

**Final**

**Facility-wide Groundwater Monitoring Program Plan  
RVAAP-66 Facility-wide Groundwater  
Addendum for 2024**

**Former Ravenna Army Ammunition Plant  
Portage and Trumbull Counties, Ohio**

**Contract No. W912QR-21-D-0016  
Delivery Order No. W912QR22F0186**

**Prepared for:**



**U.S. Army Corps of Engineers  
Louisville District**

**Prepared by:**



**8866 Commons Boulevard, Suite 201  
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**August 20, 2024**

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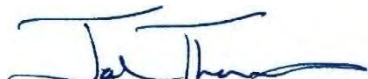
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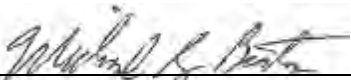
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Notice is hereby given that an independent technical review, that is appropriate to the level of risk and complexity inherent in the project, has been conducted. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions; methods, procedures, and material used in analyses; alternatives evaluated; the appropriateness of data used and level obtained; and reasonableness of the result, including whether the product meets the customer's needs consistent with law and existing Corps policy. All concerns and comments resulting from these independent technical reviews have been resolved.

  
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Jed Thomas, P.E., PMP  
Study/Design Team Leader

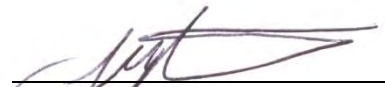
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Michael Barta  
Independent Technical Review Team Leader

8/20/2024  
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Significant concerns and explanation of the resolutions are documented within the project file.

As noted above, all concerns resulting from the independent technical review of the document have been fully resolved.

  
\_\_\_\_\_  
Lisa Jones-Bateman, REM, PMP  
Senior Program Manager

8/20/2024  
\_\_\_\_\_  
Date

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**Prepared for:**

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**August 20, 2024**

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Appendix A. Ohio EPA Correspondences

## ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
Army	U.S. Department of the Army
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CJAG	Camp James A. Garfield
CSM	Conceptual Site Model
DFFO	Director's Final Findings and Orders
DoD	U.S. Department of Defense
FS	Feasibility Study
FWGW	Facility-wide Groundwater
FWGWMP	Facility-wide Groundwater Monitoring Program
IRP	Installation Restoration Program
Ohio EPA	Ohio Environmental Protection Agency
P.E.	Professional Engineer
PMP	Project Management Professional
PP	Proposed Plan
PWS	Performance Work Statement
QAPP	Quality Assurance Project Plan
REM	Remedial Environmental Manager
RI	Remedial Investigation
RIWP	Remedial Investigation Work Plan
ROD	Record of Decision
RVAAP	Ravenna Army Ammunition Plant
SAP	Sampling and Analysis Plan
USACE	U.S. Army Corps of Engineers

## **1.0 INTRODUCTION**

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Leidos has been contracted by the U.S. Army Corps of Engineers (USACE), Louisville District to execute the performance work statement (PWS) titled “Groundwater Investigation and Reporting Services, Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Camp James A. Garfield (CJAG) Joint Military Training Center, Portage and Trumbull Counties, Ohio.” This work is being performed under a firm-fixed price basis in accordance with USACE, Louisville District Contract No. W912QR-21-D-0016, Delivery Order No. W912QR22F0186. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) investigation and cleanup are being conducted under the U.S. Department of Defense (DoD) Installation Restoration Program (IRP). Activities include monitoring an extensive network of groundwater monitoring wells to determine nature and extent of groundwater impacts, provide additional information in support of hydrogeologic and fate and transport models, evaluate potential exit pathways, and evaluate vertical contaminant distribution and/or particle inflow/outflow through the facility.

### **1.1 PURPOSE**

The Director’s Final Findings and Orders (DFFO) was issued to the U.S. Department of the Army (Army) on June 10, 2004 (Ohio EPA 2004). The purpose of the DFFO is for the Army to develop and implement:

- A Remedial Investigation/Feasibility Study (RI/FS), Proposed Plan (PP), Record of Decision (ROD), or other appropriate document and remedy for each area of concern (AOC) or appropriate group of AOCs at the former RVAAP
- A Facility-wide Groundwater (FWGW) investigation, monitoring, and remediation program at the former RVAAP.

Section 15 of the DFFO outlines the requirements of the Facility-wide Groundwater Monitoring Program (FWGWMP). The purpose of this 2024 Addendum is to satisfy the requirements of Section 15d that specify the FWGWMP Plan will “utilize an iterative process, with an annual review and revision cycle to accommodate the addition or deletion of wells from the groundwater monitoring network.” This Addendum provides an update to the FWGWMP Plan, including the identification of wells to be sampled as part of the FWGWMP in 2024.

### **1.2 OBJECTIVES**

The primary objectives of the facility-wide monitoring well network in this 2024 Addendum are to assess potential exit pathways, monitor contaminant concentrations related to historical RVAAP activities (e.g., explosives/propellants) at selected source area wells for trend analysis, and sample wells to refine the conceptual site model (CSM) or contaminant distribution associated with the areas recommended for evaluation within the FS.

This 2024 Addendum is a supplement to the FWGWMP Plan and discusses the subset of currently existing monitoring wells at the former RVAAP that will be monitored in 2024, the frequency of samples to be collected, and the chemicals that will be evaluated at each selected well. Contaminant

trend analysis of the 2023 sampling results was conducted by reviewing the well-specific sampling histories and time series graphs provided in the *Facility-wide Groundwater Monitoring Program RVAAP-66 Facility-wide Groundwater Annual Report for 2023* (Leidos 2024). In addition, the recommendations of the *Remedial Investigation Report for RVAAP-66 Facility wide Groundwater* (Leidos 2022a) were considered and data collected to support the FS have been incorporated into the 2024 FWGWMP.

Wells were selected for inclusion in the 2024 FWGWMP based on the following criteria:

- **FWGWMP Criterion 1:** Wells representing critical exit pathway monitoring points (generally a carryover from the 2023 program).
- **FWGWMP Criterion 2:** Wells representing primary AOC-specific contaminant source area conditions indicated to be potentially increasing or otherwise potentially unstable plume conditions.
- **FWGWMP Criterion 3:** Colocated wells used to establish the vertical distribution of contaminants within the stratigraphic sequence.
- **FWGWMP Criterion 4:** Wells refining the CSM or contaminant distribution associated with the areas recommended for evaluation within the FS.

### 1.3 REPORT ORGANIZATION

The remaining sections of this Addendum are organized as follows:

- Section 2.0. Background
- Section 3.0. Scope of Work Under the Addendum
- Section 4.0. Schedule
- Section 5.0. References.

## 2.0 BACKGROUND

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In 2004, the Army and Ohio Environmental Protection Agency (Ohio EPA) finalized the *Facility-wide Groundwater Monitoring Program Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio* (Portage Environmental 2004) for the former RVAAP, now known as CJAG Joint Military Training Center. Figure 2-1 presents the general location of CJAG.

The FWGWMP was initiated in April 2005 with quarterly sampling of 36 FWGWMP monitoring wells. Fourteen of these wells were identified as “background wells,” and the remaining wells were located at various AOCs at CJAG. The FWGWMP monitoring well network currently contains 313 permanent wells. This includes 12 permanent monitoring wells (LL1mw-090, LL1mw-091, LL1mw-092, LL1mw-093, LL3mw-247, LL3mw-248, LL12mw-248, LL12mw-249, FBQmw-178, FBQmw-179, FBQmw-180, and FBQmw-181) installed in 2023, as specified in the *Feasibility Study Monitoring Well Installation Plan for RVAAP-66 Facility-Wide Groundwater* (Leidos 2022b, herein referred to as the FS Monitoring Well Installation Plan). Sixty of these 313 permanent wells and a temporary well (071tw-001) at the CC RVAAP-71 Barn No. 5 Petroleum Release AOC were sampled in 2023. In addition to these wells, 14 permanent wells at CC RVAAP-69 Building 1048 Fire Station and 3 permanent wells at CC RVAAP-74 Building 1034 Motor Pool Hydraulic Lift are not currently incorporated into the FWGWMP monitoring well network, as they were installed and sampled to support their current site-specific investigations.

Since 2005, the results have been summarized in an annual report. In 2016, the *Remedial Investigation Work Plan for Groundwater and Environmental Services for RVAAP-66 Facility-Wide Groundwater*, herein referred to as the Remedial Investigation Work Plan (RIWP) (TEC-Weston 2016), was developed. This RIWP served as a supplement to the FWGWMP Plan and specified aspects of the RI with the goal of adequately characterizing pertinent physical and chemical groundwater conditions in the multi-aquifer hydrostratigraphic units variably present across CJAG, so that potential current and future risks to potential human and environmental receptors can be ascertained, effectively managed, and mitigated as needed. The RI Report (Leidos 2022a) presents the multi-aquifer hydrostratigraphic units and associated aquifers across CJAG and summarizes current and future risks to potential human and environmental receptors. This RI Report was approved by Ohio EPA in April 2022.

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### 3.0 SCOPE OF WORK UNDER THE ADDENDUM

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The 2024 Addendum presents information to support the continued monitoring of AOC-specific contaminant concentrations, as indicated by an analysis of results through 2023. Using data and results from the 2023 FWGWMP sampling event and findings of the RI Report (Leidos 2022a), the following sections provide an assessment of sampling to be conducted in 2024.

To achieve this objective, 60 wells have been selected for sampling in 2024. Monitoring well sampling and analytical testing will be conducted in accordance with the Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) updates provided with the RIWP (TEC-Weston 2016).

#### 3.1 REVISIONS TO THE 2024 SAMPLING SCHEME

Forty-eight wells were sampled in 2023 in accordance with the *Facility-wide Groundwater Monitoring Program Plan, RVAAP-66 Facility-wide Groundwater, Addendum for 2023* (Leidos 2023). In addition, 12 permanent wells and 1 temporary well were installed and sampled in 2023. In total, 60 permanent wells and 1 temporary well were sampled in 2023. This 2024 Addendum recommends that 60 wells be sampled in 2024. The rationale for notable differences in the number of wells sampled and the analyte list between 2023 and 2024 is presented below:

- Chemical concentrations in groundwater from the temporary well at the CC RVAAP-71 Barn No. 5 Petroleum Release AOC were below applicable screening levels. This temporary well will be abandoned in 2024.

#### 3.2 CERCLA WELLS

Selection of wells for the 2024 FWGWMP was made based on consideration of the following criteria:

- **FWGWMP Criterion 1:** Monitoring wells representing critical exit pathway monitoring points (i.e., located along the CJAG boundary or downgradient from AOC concentration areas).
  - *Unconsolidated Aquifer:* LL1mw-064, LL1mw-086, LL1mw-087, LL1mw-089, FWGmw-004, FWGmw-007, FWGmw-011, FWGmw-015
  - *Upper Sharon Aquifer:* LL2mw-059, FWGmw-012, FWGmw-016, FWGmw-020, FWGmw-021, FWGmw-024
  - *Basal Sharon Conglomerate Aquifer:* SCFmw-004, FWGmw-018.
- **FWGWMP Criterion 2:** Monitoring wells representing primary AOC-specific contaminant source area conditions routinely monitored or indicated to be potentially increasing or otherwise potentially unstable plume conditions.
  - *Unconsolidated Aquifer:* DETmw-003, DETmw-004, LL1mw-063, LL1mw-089, LL12mw-185, LL12mw-187, WBGmw-006, WBGmw-009
  - *Homewood Aquifer:* FBQmw-174, FBQmw-175, LL10mw-003
  - *Upper Sharon Aquifer:* LL1mw-080, LL1mw-081, LL1mw-083, LL1mw-084, LL3mw-237, LL3mw-238, LL3mw-239, LL3mw-241
  - *Basal Sharon Conglomerate Aquifer:* None currently proposed.

