B	1712.49	23.27	1689.22		
7MW5	1716.20	24.02	1692.18		
7W11	1714.82	24.81	1690.01		

**NOTES:**

DTW: Depth to water from top of casing.

GW ELEV: Groundwater elevation.

All elevations in feet above mean sea level.

NM: Not measured.

**TABLE 4**  
**HWMU-7**  
**SECOND QUARTER 2008 SUMMARY OF DETECTED CONSTITUENT CONCENTRATIONS**  
**RADFORD ARMY AMMUNITION PLANT**  
**RADFORD, VIRGINIA**

CONSTITUENT	7W12B (upgradient)	7MW6 (compliance)	7WCA (compliance)	7W11B (compliance)	GPS	QL	SW-846 METHOD
Barium	39.7	21.4	28.6	45	2,000	10	6020
Chromium	8.5	nd	nd	nd	100	5	6020
Cobalt	nd	nd	5.8	nd	156.65	5	6020
Copper	1.7 J	nd	1.6 J	2.2 J	1,300	5	6020
Lead	nd	nd	0.21 J	nd	15	1	6020
Nickel	nd	nd	15.8	2.1 J	313	10	6020
Zinc	7.5 J	8.6 J	6.7 J	4.9 J	4,695	10	6020
Chloroform	nd	1.5	nd	nd	na	1	8260B
2,4-Dinitrotoluene	nd	nd	1.2 J	nd	31.3	10	8270C

CONSTITUENT	7W9C (plume well)	7W10B (plume well)	7W10C (plume well)	7W13 (plume well)	BACKGROUND	QL	SW-846 METHOD
Barium	26.6	83.2	51.8	14.1	47	10	6020
Cobalt	~	~	~	5.8	5	5	6020

**NOTES:**

**All Units in ug/l.**

GPS: Groundwater Protection Standards. Listed in Appendix G to Attachment 3 of the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Management Units 5, 7, 10, and 16 (October 4, 2002).

Background: Site-specific background concentrations. Listed in Appendix F to Attachment 3 of the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Management Units 5, 7, 10, and 16 (October 4, 2002).

QL: Permit-specified Quantitation Limit.

SW-846 Method: Permit-specified analytical method.

nd: Not detected above the Detection Limit (upgradient and compliance wells). Detection limits are summarized in Appendix A of this report.

~: Not detected above the Permit-specified Quantitation Limit.

na: Not applicable.

J: Associated result is estimated.

**TABLE 5**  
**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		
10DDH2R	1704.38	20.34	1684.04		
10D3	1702.95	18.85	1684.10		
10D3D	1702.64	18.72	1683.92		
10MW1	1703.62	18.94	1684.68		

**NOTES:**

DTW: Depth to water from top of casing.

GW ELEV: Groundwater elevation.

All elevations in feet above mean sea level.

**TABLE 6**  
**HWMU-10**  
**SECOND QUARTER 2008 SUMMARY OF DETECTED CONSTITUENT CONCENTRATIONS**  
**RADFORD ARMY AMMUNITION PLANT**  
**RADFORD, VIRGINIA**

CONSTITUENT	10D4 (upgradient)	10DDH2R (compliance)	10D3 (compliance)	10D3D (compliance)	10MW1 (compliance)	GPS	QL	SW-846 METHOD
Barium	123 J	95.3 J	118 J	54.4 J	92.9 J	2,000	10	6020
Chromium	3.5 J	4 J	1.8 J	nd	2.4 J	100	5	6020
Copper	1.2 J	nd	1.1 J	nd	nd	1,300	5	6020
Lead	0.38 J	nd	nd	nd	nd	15	1	6020
Zinc	5 J	3.5 J	4.9 J	6.7 J	3.7 J	4,695	10	6020
Acetone	nd	180 J	nd	18,000	nd	na	5	8260B
Chloroform	17	nd	1.5	nd	3.7	80	1	8260B
2-Propanol	nd	6,300	nd	40,000	nd	na	1,000	8260B

**NOTES:**

**All Units in ug/l.**

GPS: Groundwater Protection Standards. Listed in Appendix G to Attachment 4 of the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Management Units 5, 7, 10, and 16 (October 4, 2002).

QL: Permit-specified Quantitation Limit.