- **FWGWMP Criterion 3:** Colocated monitoring wells used to evaluate the vertical distribution of contaminants within the stratigraphic sequence (includes all wells installed to date).
  - **East of Ramsdell Quarry Landfill:** FWGmw-011 (Unconsolidated Aquifer), FWGmw-012 (Upper Sharon Aquifer)
  - **Southeast of Load Line 1:** LL1mw-087 (Unconsolidated Aquifer), SCFmw-004 (Basal Sharon Conglomerate Aquifer)
  - **Post Boundary at Load Line 12:** FWGmw-020 (Upper Sharon Aquifer), FWGmw-018 (Basal Sharon Conglomerate Aquifer)
  - **Winklepeck Burning Grounds:** WBGmw-009 (Unconsolidated Aquifer), WBGmw-020 (Upper Sharon Aquifer)
  - **Winklepeck Burning Grounds:** WBGmw-006 (Unconsolidated Aquifer), WBGmw-021 (Upper Sharon Aquifer)
  - **Post Boundary South of the CJAG Main Cantonment Area:** FWGmw-015 (Unconsolidated Aquifer), FWGmw-016 (Upper Sharon Aquifer).
  
- **FWGWMP Criterion 4:** Monitoring wells refining the CSM or contaminant distribution associated with the areas recommended for evaluation within the FS.
  - **Winklepeck Burning Grounds:** WBGmw-014, WBGmw-016, WBGmw-017, WBGmw-018
  - **Load Line 1:** LL1mw-080, LL1mw-082, LL1mw-083, LL1mw-084, LL1mw-086, LL1mw-090, LL1mw-091, LL1mw-092, LL1mw-093, FWGmw-010
  - **Load Line 2:** LL2mw-059
  - **Load Line 3:** LL3mw-245, LL3mw-247, LL3mw-248
  - **Load Line 12:** LL12mw-244, LL12mw-245, LL12mw-246, LL12mw-248, LL12mw-249, FWGmw-018, FWGmw-020
  - **Fuze and Booster Quarry:** FBQmw-173, FBQmw-178, FBQmw-179, FBQmw-180, FBQmw-181, FWGmw-023.

The list of analytes for 2024 reflects the potential chemicals of concern within certain areas or immediately downgradient from potential source areas, as appropriate. Table 3-1 provides a comprehensive summary of the proposed wells, 2023 results summary, and rationale for their inclusion in the 2024 FWGWMP sampling scheme. This table also presents results from wells sampled in 2023 that do not require additional analysis in 2024 (highlighted in gray). Figure 3-1 show the wells to be sampled during the 2024 FWGWMP.

The refined analyte list is presented in Table 3-2. The analytical methods for these analytes are provided in Table 3-3. Evaluation of data collected during 2024 will be conducted in accordance with the Final FWGW RIWP, including the supporting SAP and QAPP updates (TEC Weston 2016).



Table 3-1. Recommended FWGWMP Wells for 2024

No.	RVAAP-66 Area	Well Name	Aquifer	2023 FWGWMP Sampling Recommendations	2023 Sampling Results	2024 FWGWMP Sampling Recommendations	FWGWMP Sampling Criterion (See Section 3.2)
1	RVAAP-04 Open Demolition Area #2	DETmw-003	Unconsolidated	In accordance with the DFFO, analytical parameters for this well in 2023 include VOCs, phthalates, PAHs, phenols, PCBs, explosives, pesticides, cyanide, and metals.	<ul style="list-style-type: none"> <li>Explosives, cyanide, VOCs, PCBs, and pesticides were not detected in the parent or duplicate samples in Spring or Fall 2023.</li> <li>Seventeen SVOCs, including 2-methylnaphthalene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, di-n-butyl phthalate, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, and pyrene were detected in groundwater during 2023. All SVOC concentrations were below screening levels, with the exception of benz(a)anthracene and dibenz(a,h)anthracene. Benz(a)anthracene was only detected in the Fall 2023 duplicate sample at a concentration of 0.00018 mg/L, which exceeded the RSL of 0.00003 mg/L. Dibenz(a,h)anthracene was only detected in the Fall 2023 duplicate sample at a concentration of 0.00013 mg/L, which exceeded the RSL of 0.000025 mg/L.</li> <li>All detected metals concentrations were below the screening level or background concentration, except for arsenic, iron, and manganese. The arsenic concentration detected in the Fall 2023 parent sample at 0.012 mg/L exceeded the MCL of 0.01 mg/L. All other arsenic detections were below the MCL concentration of 0.01 mg/L. The iron concentration detected in the Spring 2023 duplicate sample at 2.1 mg/L and in the Fall 2023 parent sample at 2 mg/L exceeded the background concentration of 1.91 mg/L. All other iron detections were below the background concentration of 1.91 mg/L. The manganese concentration detected in the Spring 2023 parent sample at 0.25 J mg/L, the Spring 2023 duplicate sample at 0.26 mg/L, and the Fall 2023 parent sample at 0.25 J mg/L exceeded the background concentration of 0.075 mg/L. Manganese was not detected in the Fall 2023 duplicate sample.</li> <li>pH was 6.86 S.U. in Spring 2023 and 7.32 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>In accordance with the DFFO, continue to monitor for VOCs, phthalates, PAHs, phenols, PCBs, explosives, pesticides, cyanide, and metals.</li> </ul>	2
2	RVAAP-04 Open Demolition Area #2	DETmw-004	Unconsolidated	In accordance with the DFFO, analytical parameters for this well in 2023 include VOCs, phthalates, PAHs, phenols, PCBs, explosives, pesticides, cyanide, and metals.	<ul style="list-style-type: none"> <li>Pesticides, cyanide, and PCBs were not detected in Spring and Fall 2023.</li> <li>HMX and RDX were detected in groundwater during 2023. HMX detections during Fall and Spring 2023 did not exceed the RSL concentration of 0.1 mg/L. The RDX concentration detected in Spring 2023 at 0.002 mg/L exceeded the RSL of 0.00097 mg/L. RDX was not detected during Fall 2023.</li> <li>Thirteen SVOCs, including anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, di-n-butyl phthalate, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, phenanthrene, and pyrene were detected in groundwater during 2023. All SVOC concentrations were below screening levels, with the exception of benz(a)anthracene and dibenz(a,h)anthracene. Benz(a)anthracene was only detected in Spring 2023 at a concentration of 0.00091 J mg/L, which exceeded the RSL of 0.00003 mg/L. Dibenz(a,h)anthracene was only detected in Spring 2023 at a concentration of 0.000069 J mg/L, which exceeded the RSL of 0.000025 mg/L.</li> <li>Acetone was only detected in Fall 2023 at a concentration below the RSL of 1.8 mg/L.</li> <li>All metal concentrations were below the screening level or background concentration with the exceptions of manganese. Manganese was detected at 0.18 mg/L in Fall 2023, which exceeds the background concentration of 0.075 mg/L. Manganese was detected below the background concentration of 0.075 mg/L in Spring 2023.</li> <li>pH was 6.71 S.U. in Spring 2023 and 6.50 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>In accordance with the DFFO, continue to monitor for VOCs, phthalates, PAHs, phenols, PCBs, explosives, pesticides, cyanide, and metals.</li> </ul>	2

Table 3-1. Recommended FWGWMP Wells for 2024 (Continued)

No.	RVAAP-66 Area	Well Name	Aquifer	2023 FWGWMP Sampling Recommendations	2023 Sampling Results	2024 FWGWMP Sampling Recommendations	FWGWMP Sampling Criterion (See Section 3.2)
3	RVAAP-05 Winklepeck Burning Grounds	WBGmw-006	Unconsolidated	Continue to monitor for explosives and assess effectiveness of MNA (anions, TOC, alkalinity, pH, and expanded explosives, which include explosive daughter products) as a remedial option.	<ul style="list-style-type: none"> <li>• HMX, MNX, and RDX were the only explosives detected. RDX was detected at 0.0078 mg/L in Spring 2023 and 0.0066 mg/L in Fall 2023, both of which exceed the RSL of 0.00097 mg/L. HMX was detected in both Spring and Fall 2023 at concentrations below the RSL of 0.1 mg/L. MNX was only detected in Spring 2023 at a concentration of 0.00043 mg/L.</li> <li>• Sulfide, nitrate, and nitrite were not detected in Spring or Fall 2023.</li> <li>• Sulfate was detected at 24 mg/L in Spring 2023 and 27 mg/L in Fall 2023.</li> <li>• Alkalinity was detected at 270 mg/L in Spring 2023 and 280 mg/L in Fall 2023.</li> <li>• TOC was detected at 2 mg/L in Spring 2023 and 1.1 mg/L in Fall 2023.</li> <li>• pH was 7.15 S.U. in Spring 2023 and 7.47 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2, 3
4	RVAAP-05 Winklepeck Burning Grounds	WBGmw-009	Unconsolidated	Continue to monitor for explosives and assess effectiveness of MNA (anions, TOC, alkalinity, pH, and expanded explosives, which include explosive daughter products) as a remedial option.	<ul style="list-style-type: none"> <li>• HMX and RDX were the only explosives detected. RDX was detected at 0.0018 mg/L in Spring 2023 and 0.0032 mg/L in Fall 2023; both concentrations exceed the RSL of 0.00097 mg/L. HMX was detected at 0.00073 mg/L in Spring 2023 and 0.0016 mg/L in Fall 2023; both concentrations were below the RSL of 0.1 mg/L.</li> <li>• Nitrite and sulfide were not detected.</li> <li>• Nitrate was detected at 0.35 mg/L in Spring 2023 and 0.091 mg/L in Fall 2023.</li> <li>• Sulfate was detected at 15 mg/L in Spring 2023 and 22 mg/L in Fall 2023.</li> <li>• Alkalinity was detected at 180 mg/L in Spring 2023 and 340 mg/L in Fall 2023.</li> <li>• TOC was not detected in Spring 2023 and was detected at 0.91 J mg/L in Fall 2023.</li> <li>• pH was 6.27 S.U. in Spring 2023 and 6.77 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2, 3
5	RVAAP-05 Winklepeck Burning Grounds	WBGmw-014	Unconsolidated	Monitor for explosives to support the FS.	<ul style="list-style-type: none"> <li>• Explosives were not detected in Spring or Fall 2023.</li> <li>• pH was 6.94 S.U. in Spring 2023 and 7.42 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
6	RVAAP-05 Winklepeck Burning Grounds	WBGmw-016	Unconsolidated	Monitor for explosives to support the FS.	<ul style="list-style-type: none"> <li>• Explosives were not detected in Spring or Fall 2023.</li> <li>• pH was 6.41 S.U. in Spring 2023 and 7.23 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
7	RVAAP-05 Winklepeck Burning Grounds	WBGmw-017	Unconsolidated	Monitor for explosives to support the FS.	<ul style="list-style-type: none"> <li>• Explosives were not detected in Spring or Fall 2023.</li> <li>• pH was 7.36 S.U. in Spring 2023 and 7.16 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
8	RVAAP-05 Winklepeck Burning Grounds	WBGmw-018	Unconsolidated	Continue to monitor for explosives and assess effectiveness of MNA (anions, TOC, alkalinity, pH, and expanded explosives, which include explosive daughter products) as a remedial option.	<ul style="list-style-type: none"> <li>• HMX was the only explosive detected. HMX was not detected in Spring 2023. HMX was detected at 0.00011 J mg/L in Fall 2023, which was below the RSL of 0.1 mg/L.</li> <li>• Nitrite and sulfide were not detected in Spring or Fall 2023.</li> <li>• Nitrate was detected at 0.45 J mg/L in Spring 2023 and 0.43 J mg/L in Fall 2023.</li> <li>• Sulfate was detected at 9.6 mg/L in Spring 2023 and 12 J mg/L in Fall 2023.</li> <li>• Alkalinity was detected at 49 mg/L in Spring 2023 and 50 mg/L in Fall 2023.</li> <li>• TOC was not detected in Spring or Fall 2023.</li> <li>• pH was 5.52 S.U. in Spring 2023 and 6.78 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
9	RVAAP-05 Winklepeck Burning Grounds	WBGmw-020	Upper Sharon	Continue to monitor for explosives.	<ul style="list-style-type: none"> <li>• 2-Nitrotoluene was the only explosive detected. 2-Nitrotoluene was detected at 0.00021 J mg/L in Spring 2023, which was below the RC of 0.00037 mg/L. 2-Nitrotoluene was not detected in Fall 2023.</li> <li>• pH was 6.94 S.U. in Spring 2023 and 6.96 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring for explosives.</li> </ul>	3
10	RVAAP-05 Winklepeck Burning Grounds	WBGmw-021	Upper Sharon	Continue to monitor for explosives.	<ul style="list-style-type: none"> <li>• Explosives were not detected in Spring or Fall 2023.</li> <li>• pH was 7.12 S.U. in Spring 2023 and 7.19 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue monitoring for explosives.</li> </ul>	3

**Table 3-1. Recommended FWGWMP Wells for 2024 (Continued)**

No.	RVAAP-66 Area	Well Name	Aquifer	2023 FWGWMP Sampling Recommendations	2023 Sampling Results	2024 FWGWMP Sampling Recommendations	FWGWMP Sampling Criterion (See Section 3.2)
11	RVAAP-08 Load Line 1	LL1mw-063	Unconsolidated	Continue to monitor for explosives.	<ul style="list-style-type: none"> <li>LL1mw-063 was dry in Fall 2023 and only sampled in Spring 2023.</li> <li>2-amino-4,6-DNT, 4-amino-2,6-DNT, and HMX were the only explosives detected. The detected concentration of 2-amino-4,6-DNT in Spring 2023 was below the RC of 0.000209 mg/L. The detected concentration of HMX in Spring 2023 was below the RSL of 0.1 mg/L. 4-amino-2,6-DNT was detected at 0.00032 mg/L in Spring 2023, which exceeded the RC of 0.000209 mg/L.</li> <li>pH was 5.73 S.U. in Spring 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2
12	RVAAP-08 Load Line 1 (east of Load Line 1 fence)	LL1mw-064	Unconsolidated	Continue to monitor for explosives in this exit pathway well.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 7.43 S.U. in Spring 2023 and 7.35 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1
13	RVAAP-08 Load Line 1	LL1mw-080	Upper Sharon	Continue to monitor for explosives and assess effectiveness of MNA (anions, TOC, alkalinity, pH, and expanded explosives, which include explosive daughter products) as a remedial option.	<ul style="list-style-type: none"> <li>TNT, 2-amino-4,6-DNT, 3,5-dinitroaniline, 4-amino-2,6-DNT, HMX, and RDX were detected; however, only 2-amino-4,6-DNT, 4-amino-2,6-DNT, and RDX exceeded screening criteria.</li> <li>The detected concentration of 2-amino-4,6-DNT at 0.00084 mg/L in Spring 2023 and 0.0003 J mg/L in Fall 2023 exceeded the RC of 0.000209 mg/L. The detected concentration of 4-amino-2,6-DNT at 0.0021 mg/L in Spring 2023 and 0.00061 J mg/L in Fall 2023 exceeded the RC of 0.000209 mg/L. The detected concentration of RDX at 0.012 mg/L in Spring 2023 and 0.0019 mg/L in Fall 2023 exceeded the RSL of 0.00097 mg/L.</li> <li>Nitrite and sulfide were not detected in Spring or Fall 2023.</li> <li>Nitrate was not detected in Spring 2023 but was detected at 0.09 J mg/L in Fall 2023.</li> <li>Sulfate was detected at 26 mg/L in Spring 2023 and 500 mg/L in Fall 2023.</li> <li>Alkalinity was detected at 85 mg/L in Spring 2023 and 140 mg/L in Fall 2023.</li> <li>TOC was detected at 1.2 mg/L in Spring 2023 and an estimated concentration of 1.7 mg/L in Fall 2023.</li> <li>pH was 6.53 S.U. in Spring 2023 and 6.66 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2,4
14	RVAAP-08 Load Line 1	LL1mw-081	Upper Sharon	Continue to monitor for explosives.	<ul style="list-style-type: none"> <li>2-amino-4,6-DNT and RDX were the only explosives detected. 2-amino-4,6-DNT was only detected in Spring 2023 at a concentration of 0.0003 J mg/L, which exceeded the RC of 0.000209 mg/L. RDX was only detected in Spring 2023 at a concentration of 0.0012 mg/L, which exceeded the RSL of 0.00097 mg/L.</li> <li>pH was 6.55 S.U. in Spring 2023 and 6.38 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2
15	RVAAP-08 Load Line 1	LL1mw-082	Upper Sharon	Monitor for explosives to support the FS.	<ul style="list-style-type: none"> <li>RDX was the only explosives detected. RDX was only detected in Spring 2023 at a concentration of 0.00098 J mg/L, which exceeded the RSL of 0.00097 mg/L.</li> <li>pH was 6.37 S.U. in Spring 2023 and 6.79 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4

**Table 3-1. Recommended FWGWMP Wells for 2024 (Continued)**

No.	RVAAP-66 Area	Well Name	Aquifer	2023 FWGWMP Sampling Recommendations	2023 Sampling Results	2024 FWGWMP Sampling Recommendations	FWGWMP Sampling Criterion (See Section 3.2)
16	RVAAP-08 Load Line 1	LL1mw-083	Upper Sharon	Continue to monitor for explosives and assess effectiveness of MNA (anions, TOC, alkalinity, pH, and expanded explosives, which include explosive daughter products) as a remedial option.	<ul style="list-style-type: none"> <li>1,3,5-TNB, 1,3-DNB, TNT, 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3,5-dinitroaniline, 4-amino-2,6-DNT, HMX, and RDX were the only explosives detected. The explosives 1,3,5-TNB, 2-nitrotoluene, HMX, and RDX did not exceed screening levels. 1,3-DNB was only detected in Spring 2023 at a concentration of 0.0011 J mg/L, which exceeded the RSL of 0.0002 mg/L. The detected concentration of TNT in Spring 2023 at 0.0018 mg/L and Fall 2023 at 0.0014 J mg/L both exceeded the RSL of 0.00098 mg/L. The detected concentration of 2,4-DNT in Spring 2023 at 0.0029 mg/L and Fall 2023 at 0.0029 J mg/L both exceeded the RSL of 0.00024 mg/L. 2,6-DNT was only detected in Fall 2023 at a concentration of 0.0016 J mg/L, which exceeds the RC of 0.000122 mg/L. The detected concentration of 2-amino-4,6-DNT in Spring 2023 at 0.0087 mg/L and Fall 2023 at 0.0079 J mg/L both exceeded the RC of 0.000209 mg/L. The detected concentration of 3,5-dinitroaniline in Spring 2023 at 0.0027 mg/L and Fall 2023 at 0.0017 J mg/L both exceeded the RSL of 0.00077 mg/L. The detected concentration of 4-amino-2,6-DNT in Spring 2023 at 0.013 mg/L and Fall 2023 at 0.011 J mg/L both exceeded the RC of 0.000209 mg/L.</li> <li>Alkalinity, nitrite, and sulfide were not detected in Spring or Fall 2023.</li> <li>Nitrate was detected at 0.18 J mg/L in both Spring and Fall 2023.</li> <li>Sulfate was detected at 23 J mg/L in Spring 2023 and 180 mg/L in Fall 2023.</li> <li>TOC was detected at 0.93 J mg/L in Spring 2023 and at 0.9 J mg/L in Fall 2023.</li> <li>pH was 4.44 S.U. in Spring 2023 and 4.47 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2,4
17	RVAAP-08 Load Line 1	LL1mw-084	Upper Sharon	Continue to monitor for explosives and assess effectiveness of MNA (anions, TOC, alkalinity, pH, and expanded explosives, which include explosive daughter products) as a remedial option.	<ul style="list-style-type: none"> <li>1,3,5-TNB, 1,3-DNB, TNT, 2,4-diamino-6-nitrotoluene, 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3,5-dinitroaniline, 4-amino-2,6-DNT, HMX, MNX, RDX, and TNX were the only explosives detected. The explosives 1,3,5-TNB, 2,4-diamino-6-nitrotoluene, 2-nitrotoluene, HMX, MNX, RDX, and TNX did not exceed screening levels. 1,3-Dinitrobenzene was only detected in the Spring 2023 parent and duplicate samples at concentrations of 0.0014 J and 0.0016 mg/L, respectively, both of which exceeded the RSL of 0.0002 mg/L. Detected concentrations of TNT in both the Spring 2023 and Fall 2023 parent and duplicate samples exceeded the RSL of 0.00098 mg/L. The detected concentration of TNT in the Spring 2023 parent sample was 0.0021 mg/L, while the duplicate was 0.0024 mg/L. The detected concentration of TNT in the Fall 2023 parent sample was 0.0021 J mg/L, while the duplicate was 0.0022 J mg/L. Detected concentrations of 2,4-DNT in the Spring 2023 duplicate sample and the Fall 2023 parent and duplicate samples exceeded the RSL of 0.00024 mg/L. The detected concentration of 2,4-DNT in the Spring 2023 duplicate sample was 0.00097 mg/L, while the parent sample was non-detect. The detected concentration of 2,4-DNT was 0.0015 J mg/L in the Fall 2023 parent sample and 0.0014 J mg/L in the duplicate. 2,6-DNT was only detected in the Fall 2023 duplicate sample at a concentration of 0.0008 mg/L, which exceeds the RC of 0.000122 mg/L. Detected concentrations of 2-amino-4,6-DNT in both the Spring and Fall 2023 parent and duplicate samples exceeded the RC of 0.000209 mg/L. The detected concentration of 2-amino-4,6-DNT in the Spring 2023 parent sample was 0.0062 mg/L, while the duplicate was 0.0068 mg/L. The detected concentration of 2-amino-4,6-DNT in the Fall 2023 parent sample was 0.0053 J mg/L, while the duplicate was 0.0052 J mg/L. Detected concentrations of 3,5-dinitroaniline in both the Spring and Fall 2023 parent and duplicate samples exceeded the RSL of 0.00077 mg/L. The detected concentration of 3,5-dinitroaniline in the Spring 2023 parent sample was 0.00099 mg/L, while the duplicate was 0.0012 mg/L. The detected concentration of 3,5-dinitroaniline in the Fall 2023 parent and duplicate sample was 0.0016 J mg/L. Detected concentrations of 4-amino-2,6-DNT in both the Spring 2023 and Fall 2023 parent and duplicate samples exceeded the RC of 0.000209 mg/L. The detected concentration of 4-amino-2,6-DNT in the Spring 2023 parent sample was 0.016 mg/L, while the duplicate was 0.018 mg/L. The detected concentration of 4-amino-2,6-DNT in the Fall 2023 parent and duplicate sample was 0.013 J mg/L.</li> <li>Nitrite and sulfide were not detected in the parent or duplicate sample in Spring or Fall 2023.</li> <li>Nitrate was detected at 0.67 and 0.66 mg/L in the parent and duplicate samples, respectively, in Spring 2023. Nitrate was detected at 0.4 J and 0.39 J mg/L in the parent and duplicate samples, respectively, in Fall 2023.</li> <li>Sulfate was only detected in the Spring 2023 parent sample at 110 mg/L and at 120 mg/L in the parent and duplicate samples in Fall 2023.</li> <li>Alkalinity was detected at 48 and 50 mg/L in the parent and duplicate samples, respectively, in Spring 2023. Alkalinity was detected at 29 mg/L in the parent and duplicate samples in Fall 2023.</li> <li>TOC was detected at 1.5 mg/L in Spring 2023 and 1.3 mg/L in Fall 2023.</li> <li>pH was 5.84 S.U. in Spring 2023 and 5.7 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2,4

Table 3-1. Recommended FWGWMP Wells for 2024 (Continued)