SW-846 Method: Permit-specified analytical method.

nd: Not detected above the Detection Limit (upgradient and compliance wells). Detection limits are summarized in Appendix A of this report.

na: Not applicable. The VDEQ is in the process of establishing GPSs for acetone and 2-propanol.

J: Associated result is estimated.

**TABLE 7**  
**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		
16MW8	1815.82	73.71	1742.11		
16MW9	1808.88	65.48	1743.40		
16WC1A	1812.61	68.93	1743.68		
16WC1B	1812.95	69.17	1743.78		
16-1	1815.82	53.32	1762.50		
16-2	1810.99	55.78	1755.21		
16-3	1824.77	58.58	1766.19		
16-5	1742.60	3.43	1739.17		
16WC2B	1818.71	55.77	1762.94		
16WC2A	1820.05	DRY	DRY		
16C3	1822.22	DRY	DRY		
16CDH3	1825.60	DRY	DRY		
SPRING	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.

**TABLE 8**  
**HW/MU-16**  
**SECOND QUARTER 2008 SUMMARY OF DETECTED CONSTITUENT CONCENTRATIONS**  
**RADFORD ARMY AMMUNITION PLANT**  
**RADFORD, VIRGINIA**

CONSTITUENT	16C1 (upgradient)	16MW8 (compliance)	16MW9 (compliance)	16WC1A (compliance)	16WC1B (compliance)	GPS	QL	SW-846 METHOD
Barium	201 J	109 J	305 J	244 J	178 J	2,000	10	6020
Beryllium	nd	0.29 J	nd	nd	nd	4	1	6020
Cadmium	nd	0.25 J	nd	nd	nd	5	1	6020
Chromium	nd	1.4 J	nd	nd	2 J	100	5	6020
Cobalt	nd	nd	2 J	7.1	1.5 J	313	5	6020
Copper	nd	nd	1.8 J	28.8 J	nd	1,300	5	6020
Lead	nd	0.64 J	nd	0.38 J	0.24 J	15	1	6020
Nickel	nd	6.6 J	7.2 J	8.8 J	nd	313	10	6020
Silver	nd	2.2	nd	nd	nd	78.25	2	6020
Vanadium	nd	nd	nd	nd	1 J	109.55	10	6020
Zinc	nd	24.1	nd	8.8 J	7 J	4,695	10	6020
Chloroethane	4.6	nd	nd	nd	nd	20.7	1	8260B
1,1-Dichloroethane	6.6	nd	2.2	1.4	1.6	296.08	1	8260B
Dimethyl ether	8.1 J	nd	2.7 J	1.6 J	nd	na	12.5	8260B
Methylene chloride	5.3	nd	nd	nd	nd	13.95	1	8260B

CONSTITUENT	16-1 (plume well)	16-2 (plume well)	16-3 (plume well)	16-5 (plume well)	16WC2B (plume well)	16SPRING (plume point)	BACKGROUND	QL	SW-846 METHOD
Barium	245	310	776	195	134	319	175.4	10	6020
Chromium	~	~	5	5.9	~	~	6.2	5	6020
Zinc	~	~	~	~	12.2	~	51	10	6020

**NOTES:**

**All Units in ug/l.**

GPS: Groundwater Protection Standards. Listed in Appendix G to Attachment 5 of the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Management Units 5, 7, 10, and 16 (October 4, 2002).

\*: Chloroethane and Methylene chloride were added to the Groundwater Monitoring List for HW/MU-16 beginning in Fourth Quarter 2003. GPSs were established for Chloroethane and Methylene chloride in accordance with the procedures specified in Permit Condition V.J.4.g.

Background: Site-specific background concentrations. Listed in Appendix F to Attachment 5 of the Final Hazardous Waste Post-Closure Care Permit for Hazardous Waste Management Units 5, 7, 10, and 16 (October 4, 2002).

QL: Permit-specified Quantitation Limit.

SW-846 Method: Permit-specified analytical method.

nd: Not detected above the Detection Limit (upgradient and compliance wells). Detection limits are summarized in Appendix A of this report.

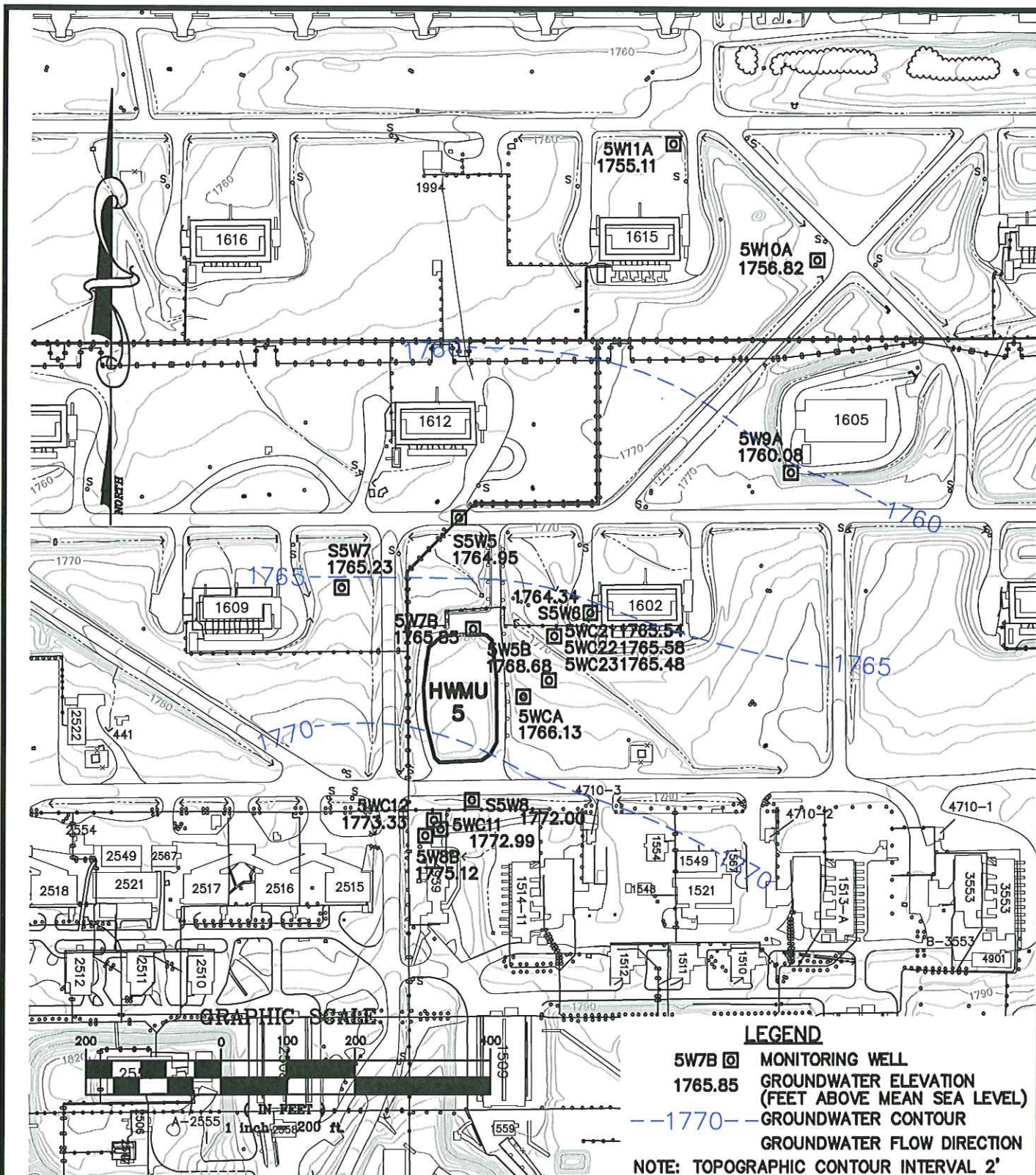
~: Not detected above the Permit-specified Quantitation Limit.

na: Not applicable. The VDEQ is in the process of developing a GPS for dimethyl ether.

J: Associated result is estimated.