No.	RVAAP-66 Area	Well Name	Aquifer	2023 FWGWMP Sampling Recommendations	2023 Sampling Results	2024 FWGWMP Sampling Recommendations	FWGWMP Sampling Criterion (See Section 3.2)
18	RVAAP-08 Load Line 1	LL1mw-086	Unconsolidated	Monitor for explosives in this exit pathway well. Although no historical exceedances of screening levels have been detected, ongoing sampling for explosives is recommended in support of the FS.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 7.36 S.U. in Spring 2023 and 7.7 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1, 4
19	RVAAP-08 Load Line 1 (southeast of Load Line 1 fence)	LL1mw-087	Unconsolidated	Continue to monitor for explosives in this exit pathway well.	<ul style="list-style-type: none"> <li>Explosives were not detected in the parent or duplicate samples in Spring or Fall 2023.</li> <li>pH was 6.65 S.U. in Spring 2023. The well could not sustain low flow purging in Fall 2023. The well was purged dry, allowed to recharge, and sampled within hours (water quality parameters could not be recorded).</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1, 3
20	RVAAP-08 Load Line 1 (southeast of Load Line 1 fence)	LL1mw-089	Unconsolidated	Continue to monitor for explosives in this exit pathway well.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 5.26 S.U. in Spring 2023 and 5.72 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1, 2
21	RVAAP-08 Load Line 1	LL1mw-090	Unconsolidated	Not included in the 2023 Addendum. The monitoring well was installed and sampled in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b).	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 6.77 S.U. in Spring 2023 and 6.08 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
22	RVAAP-08 Load Line 1	LL1mw-091	Upper Sharon	Not included in the 2023 Addendum. The monitoring well was installed and sampled in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b).	<ul style="list-style-type: none"> <li>RDX was detected in Spring 2023 at 0.002 mg/L, which exceeded the RSL of 0.00097 mg/L. No other explosives were detected in Spring or Fall 2023.</li> <li>pH was 6.39 S.U. in Spring 2023 and 6.75 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
23	RVAAP-08 Load Line 1	LL1mw-092	Unconsolidated	Not included in the 2023 Addendum. The monitoring well was installed and sampled in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b).	<ul style="list-style-type: none"> <li>RDX was detected in Spring and Fall 2023 at 0.001 J mg/L, which exceeded the RSL of 0.00097 mg/L. No other explosives were detected in Spring or Fall 2023.</li> <li>pH was 7.09 S.U. in Spring 2023 and 7.21 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
24	RVAAP-08 Load Line 1	LL1mw-093	Upper Sharon	Not included in the 2023 Addendum. The monitoring well was installed and sampled in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b).	<ul style="list-style-type: none"> <li>RDX was detected in Spring 2023 at 0.00067 J mg/L and Fall 2023 at 0.00082 J mg/L; both detections were below the RSL of 0.00097 mg/L. No other explosives were detected in Spring or Fall 2023.</li> <li>pH was 6.72 S.U. in Spring 2023 and 7.21 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
25	RVAAP-09 Load Line 2 South	LL2mw-059	Upper Sharon	Continue to monitor for explosives and assess effectiveness of MNA (anions, TOC, alkalinity, pH, and expanded explosives, which include explosive daughter products) as a remedial option.	<ul style="list-style-type: none"> <li>1,3,5-TNB, 2,4-DNT, 3,5-dinitroaniline, and 4-amino-2,6-DNT were the only explosives detected in 2023. Detected concentrations of 1,3,5-TNB in Spring 2023 did not exceed screening levels. The detected concentrations of 2,4-DNT in Spring 2023 at 0.0003 mg/L and Fall 2023 at 0.00029 J mg/L both exceeded the RSL of 0.00024 mg/L. The detected concentrations of 3,5-dinitroaniline in Spring 2023 at 0.0019 mg/L and Fall 2023 at 0.0018 J mg/L exceeded the RSL of 0.00077 mg/L. The detected concentrations of 4-amino-2,6-DNT in Spring 2023 at 0.00054 mg/L and Fall 2023 at 0.00057 J mg/L exceeded the RC of 0.000209 mg/L.</li> <li>Nitrite was not detected in Spring or Fall 2023.</li> <li>Nitrate was detected at 0.39 J mg/L in Spring 2023 and 0.42 J mg/L in Fall 2023.</li> <li>Sulfate was detected at 16 mg/L in Spring 2023 and 20 mg/L in Fall 2023.</li> <li>Sulfide was only detected in Fall 2023 at 1.6 J mg/L.</li> <li>Alkalinity was detected at 110 mg/L in Spring 2023 and 100 mg/L in Fall 2023.</li> <li>TOC was detected at 1.2 mg/L in Spring 2023 and 1.3 mg/L in Fall 2023.</li> <li>pH was 6.13 S.U. in Spring 2023 and 6.24 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	1, 4
26	RVAAP-10 Load Line 3	LL3mw-237	Upper Sharon	Continue to monitor for explosives.	<ul style="list-style-type: none"> <li>The explosives TNT, 2-amino-4,6-DNT, and 4-amino-2,6-DNT were detected; however, only, 2-amino-4,6-DNT and 4-amino-2,6-DNT exceeded screening levels in Spring 2023. The detected concentration of 2-amino-4,6-DNT in Spring 2023 at 0.001 exceeded the RC of 0.000209 mg/L. The detected concentration of 4-amino-2,6-DNT in Spring 2023 at 0.0022 mg/L exceeded the RC of 0.000209 mg/L.</li> <li>pH was 6.42 S.U. in Spring 2023 and 6.28 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2

Table 3-1. Recommended FWGWMP Wells for 2024 (Continued)

No.	RVAAP-66 Area	Well Name	Aquifer	2023 FWGWMP Sampling Recommendations	2023 Sampling Results	2024 FWGWMP Sampling Recommendations	FWGWMP Sampling Criterion (See Section 3.2)
27	RVAAP-10 Load Line 3	LL3mw-238	Upper Sharon	Continue to monitor for explosives and assess effectiveness of MNA (anions, TOC, alkalinity, pH, and expanded explosives, which include explosive daughter products) as a remedial option.	<ul style="list-style-type: none"> <li>1,3,5-TNB, TNT, 2-amino-4,6-DNT, 3,5-dinitroaniline, 4-amino-2,6-DNT, HMX, and RDX were the only explosives detected. Detected concentrations of the explosives 1,3,5-TNB and HMX did not exceed screening levels. The detected concentrations of TNT in Spring 2023 at 0.028 J mg/L and Fall 2023 at 0.025 J mg/L exceeded the RSL of 0.00098 mg/L. 2-Amino-4,6-DNT was only detected in Spring 2023 at a concentration of 0.007 mg/L, which exceeds the RC of 0.000209 mg/L. The detected concentration of 3,5-dinitroaniline in Spring 2023 at 0.00092 mg/L exceeded the RSL of 0.00077 mg/L; the detected concentration in Fall 2023 did not exceed the RSL. The detected concentrations of 4-amino-2,6-DNT in Spring 2023 at 0.021 mg/L and Fall 2023 at 0.021 J mg/L exceeded the RC of 0.000209 mg/L. The detected concentrations of RDX in Spring 2023 at 0.0075 mg/L and Fall 2023 at 0.013 J mg/L exceeded the RSL of 0.00097 mg/L.</li> <li>Nitrite and sulfide were not detected in Spring or Fall 2023.</li> <li>Nitrate was detected 0.59 mg/L in Spring 2023 and 0.54 mg/L in Fall 2023.</li> <li>Sulfate was detected at 53 mg/L in Spring 2023 and 60 mg/L in Fall 2023.</li> <li>Alkalinity was detected at 140 mg/L in Spring and Fall 2023.</li> <li>TOC was detected at 2.6 mg/L in Spring 2023 and 2.2 mg/L in Fall 2023.</li> <li>pH was 6.72 S.U. in Spring 2023 and 6.27 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2
28	RVAAP-10 Load Line 3	LL3mw-239	Upper Sharon	Continue to monitor for explosives and assess effectiveness of MNA (anions, TOC, alkalinity, pH, and expanded explosives, which include explosive daughter products) as a remedial option.	<ul style="list-style-type: none"> <li>TNT, 2,4-DNT, 2-amino-4,6-DNT, 3,5-dinitroaniline, 4-amino-2,6-DNT, and RDX were the only explosives detected. Detected concentrations of 2,4-DNT and 3,5-dinitroaniline were below screening levels. The detected concentrations of TNT in Spring 2023 at 0.0033 mg/L and Fall 2023 at 0.0021 J mg/L exceeded the RSL of 0.00098 mg/L. The detected concentrations of 2-amino-4,6-DNT in Spring 2023 at 0.0011 mg/L and Fall 2023 at 0.00062 J mg/L exceeded the RC of 0.000209 mg/L. The detected concentrations of 4-amino-2,6-DNT in Spring 2023 at 0.0019 mg/L and Fall 2023 at 0.0013 J mg/L exceeded the RC of 0.000209 mg/L. Only the detected concentration of RDX in Spring 2023 at 0.0011 mg/L exceeded the RSL of 0.00097 mg/L.</li> <li>Nitrite and sulfide were not detected in Spring or Fall 2023.</li> <li>Nitrate was detected at 0.9 mg/L in Spring 2023 and 0.48 J mg/L in Fall 2023.</li> <li>Sulfate was detected at 38 mg/L in Spring 2023 and 41 mg/L in Fall 2023.</li> <li>Alkalinity was detected at 53 mg/L in Spring 2023 and 60 mg/L in Fall 2023.</li> <li>TOC was detected at 1.4 mg/L in Spring 2023 and 0.96 J mg/L in Fall 2023.</li> <li>pH was 5.94 S.U. in Spring 2023 and 6.31 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2
29	RVAAP-10 Load Line 3	LL3mw-241	Upper Sharon	Continue to monitor for explosives.	<ul style="list-style-type: none"> <li>1,3,5-TNB, TNT, 2,4-DNT, 2-amino-4,6-DNT, 3,5-dinitroaniline, 4-amino-2,6-DNT, HMX, and RDX were the only explosives detected. The explosives 1,3,5-TNB, 2,4-DNT, 3,5-dinitroaniline, and HMX were detected at concentrations below screening levels. Detected concentrations of TNT in the Spring 2023 parent sample at 0.0002 mg/L and the Fall 2023 parent and duplicate sample at 0.00089 mg/L exceeded the RSL of 0.00098 mg/L. The only detected concentration of 2-amino-4,6-DNT was in the Fall 2023 duplicate sample at 0.0011 mg/L, which exceeded the RC of 0.000209 mg/L. The detected concentration of 4-amino-2,6-DNT was 0.0017 mg/L in the Spring 2023 parent sample, 0.0011 J mg/L in the Fall 2023 parent sample, and 0.00086 J mg/L in the Fall 2023 duplicate sample. All three detections of 4-amino-2,6-DNT exceeded the RC of 0.000209 mg/L. 4-Amino-2,6-DNT was not detected in the Spring 2023 duplicate sample. The detected concentration of RDX in the Spring 2023 sample of 0.001 J mg/L exceeded the RSL of 0.00097 mg/L. Detected concentrations of RDX in the Fall 2023 parent and duplicate samples did not exceed the RSL.</li> <li>pH was 6.01 S.U. in Spring 2023 and 6.5 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2

**Table 3-1. Recommended FWGWMP Wells for 2024 (Continued)**

No.	RVAAP-66 Area	Well Name	Aquifer	2023 FWGWMP Sampling Recommendations	2023 Sampling Results	2024 FWGWMP Sampling Recommendations	FWGWMP Sampling Criterion (See Section 3.2)
30	RVAAP-10 Load Line 3	LL3mw-245	Upper Sharon	Monitor for explosives to support the FS.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 7.15 S.U. in Spring 2023 and 7.06 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
31	RVAAP-10 Load Line 3	LL3mw-247	Upper Sharon	Not included in the 2023 Addendum. The monitoring well was installed and sampled in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b).	<ul style="list-style-type: none"> <li>RDX was detected in Spring 2023 at 0.0017 J mg/L and in Fall 2023 at 0.0019 mg/L; both detections exceeded the RSL of 0.00097 mg/L. No other explosives were detected in Spring or Fall 2023.</li> <li>pH was 6.2 S.U. in Spring 2023 and 6.49 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
32	RVAAP-10 Load Line 3	LL3mw-248	Upper Sharon	Not included in the 2023 Addendum. The monitoring well was installed and sampled in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b).	<ul style="list-style-type: none"> <li>RDX was detected in Spring 2023 at 0.002 J mg/L, which exceeded the RSL of 0.00097 mg/L. No other explosives were detected in Spring or Fall 2023.</li> <li>pH was 6.14 S.U. in Spring 2023 and 6.18 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
33	RVAAP-12 Load Line 12	LL12mw-185	Unconsolidated	Continue to monitor for nitrate and ammonia.	<ul style="list-style-type: none"> <li>Nitrate was detected at 67 mg/L (parent) and 74 mg/L (duplicate) in Spring 2023 and 56 mg/L (parent) and 54 mg/L (duplicate) in Fall 2023, which exceeded the MCL of 10 mg/L.</li> <li>Ammonia was not detected in Spring 2023; however, it was detected at 0.097 J mg/L (parent) and 0.11 mg/L (duplicate) in Fall 2023.</li> <li>pH was 6.6 S.U. in Spring 2023 and 6.66 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for nitrate and ammonia to support the FS and future remedial decisions.</li> </ul>	2
34	RVAAP-12 Load Line 12	LL12mw-187	Unconsolidated	Continue to monitor for nitrate and ammonia.	<ul style="list-style-type: none"> <li>Nitrate was detected at 1,500 J mg/L in Spring 2023 and 1,700 J mg/L in Fall 2023, which exceeded the MCL of 10 mg/L and the RSL of 3.2 mg/L.</li> <li>Ammonia has no screening level but was detected at 730 mg/L in Spring and Fall 2023.</li> <li>pH was 6.25 S.U. in Spring 2023 and 6.55 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for nitrate and ammonia to support the FS and future remedial decisions.</li> </ul>	2
35	RVAAP-12 Load Line 12	LL12mw-244	Unconsolidated	Monitor for nitrate and ammonia to support the FS.	<ul style="list-style-type: none"> <li>Nitrate was not detected in 2023.</li> <li>Ammonia has no screening level but was detected at 0.22 mg/L in Spring 2023 and 0.35 mg/L in Fall 2023.</li> <li>pH was 7.22 S.U. in Spring 2023 and 7.17 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for nitrate and ammonia to support the FS and future remedial decisions.</li> </ul>	4
36	RVAAP-12 Load Line 12	LL12mw-245	Unconsolidated	Monitor for nitrate and ammonia to support the FS.	<ul style="list-style-type: none"> <li>Nitrate was not detected in Spring 2023 but was detected in Fall 2023 at 0.16 J mg/L, which is below the screening level.</li> <li>Ammonia was not detected in 2023.</li> <li>pH was 6.92 S.U. in Spring 2023 and 6.98 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for nitrate and ammonia to support the FS and future remedial decisions.</li> </ul>	4
37	RVAAP-12 Load Line 12	LL12mw-246	Unconsolidated	Monitor for nitrate and ammonia to support the FS.	<ul style="list-style-type: none"> <li>Nitrate was not detected in 2023.</li> <li>Ammonia has no screening level but was detected at 0.14 mg/L in Spring 2023 and was not detected in Fall 2023.</li> <li>pH was 7.06 S.U. in Spring 2023 and 7.09 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for nitrate and ammonia to support the FS and future remedial decisions.</li> </ul>	4
38	RVAAP-12 Load Line 12	LL12mw-248	Unconsolidated	Not included in the 2023 Addendum. The monitoring well was installed and sampled in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b).	<ul style="list-style-type: none"> <li>Nitrate and ammonia were not detected in Spring 2023. Well LL12mw-248 was dry and could not be sampled in Fall 2023.</li> <li>pH was 7.49 S.U. in Spring 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for nitrate and ammonia to support the FS and future remedial decisions.</li> </ul>	4
39	RVAAP-12 Load Line 12	LL12mw-249	Unconsolidated	Not included in the 2023 Addendum. The monitoring well was installed and sampled in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b).	<ul style="list-style-type: none"> <li>Nitrate was not detected in Spring 2023. Nitrate was detected in Fall 2023 at 0.15 J mg/L (duplicate), which is below the MCL of 10 mg/L.</li> <li>Ammonia was detected in Spring 2023 at 0.18 mg/L (duplicate) and was not detected in Fall 2023.</li> <li>pH was 7.21 S.U. in Spring 2023 and 7.13 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for nitrate and ammonia to support the FS and future remedial decisions.</li> </ul>	4

Table 3-1. Recommended FWGWMP Wells for 2024 (Continued)

No.	RVAAP-66 Area	Well Name	Aquifer	2023 FWGWMP Sampling Recommendations	2023 Sampling Results	2024 FWGWMP Sampling Recommendations	FWGWMP Sampling Criterion (See Section 3.2)
40	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-173	Homewood	Continue to monitor for explosives and assess effectiveness of MNA (anions, TOC, alkalinity, pH, and expanded explosives, which include explosive daughter products) as a remedial option.	<ul style="list-style-type: none"> <li>TNT, 2-amino-4,6-DNT, 3,5-dinitroaniline, and 4-amino-2,6-DNT were the only explosives detected. Detected concentrations of TNT and 3,5-dinitroaniline were below screening levels. The detected concentration of 2-amino-4,6-DNT in the Spring 2023 parent sample at 0.0012 mg/L exceeded the RC of 0.000209 mg/L and was not detected in Fall 2023. The detected concentration of 4-amino-2,6-DNT in the Spring 2023 parent sample at 0.0015 mg/L exceeded the RC of 0.000209 mg/L and was not detected in Fall 2023.</li> <li>Nitrite and sulfide were not detected in Spring or Fall 2023.</li> <li>Nitrate was detected in the Spring 2023 parent sample at 0.2 mg/L and in the duplicate at 0.21 mg/L, both below the MCL of 10 mg/L. Nitrate was not detected in Fall 2023.</li> <li>Sulfate was detected at 42 mg/L in the parent sample and 45 mg/L in the duplicate sample in Spring 2023. Sulfate was detected at 33 J mg/L in the parent and duplicate sample in Fall 2023.</li> <li>Alkalinity was detected at 18 mg/L in the parent sample and duplicate sample in Spring 2023 and at 23 mg/L in the parent sample and 21 mg/L in the duplicate sample in Fall 2023.</li> <li>TOC was detected at 0.85 J mg/L in Spring 2023 and 0.57 J mg/L in Fall 2023.</li> <li>pH was 5.43 S.U. in Spring 2023 and 5.69 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
41	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-174	Homewood	Continue to monitor for explosives and assess effectiveness of MNA (anions, TOC, alkalinity, pH, and expanded explosives, which include explosive daughter products) as a remedial option.	<ul style="list-style-type: none"> <li>TNT, 2,4-DNT, 2-amino-4,6-DNT, 3,5-dinitroaniline, and 4-amino-2,6-DNT were the only explosives detected. Detected concentrations of 3,5-dinitroaniline were below screening levels. The detected concentrations of TNT in Spring 2023 at 0.0033 mg/L and Fall 2023 at 0.0044 mg/L both exceeded the RSL of 0.00098 mg/L. 2,4-DNT was only detected in Spring 2023 at 0.00049 J mg/L, which exceeded the RSL of 0.00024 mg/L. The detected concentrations of 2-amino-4,6-DNT in Spring 2023 at 0.007 mg/L and Fall 2023 at 0.0052 mg/L both exceeded the RC of 0.000209 mg/L. The detected concentrations of 4-amino-2,6-DNT in Spring 2023 at 0.012 mg/L and Fall 2023 at 0.025 mg/L both exceeded the RC of 0.000209 mg/L.</li> <li>Sulfide and nitrite were not detected in Spring or Fall 2023.</li> <li>Nitrate was detected at 0.89 mg/L in Spring 2023 and 0.52 mg/L in Fall 2023.</li> <li>Sulfate was detected at 64 mg/L in Spring 2023 and 35 mg/L in Fall 2023.</li> <li>Alkalinity was detected at 8.3 J mg/L in Spring 2023 and 26 mg/L in Fall 2023.</li> <li>TOC was detected at 1.7 mg/L in Spring and Fall 2023.</li> <li>pH was 4.7 S.U. in Spring 2023 and 5.99 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2
42	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-175	Homewood	Continue to monitor for explosives.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 5.09 S.U. in Spring 2023 and 5.93 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	2
43	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-178	Homewood	Not included in the 2023 Addendum. The monitoring well was installed and sampled in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b).	<ul style="list-style-type: none"> <li>RDX was detected at 0.0027 J mg/L in the Spring 2023 parent sample and at 0.0026 J mg/L in the Spring 2023 duplicate sample; both detections exceeded the RSL of 0.00097 mg/L. No other explosives were detected in Spring or Fall 2023.</li> <li>pH was 5.76 S.U. in Spring 2023 and 5.95 in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
44	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-179	Upper Sharon	Not included in the 2023 Addendum. The monitoring well was installed and sampled in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b).	<ul style="list-style-type: none"> <li>RDX was detected in Spring 2023 at 0.00077 J mg/L, which is below the RSL of 0.00097 mg/L. 2-nitrotoluene was detected in Spring 2023 at 0.00028 J mg/L, which is below the RC of 0.00037 mg/L. No other explosives were detected in Spring or Fall 2023.</li> <li>pH was 6.68 S.U. in Spring 2023 and 7.24 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4



Table 3-1. Recommended FWGWMP Wells for 2024 (Continued)

No.	RVAAP-66 Area	Well Name	Aquifer	2023 FWGWMP Sampling Recommendations	2023 Sampling Results	2024 FWGWMP Sampling Recommendations	FWGWMP Sampling Criterion (See Section 3.2)
45	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-180	Homewood	Not included in the 2023 Addendum. The monitoring well was installed and sampled in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b).	<ul style="list-style-type: none"> <li>RDX was detected in Spring 2023 at 0.011 J mg/L, which exceeded the RSL of 0.00097 mg/L. 2-Nitrotoluene was detected in Spring 2023 at 0.00022 J mg/L, which is below the RC of 0.00037 mg/L. No other explosives were detected in Spring or Fall 2023.</li> <li>pH was 5.69 S.U. in Spring 2023 and 6.11 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
46	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-181	Upper Sharon	Not included in the 2023 Addendum. The monitoring well was installed and sampled in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b).	<ul style="list-style-type: none"> <li>RDX was detected in Spring 2023 at 0.00096 J mg/L, which is below the RSL of 0.00097 mg/L. No other explosives were detected in Spring or Fall 2023.</li> <li>pH was 6.73 S.U. in Spring 2023 and 7.1 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
47	RVAAP-43 Load Line 10	LL10mw-003	Homewood	Continue to monitor for carbon tetrachloride to verify recent reduced concentrations.	<ul style="list-style-type: none"> <li>Carbon tetrachloride was not detected Spring 2023 and was detected at 0.0018 mg/L in Fall 2023, below the MCL of 0.005 mg/L.</li> <li>pH was 6.46 S.U. in Spring 2023 and 6.83 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to monitor for carbon tetrachloride to verify recent reduced concentrations.</li> </ul>	2
48	RVAAP-66 Facility-wide Groundwater (southern portion of Administration Area)	FWGmw-004	Unconsolidated	Continue to monitor for explosives in this exit pathway well.	<ul style="list-style-type: none"> <li>Explosives were not detected in the parent or duplicate sample in Spring or Fall 2023.</li> <li>pH was 7.04 S.U. in Spring and Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1
49	RVAAP-66 Facility-wide Groundwater (southwestern portion of facility, south of NACA Test Area)	FWGmw-007	Unconsolidated	Continue to monitor for explosives in this exit pathway well.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 6.85 S.U. in Spring 2023 and 6.87 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1
50	RVAAP-66 Facility-wide Groundwater (in DLA Main Ore Storage Area)	FWGmw-010	Unconsolidated	Monitor for explosives to support the FS.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023</li> <li>pH was 5.4 S.U. in Spring 2023 and 5.76 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
51	RVAAP-66 Facility-wide Groundwater (near East Classification Yard)	FWGmw-011	Unconsolidated	Continue to monitor for explosives in this exit pathway well.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 7.07 S.U. in Spring 2023 and 7.06 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1, 3
52	RVAAP-66 Facility-wide Groundwater (near East Classification Yard)	FWGmw-012	Upper Sharon	Continue to monitor for explosives in this exit pathway well.	<ul style="list-style-type: none"> <li>RDX was detected at 0.00031 J mg/L in Spring 2023, which is below the RSL of 0.00097 mg/L. No other explosives were detected in Spring or Fall 2023.</li> <li>pH was 6.3 S.U. in Spring 2023 and 5.95 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1, 3
53	RVAAP-66 Facility-wide Groundwater (southeast of Administration Area)	FWGmw-015	Unconsolidated	Continue to monitor for explosives in this exit pathway well.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 6.94 S.U. in Spring 2023 and 7.2 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1, 3
54	RVAAP-66 Facility-wide Groundwater (southeast of Administration Area)	FWGmw-016	Upper Sharon	Continue to monitor for explosives in this exit pathway well.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 7.14 S.U. in Spring 2023 and 7.38 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1, 3
55	RVAAP-66 Facility-wide Groundwater (off-facility, south of State Route 5, south of Load Line 12)	FWGmw-018	Basal Sharon	Continue to monitor for nitrates to support the FS. Discontinue sampling for VOCs, as VOCs have not been detected in well since 2018.	<ul style="list-style-type: none"> <li>Nitrate was not detected in Spring or Fall 2023.</li> <li>pH was 7.19 S.U. in Spring 2023 and 7.03 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for nitrates to support the FS and future remedial decisions.</li> </ul>	1, 3, 4
56	RVAAP-66 Facility-wide Groundwater (off-facility, south of State Route 5, south of Load Line 12)	FWGmw-020	Upper Sharon	Continue to monitor for nitrates to support the FS. Discontinue sampling for VOCs, as VOCs have not been detected in well since 2018.	<ul style="list-style-type: none"> <li>Nitrate was detected in Spring 2023 at 0.13 J mg/L, below the MCL of 10 mg/L. Nitrate was not detected in Fall 2023.</li> <li>pH was 6.95 S.U. in Spring 2023 and 7.07 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for nitrates to support the FS and future remedial decisions.</li> </ul>	1, 3, 4