## **APPENDIX D**

### **FIGURES**



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

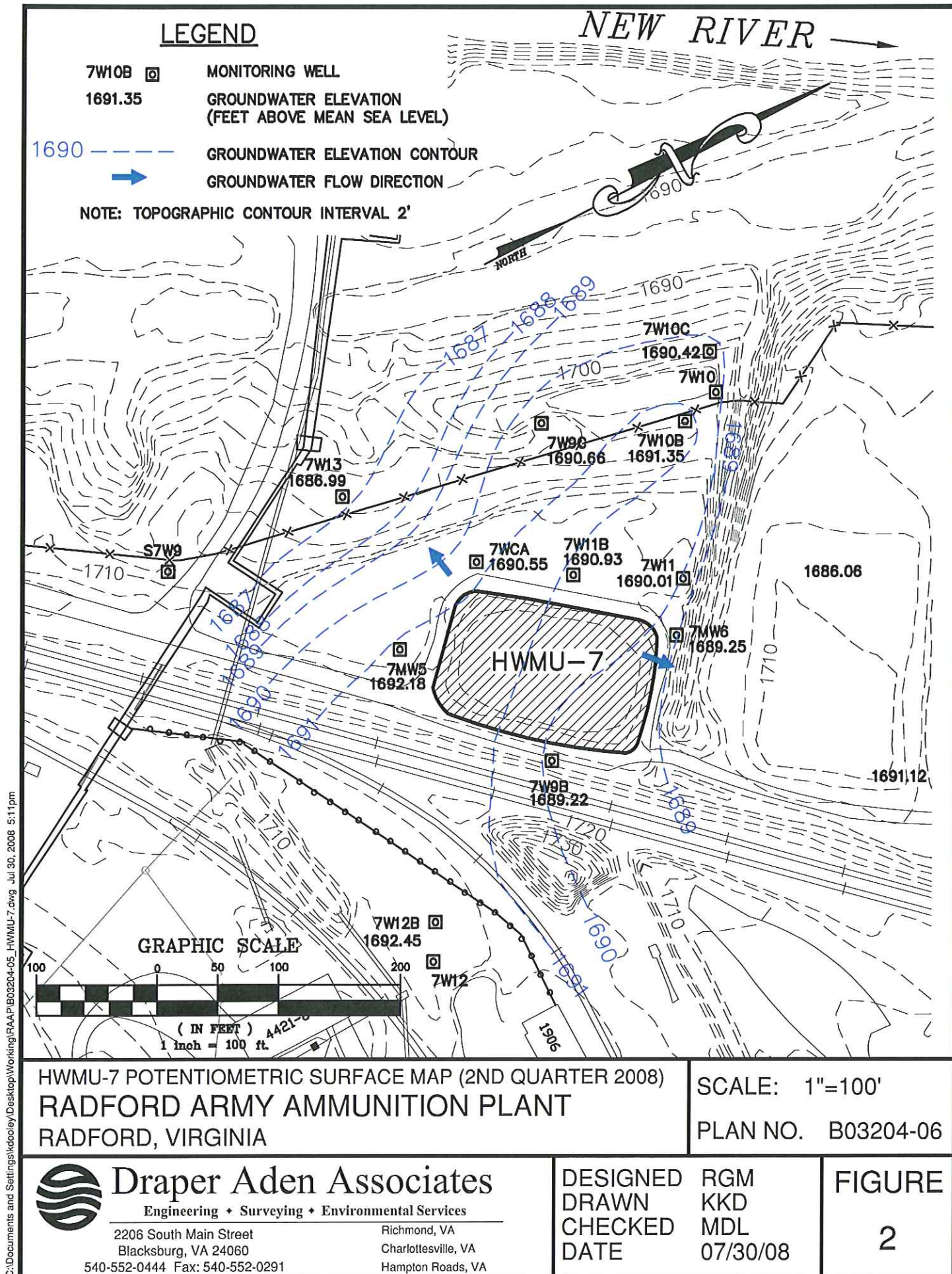
Richmond, VA  
 Charlottesville, VA  
 Hampton Roads, VA