Table 3-1. Recommended FWGWMP Wells for 2024 (Continued)

No.	RVAAP-66 Area	Well Name	Aquifer	2023 FWGWMP Sampling Recommendations	2023 Sampling Results	2024 FWGWMP Sampling Recommendations	FWGWMP Sampling Criterion (See Section 3.2)
57	RVAAP-66 Facility-wide Groundwater (off-facility, south of State Route 5, south of Load Line 3)	FWGmw-021	Upper Sharon	Continue to monitor for explosives in this exit pathway well.	<ul style="list-style-type: none"> <li>2-amino-4,6-DNT was detected in Spring 2023 and RDX was detected in Fall 2023, both concentrations were below screening levels. No other explosives were detected in Spring or Fall 2023.</li> <li>pH was 6.05 S.U. in Spring 2023 and 6.33 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1
58	RVAAP-66 Facility-wide Groundwater (downgradient from Fuze and Booster Quarry Landfill/Ponds)	FWGmw-023	Upper Sharon	Monitor for explosives to support the FS.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 7.04 S.U. in Spring 2023 and 7.32 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives to support the FS and future remedial decisions.</li> </ul>	4
59	RVAAP-66 Facility-wide Groundwater (off-facility, south of State Route 5, south of Load Line 2)	FWGmw-024	Upper Sharon	Continue to monitor for explosives in this exit pathway well.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 6.99 S.U. in Spring 2023 and 7.22 in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1
60	RVAAP-66 Facility-wide Groundwater (southeastern portion of facility)	SCFmw-004	Basal Sharon	Continue to monitor for explosives in this exit pathway well.	<ul style="list-style-type: none"> <li>Explosives were not detected in Spring or Fall 2023.</li> <li>pH was 6.87 S.U. in Spring 2023 and 7.02 S.U. in Fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Continue monitoring for explosives in this exit pathway well.</li> </ul>	1, 3
	CC RVAAP-71 Barn No. 5 Petroleum Release	071tw-001	Unconsolidated	Not included in the 2023 Addendum. Newly installed and sampled temporary well in accordance with the FS Monitoring Well Installation Plan (Leidos 2022b). Only proposed for one round of sampling, completed in Spring 2023. The temporary well will be abandoned in 2024.	<ul style="list-style-type: none"> <li>Lead was detected in the parent sample at 0.00083 J mg/L and at 0.00081 J mg/L in the duplicate, both detections are below the MCL of 0.015 mg/L.</li> <li>1-Methylnaphthalene was detected in the parent sample at 0.000033 J mg/L and at 0.000031 J mg/L in the duplicate; both detections are below the RSL of 0.0011 mg/L. 2-Methylnaphthalene was detected in the parent sample at 0.000036 J mg/L and at 0.000037 J mg/L in the duplicate, both detections are below the RSL of 0.0036 mg/L.</li> <li>Benzene was only detected in the duplicate sample at 0.00035 mg/L, which is below the MCL of 0.005 mg/L.</li> <li>TPH GRO was detected in the parent and duplicate sample at 0.074 mg/L, screening levels do not exist for TPH GRO.</li> <li>pH was 7.23 S.U.</li> </ul>	<ul style="list-style-type: none"> <li>Additional sampling under the FWGWMP is not recommended.</li> <li>All chemical concentrations from groundwater collected from the temporary well were below applicable screening levels.</li> <li>This temporary well will be abandoned in 2024.</li> </ul>	NS

Denotes wells where additional sampling is not recommended.

This table does not include a discussion of essential nutrients (calcium, chloride, iodine, iron, magnesium, potassium, phosphorus, and sodium).

- |  |   |
|--|---|
| DFFO = Director's Final Findings and Orders            | PCB = Polychlorinated Biphenyl                  |
| DNB = Dinitrobenzene                                   | RC = Residential Cleanup Goal                   |
| DNT = Dinitrotoluene                                   | RDX = Hexahydro-1,3,5-Trinitro-1,3,5-Triazine   |
| FS = Feasibility Study                                 | RSL = Regional Screening Level                  |
| FWGWMP = Facility-wide Groundwater Monitoring Plan     | RVAAP = Ravenna Army Ammunition Plant           |
| GRO = Gasoline-Range Organics                          | S.U. = Standard Unit                            |
| HMX = Octahydro-1,3,5,7-Tetranitro-1,3,5,7-Tetrazocine | SVOC = Semivolatile Organic Compound            |
| MCL = Maximum Contaminant Level                        | TNB = Trinitrobenzene                           |
| mg/L = Milligrams per Liter                            | TNT = 2,4,6-Trinitrotoluene                     |
| MNA = Monitored Natural Attenuation                    | TNX = Hexahydro-1,3,5-Trinitroso-1,3,5-Triazine |
| MNX = Hexahydro-1-Nitroso-3,5-Dinitro-1,3,5-Triazine   | TOC = Total Organic Carbon                      |
| NACA = National Advisory Committee on Aeronautics      | TPH = Total Petroleum Hydrocarbons              |
| PAH = Polycyclic Aromatic Hydrocarbon                  | VOC = Volatile Organic Compound                 |

Table 3-2. FWGWMP Wells with Analytical Testing Suite

No.	RVAAP-66 Area	Well Name	Aquifer	Explosives	Nitrate	Metals	VOCs	SVOCs*	PCBs	Pesticides	Cyanide	Other
1	RVAAP-04 Open Demolition Area #2	DEtmw-003	Unconsolidated	X		X	X	X	X	X	X	
2	RVAAP-04 Open Demolition Area #2	DEtmw-004	Unconsolidated	X		X	X	X	X	X	X	
3	RVAAP-05 Winklepeck Burning Grounds	WBGmw-006	Unconsolidated	X								
4	RVAAP-05 Winklepeck Burning Grounds	WBGmw-009	Unconsolidated	X								
5	RVAAP-05 Winklepeck Burning Grounds	WBGmw-014	Unconsolidated	X								
6	RVAAP-05 Winklepeck Burning Grounds	WBGmw-016	Unconsolidated	X								
7	RVAAP-05 Winklepeck Burning Grounds	WBGmw-017	Unconsolidated	X								
8	RVAAP-05 Winklepeck Burning Grounds	WBGmw-018	Unconsolidated	X								
9	RVAAP-05 Winklepeck Burning Grounds	WBGmw-020	Upper Sharon	X								
10	RVAAP-05 Winklepeck Burning Grounds	WBGmw-021	Upper Sharon	X								
11	RVAAP-08 Load Line 1	LL1mw-063	Unconsolidated	X								
12	RVAAP-08 Load Line 1	LL1mw-064	Unconsolidated	X								
13	RVAAP-08 Load Line 1	LL1mw-080	Upper Sharon	X								
14	RVAAP-08 Load Line 1	LL1mw-081	Upper Sharon	X								
15	RVAAP-08 Load Line 1	LL1mw-082	Upper Sharon	X								
16	RVAAP-08 Load Line 1	LL1mw-083	Upper Sharon	X								
17	RVAAP-08 Load Line 1	LL1mw-084	Upper Sharon	X								
18	RVAAP-08 Load Line 1	LL1mw-086	Unconsolidated	X								
19	RVAAP-08 Load Line 1	LL1mw-087	Unconsolidated	X								
20	RVAAP-08 Load Line 1	LL1mw-089	Unconsolidated	X								
21	RVAAP-08 Load Line 1	LL1mw-090	Unconsolidated	X								
22	RVAAP-08 Load Line 1	LL1mw-091	Upper Sharon	X								
23	RVAAP-08 Load Line 1	LL1mw-092	Unconsolidated	X								
24	RVAAP-08 Load Line 1	LL1mw-093	Upper Sharon	X								
25	RVAAP-09 Load Line 2	LL2mw-059	Upper Sharon	X								
26	RVAAP-10 Load Line 3	LL3mw-237	Upper Sharon	X								
27	RVAAP-10 Load Line 3	LL3mw-238	Upper Sharon	X								
28	RVAAP-10 Load Line 3	LL3mw-239	Upper Sharon	X								
29	RVAAP-10 Load Line 3	LL3mw-241	Upper Sharon	X								
30	RVAAP-10 Load Line 3	LL3mw-245	Upper Sharon	X								
31	RVAAP-10 Load Line 3	LL3mw-247	Upper Sharon	X								
32	RVAAP-10 Load Line 3	LL3mw-248	Upper Sharon	X								
33	RVAAP-12 Load Line 12	LL12mw-185	Unconsolidated		X							Ammonia
34	RVAAP-12 Load Line 12	LL12mw-187	Unconsolidated		X							Ammonia
35	RVAAP-12 Load Line 12	LL12mw-244	Unconsolidated		X							Ammonia
36	RVAAP-12 Load Line 12	LL12mw-245	Unconsolidated		X							Ammonia
37	RVAAP-12 Load Line 12	LL12mw-246	Unconsolidated		X							Ammonia
38	RVAAP-12 Load Line 12	LL12mw-248	Unconsolidated		X							Ammonia
39	RVAAP-12 Load Line 12	LL12mw-249	Unconsolidated		X							Ammonia
40	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-173	Homewood	X								

Table 3-2. FWGWMP Wells with Analytical Testing Suite (Continued)

No.	RVAAP-66 Area	Well Name	Aquifer	Explosives	Nitrate	Metals	VOCs	SVOCs*	PCBs	Pesticides	Cyanide	Other
41	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-174	Homewood	X								
42	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-175	Homewood	X								
43	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-178	Homewood	X								
44	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-179	Upper Sharon	X								
45	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-180	Homewood	X								
46	RVAAP-16 Fuze and Booster Quarry Landfill/Ponds	FBQmw-181	Upper Sharon	X								
47	RVAAP-43 Load Line 10	LL10mw-003	Homewood									Carbon Tetrachloride
48	RVAAP-66 Facility-wide Groundwater	FWGmw-004	Unconsolidated	X								
49	RVAAP-66 Facility-wide Groundwater	FWGmw-007	Unconsolidated	X								
50	RVAAP-66 Facility-wide Groundwater	FWGmw-010	Unconsolidated	X								
51	RVAAP-66 Facility-wide Groundwater	FWGmw-011	Unconsolidated	X								
52	RVAAP-66 Facility-wide Groundwater	FWGmw-012	Upper Sharon	X								
53	RVAAP-66 Facility-wide Groundwater	FWGmw-015	Unconsolidated	X								
54	RVAAP-66 Facility-wide Groundwater	FWGmw-016	Upper Sharon	X								
55	RVAAP-66 Facility-wide Groundwater	FWGmw-018	Basal Sharon		X							
56	RVAAP-66 Facility-wide Groundwater	FWGmw-020	Upper Sharon		X							
57	RVAAP-66 Facility-wide Groundwater	FWGmw-021	Upper Sharon	X								
58	RVAAP-66 Facility-wide Groundwater	FWGmw-023	Upper Sharon	X								
59	RVAAP-66 Facility-wide Groundwater	FWGmw-024	Upper Sharon	X								
60	RVAAP-66 Facility-wide Groundwater	SCFmw-004	Basal Sharon	X								

X = Indicates well or constituent to be sampled as part of the 2024 FWGWMP. Wells and constituents will be sampled semi-annually.

\*SVOCs include phthalates, nitroaromatics, polycyclic aromatic hydrocarbons, and phenols.

FWGWMP = Facility-wide Groundwater Monitoring Program

PCB = Polychlorinated Biphenyl

RVAAP = Ravenna Army Ammunition Plant

SVOC = Semivolatile Organic Compound

VOC = Volatile Organic Compound

**Table 3-3. Analytical Laboratory Test Methods**

<b>Constituents</b>	<b>Method*</b>
Nitroaromatics and Nitramines (Explosives)	Explosives by HPLC (8330B)
Nitrate	General Chemistry (9056)
Metals (Aluminum, Iron, Magnesium, Potassium, Sodium, Phosphorus, Calcium)	Inductively Coupled Plasma (6010D)
Metals (Antimony, Beryllium, Thallium, Zinc, Cadmium, Manganese, Barium, Nickel, Silver, Vanadium, Chromium, Cobalt, Copper, Arsenic, Lead, Selenium)	Inductively Coupled Plasma/Mass Spectrometry (6020B)
Mercury	Liquid Waste Cold Vapor Technique (7470A)
VOCs	GC/MS Volatile Organics (8260D)
SVOCs, including Phthalates, Phenols, or Nitroaromatics	GC/MS Semivolatile Organics (8270E)
PCBs	GC – SVOCs (8082A)
Pesticides	GC Semivolatile Organics (8081B)
Cyanide (Total)	General Chemistry (9012B)

\*USEPA SW846

GC = Gas Chromatography

HPLC = High-Performance Liquid Chromatography

MS = Mass Spectrometry

PCB = Polychlorinated Biphenyl

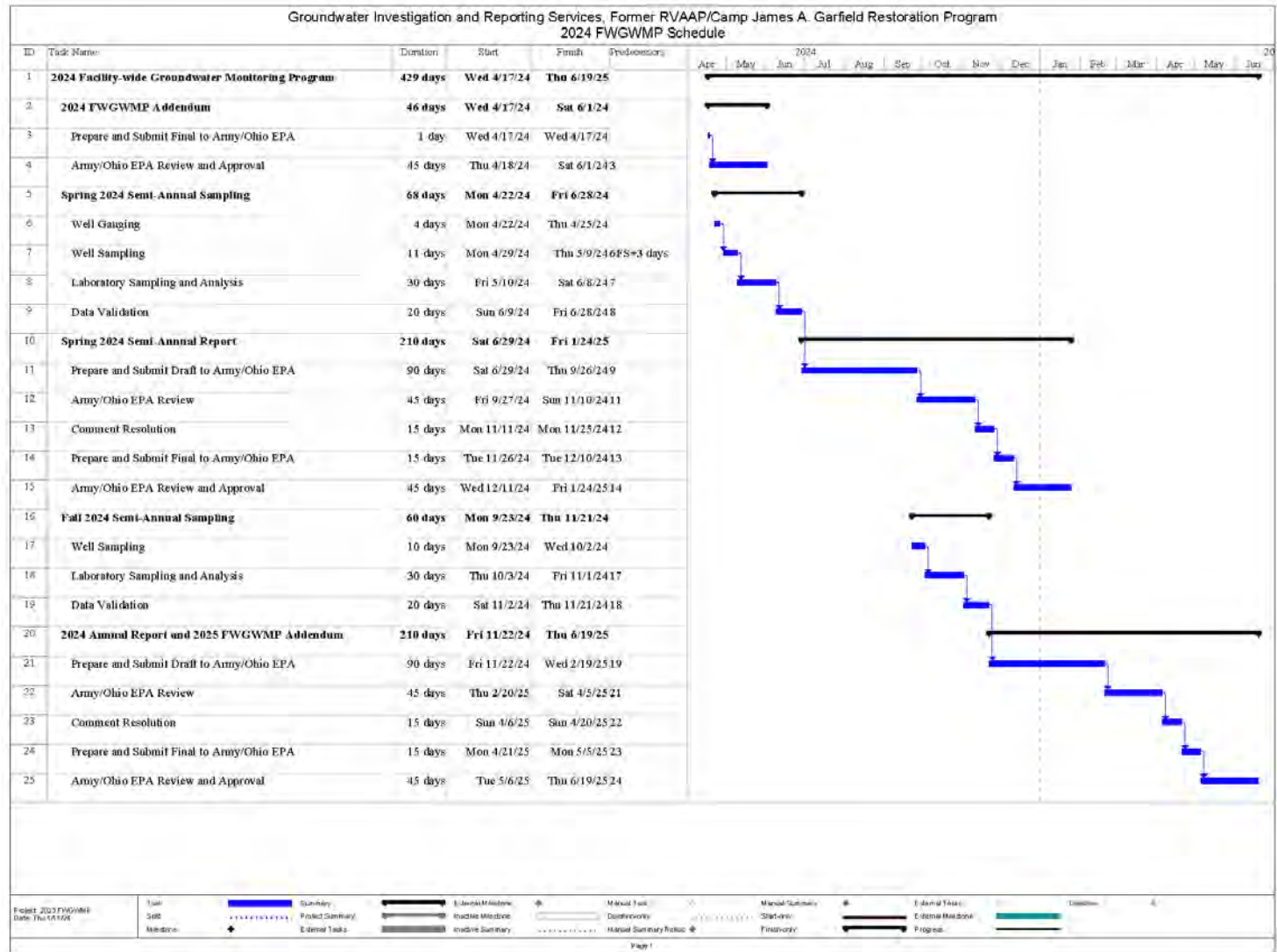
SVOC = Semivolatile Organic Compound

USEPA = U.S. Environmental Protection Agency

VOC = Volatile Organic Compound

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## 4.0 SCHEDULE



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## 5.0 REFERENCES

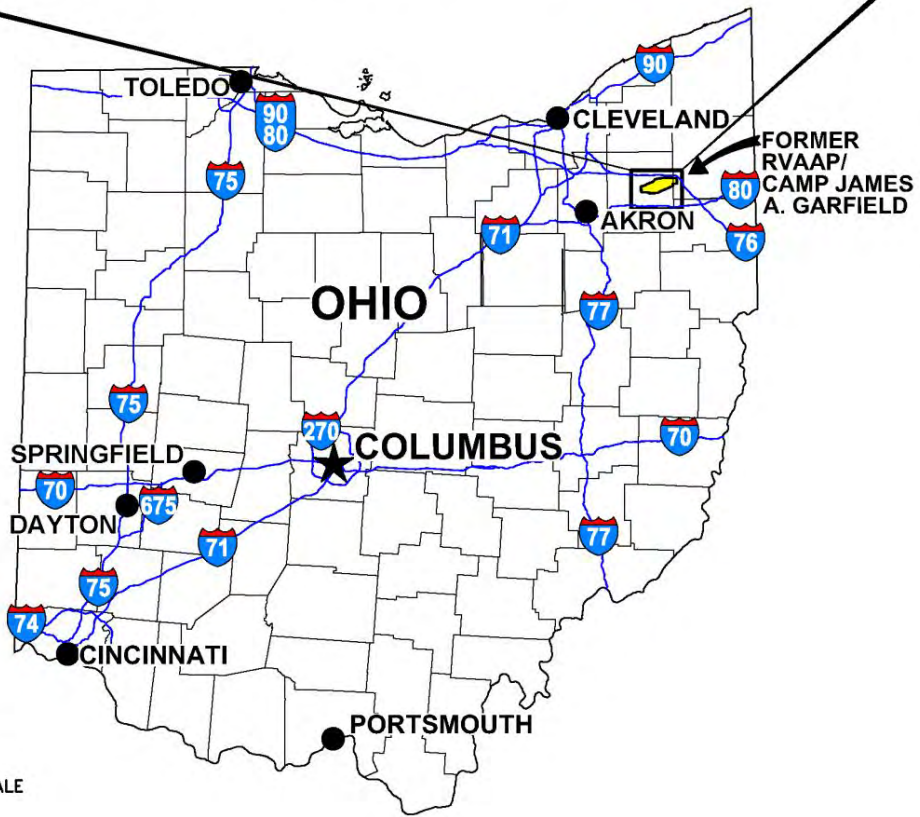
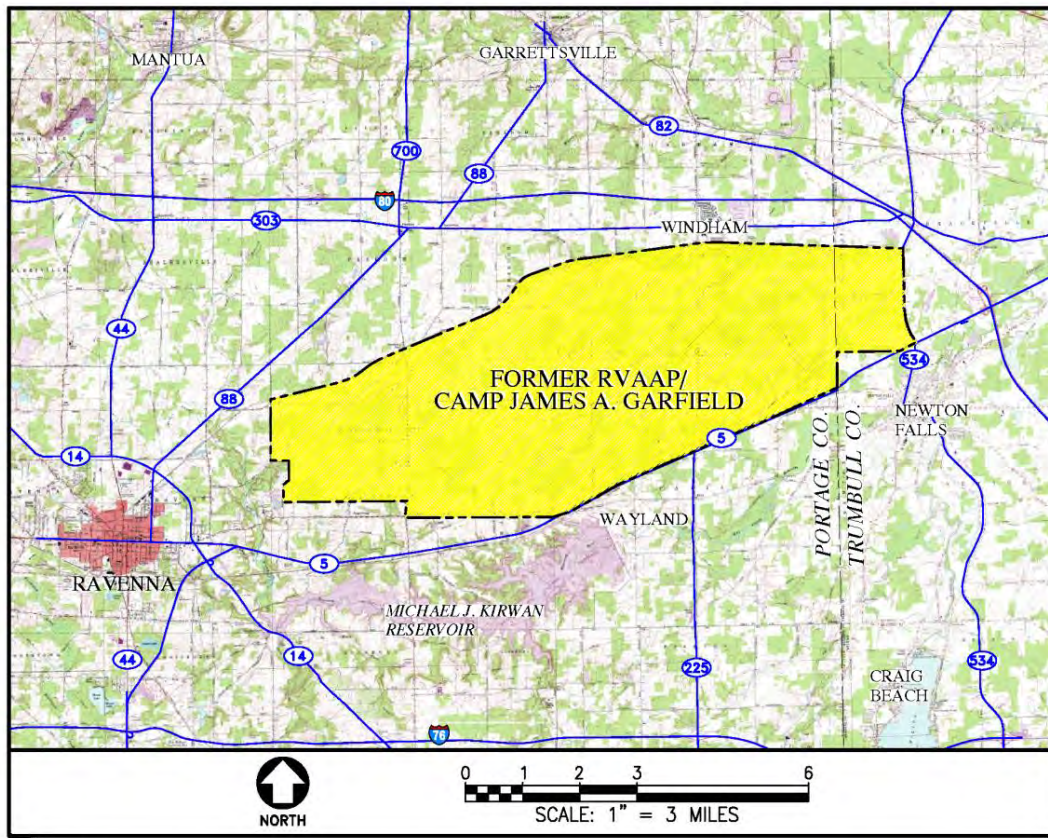
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- Leidos. 2022b. *Feasibility Study Monitoring Well Installation Plan for RVAAP-66 Facility-Wide Groundwater*. November.
- Leidos. 2023. *Facility-wide Groundwater Monitoring Program Plan, RVAAP-66 Facility-wide Groundwater, Addendum for 2023*. May.
- Leidos. 2024. *Annual Report for 2023 for RVAAP-66 Facility-wide Groundwater*. PENDING.
- Ohio EPA (Ohio Environmental Protection Agency). 2004. *Director's Final Findings and Orders for the Ravenna Army Ammunition Plant*. June.
- Portage Environmental. 2004. *Facility-wide Groundwater Monitoring Program Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio*. September.
- TEC-Weston. 2016. *Remedial Investigation Work Plan for Groundwater and Environmental Investigation Services for RVAAP-66 Facility-Wide Groundwater*. December.