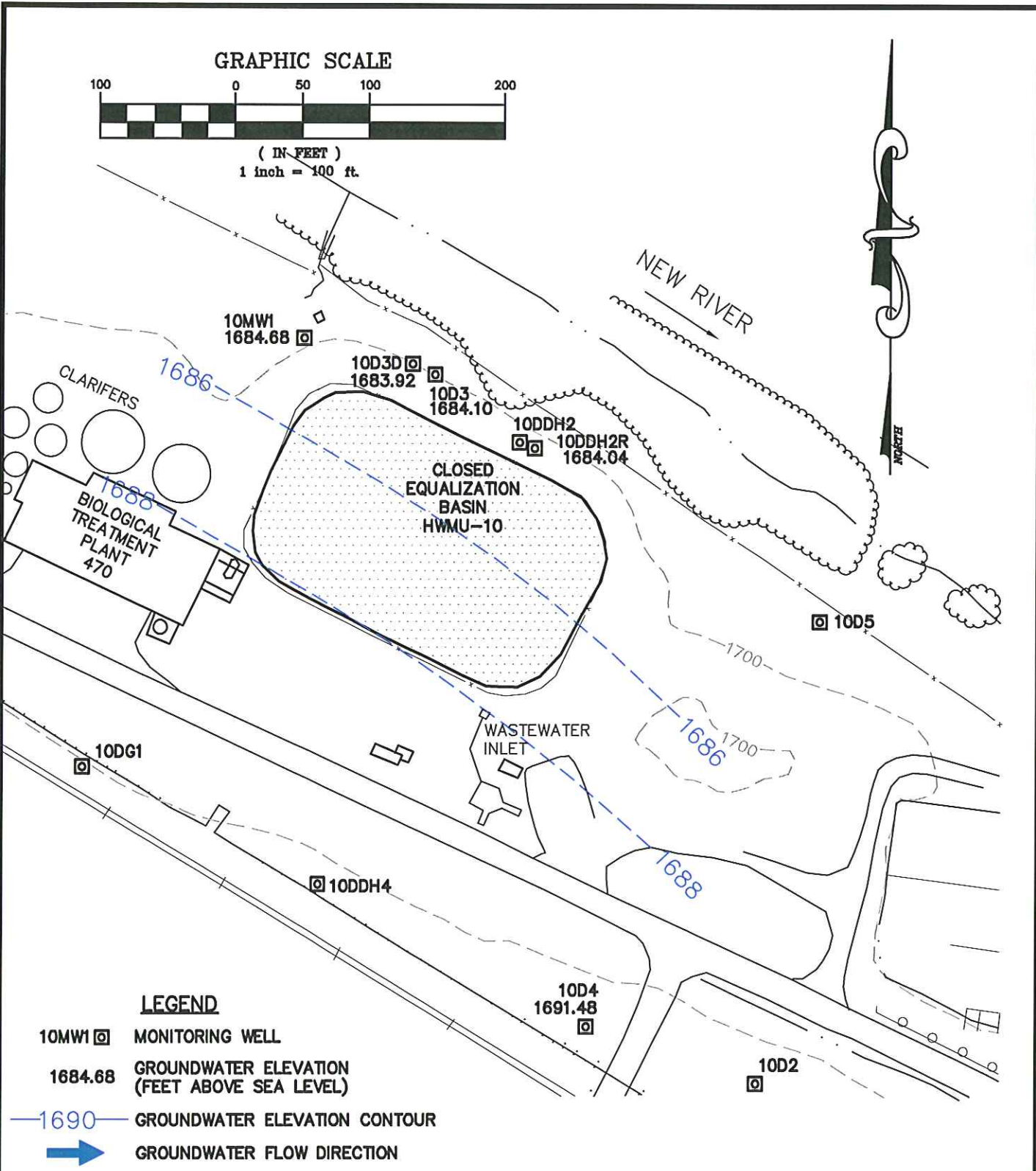
DESIGNED  
 DRAWN  
 CHECKED  
 DATE

RGM  
 KKD  
 MDL  
 7/29/2008

FIGURE

1





HWMU-10 POTENTIOMETRIC SURFACE MAP (2ND QUARTER 2008)  
**RADFORD ARMY AMMUNITION PLANT**  
 RADFORD, VIRGINIA

SCALE: 1"=100'

PLAN NO. B03204-06



**Draper Aden Associates**

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 Blacksburg, VA 24060  
 540-552-0444 Fax: 540-552-0291

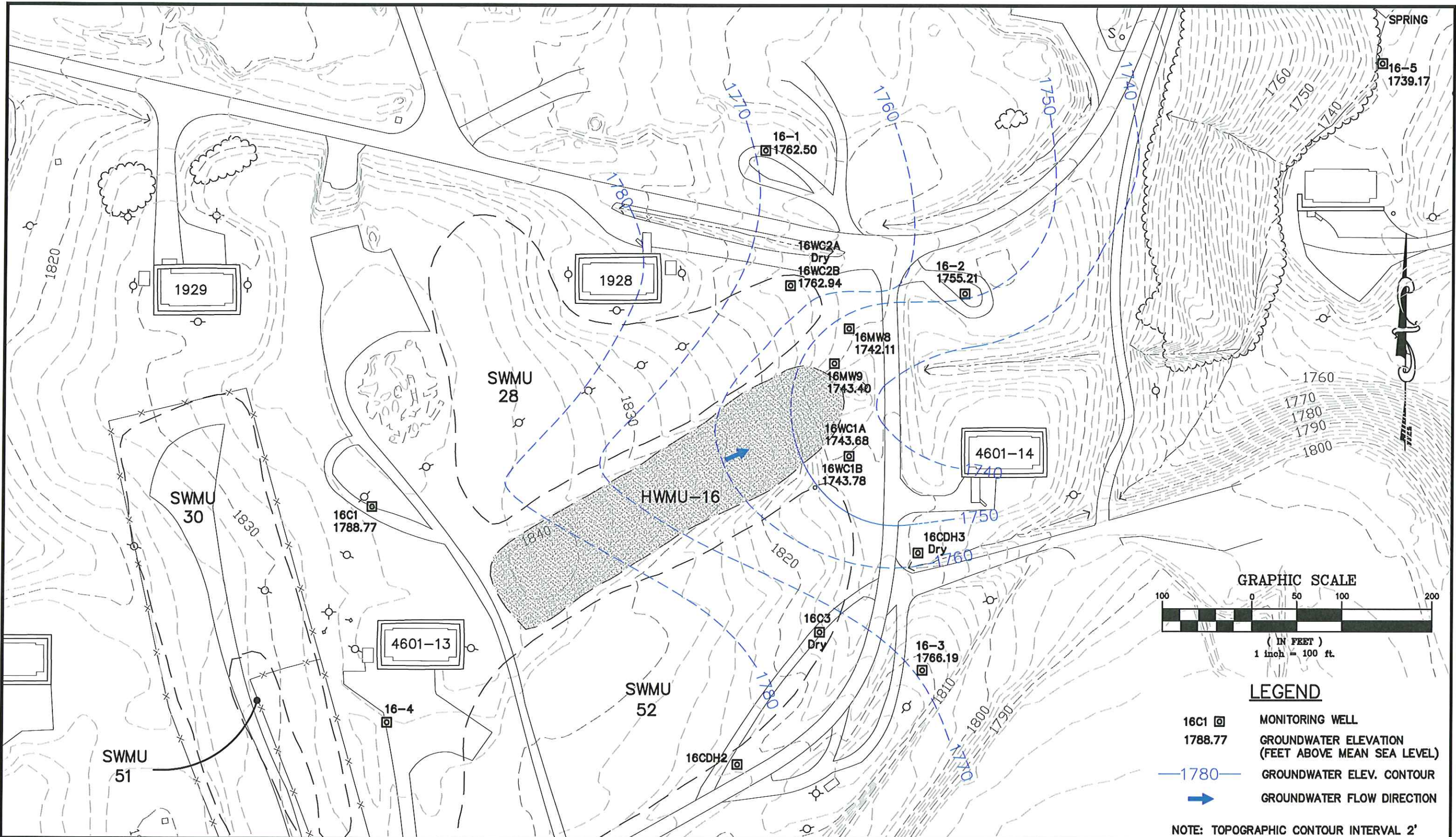
Richmond, VA  
 Charlottesville, VA  
 Hampton Roads, VA

DESIGNED  
 DRAWN  
 CHECKED  
 DATE

RGM  
 KKD  
 MDL  
 07/30/08

**FIGURE**  
 3

C:\Documents and Settings\kdooley\Desktop\Working\BAP\B03204-05\_HWMU-16.dwg Jul 31, 2008 10:12am



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Hampton Roads, VA

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DATE  
RGM  
KKD  
MDL  
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