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## **FIGURES**

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1/22/19 c:\06042\DWGS\564-ADDEN FIGURE1-1

Figure 2-1. General Location and Orientation of the Former RVAAP/CJAG

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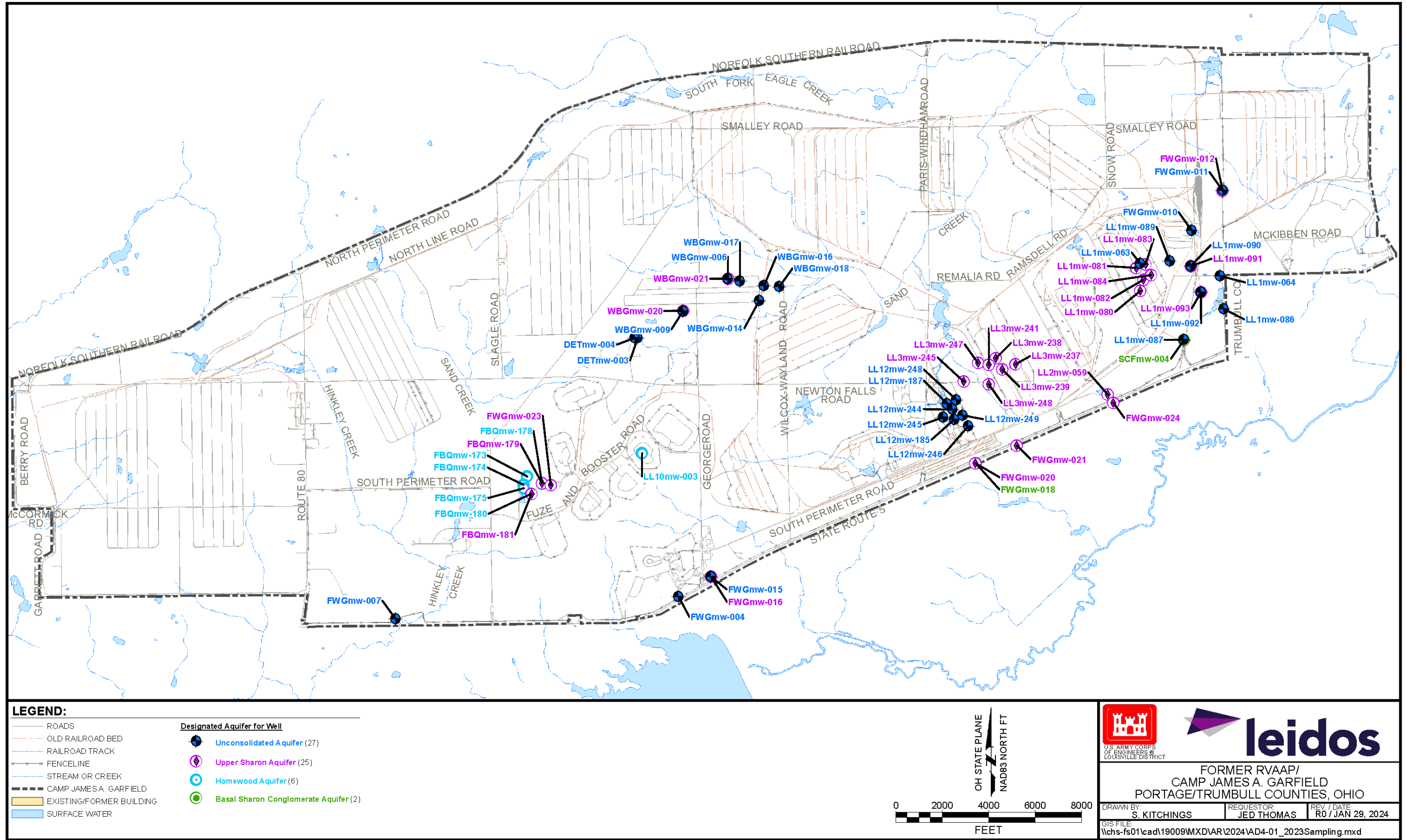


Figure 3-1. 2024 FWGWMP Wells

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**APPENDIX A**  
**OHIO EPA CORRESPONDENCES**

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August 6, 2024

**TRANSMITTED ELECTRONICALLY**

Mr. Kevin Sedlak  
Restoration Program Manager  
ARNG-ILE Clean Up  
Camp James A Garfield JTC  
1438 State Route 534 SW  
Newton Falls, OH 44444

RE:   US Army Ammunition Plt RVAAP  
Remediation Response  
Approval  
Project Records  
Remedial Response  
Portage County  
ID#267000859036

Sent via email to: [Kevin.m.sedlak.ctr@army.mil](mailto:Kevin.m.sedlak.ctr@army.mil)

**Subject:   Former Ravenna Army Ammunition Plant  
Responses to Comments on the Draft RVAAP-66 Facility-wide Groundwater  
Addendum for 2024 (Work Activity No. 267-000-859-036)  
Ohio EPA – Request for Final Report**

Dear Mr. Sedlak:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the RVAAP-66 Facility-Wide Groundwater, Responses to Comments on the Draft RVAAP-66 Facility-wide Groundwater Addendum for 2024 (Work Activity No. 267-000-859-036) for the Former Ravenna Army Ammunition Plant (RVAAP)<sup>1</sup>, Portage and Trumbull Counties, Ohio (Camp James A. Garfield Joint Training Facility-CJAG). This document was received at Ohio EPA's Northeast District Office (NEDO), Division of Environmental Response and Revitalization (DERR) on June 5, 2024. The report was prepared for the United States Army Corps of Engineers on behalf of the National Guard Bureau by Leidos.

Based on our review of the Army National Guard's Response to Ohio EPA comments provided in your letter dated June 5, 2024, we find the responses generally acceptable, and the document can be finalized. Please be sure that all agreed-upon changes, additions, and clarifications are provided in the final document.

---

<sup>1</sup><http://edocpub.epa.ohio.gov/publicportal/ViewDocument.aspx?docid=3083841>

US Army Ammunition Plt RVAAP

August 6, 2024

Page 2 of 2

In the response to Ohio EPA Comment #2, the Army referenced statistical analysis information provided as Appendix J in the Draft Facility-Wide Groundwater Annual Report for 2023. A review of that appendix indicates that the Figure J-1 graph appears to have data shifted down 0.2 ug/L (a result that should be 4.0 ug/L is shown on the graph as 3.8 ug/L). There is also no backup Sanitas statistical data printout to show what data was incorporated into the statistical graph of Figure J-1. In future Annual Reports, please continue to include the statistical analysis of Appendix J (Mann-Kendall test for LL10mw-003), but also include the statistical data printout that was missing from the 2023 report as well as an explanation of the apparently shifted data points.

If you have questions or would like to set up a meeting to discuss these comments, please contact me at [liam.mcevoy@epa.ohio.gov](mailto:liam.mcevoy@epa.ohio.gov).

Sincerely,



Liam P. McEvoy, PG

Geologist III

Division of Environmental Response and Revitalization

LPM/cm

ec: Jennifer Tierney, Chenega Reliable Services  
Angela Cobbs, Chenega Reliable Services  
Katie Tait, OHARNG RTLS  
Steven Kvaal, USACE Louisville  
Nat Peters, USACE Louisville  
Megan Oravec, Ohio EPA, NEDO DERR  
Natalie Oryshkewych, Manager, Ohio EPA NEDO DERR  
Craig Kowalski, Ohio EPA, NEDO DERR  
Thomas Schneider, Ohio EPA, SWDO DERR  
Carrie Rasik, Ohio EPA, CO DERR



**NATIONAL GUARD BUREAU**  
111 SOUTH GEORGE MASON DRIVE  
ARLINGTON VA 22204-1373

June 5, 2024

Ohio Environmental Protection Agency  
DERR-NEDO  
Attn: Mr. Liam McEvoy  
2110 East Aurora Road  
Twinsburg, OH 44087-1924

Subject: Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Portage/Trumbull Counties, RVAAP-66 Facility-Wide Groundwater, Responses to Comments on the Draft RVAAP-66 Facility-wide Groundwater Addendum for 2024 (Work Activity No. 267-000-859-036)

Dear Mr. McEvoy:

The Army National Guard (ARNG) appreciates your comments on the Draft Facility-wide Groundwater Monitoring Program Plan, RVAAP-66 Facility-wide Groundwater, Addendum for 2024. Enclosed for your review are responses to your comments. Upon final resolution of the comments, the ARNG will provide a Final version of the addendum for Ohio EPA concurrence.

These comment responses were prepared for the Army National Guard in support of the RVAAP Restoration Program. Please contact the undersigned at 330-235-2153, or [kevin.m.sedlak.ctr@army.mil](mailto:kevin.m.sedlak.ctr@army.mil) if there are issues or concerns with this submission.

Sincerely,

TAIT.KATHRYN.SE  
RENA.1289508275

Digitally signed by  
TAIT.KATHRYN.SERENA.1289508  
275  
Date: 2024.06.05 07:31:21 -04'00'

**FOR** Kevin M. Sedlak  
Restoration Project Manager  
Army National Guard Directorate

cc: Thomas Schneider, Ohio EPA, SWDO, DERR  
Carrie Rasik, Ohio EPA, CO, DERR  
Megan Oravec, Ohio EPA, NEDO, DERR  
Katie Tait, OHARNG  
Steve Kvaal, USACE Louisville  
Jay Trumble, USACE Louisville  
Jed Thomas, Leidos  
Ryan Laurich, Leidos  
Jennifer Tierney, Chenega Reliable Services

Subject: Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Portage/Trumbull Counties, RVAAP-66 Facility-Wide Groundwater, Responses to Comments on the Draft RVAAP-66 Facility-wide Groundwater Addendum for 2024 (Work Activity No. 267-000-859-036)

## COMMENTS

### **Ohio EPA Comment 1 Clarifications to the 2024 Sampling Scheme:**

The *Draft FWGWMP Addendum* for 2024, within Section 3.0 Scope of Work, references that a total of 58 wells have been selected for sampling during 2024. However, according to Table 3-1, a total of 60 wells appears selected for 2024 sampling.

Additionally, one temp well 071tw-001 installed at the RVAAP-71 Barn No. 5, was proposed to be deleted from 2024 sampling since the 2023 sampling indicated all Chemicals of Concern (COCs) were below applicable levels and the well was slated to be abandoned. According to Table 3-1, this 071tw-001 well is denoted as “The temporary well has been abandoned.” in one column and “This temporary well will be abandoned in 2024.” In another column. Section 3.1 Revisions To The 2024 Sampling Scheme indicates that “This temporary well will be abandoned in 2024.”

Please clarify if the total number of wells to be sampled per this Draft FWGWMP Addendum for 2024 is supposed to be 58 wells or 60 wells, and please clarify if the temp well 071tw-001 was abandoned in 2023 or slated for abandonment in 2024. If the well is slated for abandonment, please submit to Ohio EPA such proposed activities in a well abandonment work plan or notice of proper well abandonment activities to be conducted.

*Army Response:* Clarification and agree. The total number of wells to be sampled per the FWGWMP Addendum for 2024 is 60 wells. The number of wells referenced under Section 3.0, paragraph 2, line 94 has been revised to 60 wells. The number of wells referenced under Section 3.1, paragraph 1, line 101 has been revised to 60 wells. Temporary well 071tw-001 has not been abandoned and is currently scheduled to be abandoned in June/July 2024. Table 3-1 has been revised to indicate that the temporary well will be abandoned in 2024. Well abandonment activities will follow the existing facility-wide well abandonment work plan (*Well Abandonment Work Plan for RVAAP-66 Facility-Wide Groundwater* [TEC-Weston 2016]). A 15-day notification will be submitted to Ohio EPA prior to the completion of proper well abandonment activities for temporary well 071tw-001.

Subject: Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Portage/Trumbull Counties, RVAAP-66 Facility-Wide Groundwater, Responses to Comments on the Draft RVAAP-66 Facility-wide Groundwater Addendum for 2024 (Work Activity No. 267-000-859-036)

**Ohio EPA Comment 2 Section 3.1: Revisions to the 2024 Sampling Scheme:**

For 2023 sampling, Ohio EPA risk recommended to continue sampling monitoring well LL10mw-003 at Load Line 10 for carbon tetrachloride; while the detections are below the MCL RI 5.0 µg/L, the ~~GHMFWQW~~ were on an upward trend and the current sampling in winter and fall is not the season in which the highest concentration was detected, which was summer.

2023	2022	2021	2020	2019	2018
Fall:	Fall:	Winter:	Fall:	Fall:	June:
Below MCL	2.9 µg/L	3.5 µg/L	2.6 µg/L	below MCL	7.5 J µg/L
Spring:	Spring:	Spring:	Spring:	Spring:	October:
1.8 µg/L	4 µg/L	2.4 µg/L	1.3 J µg/L	below MCL	6.7 J µg/L

While the sampling at LL10mw-003 at Load Line 10 for carbon tetrachloride is proposed to be continued for the 2024 sampling events, please clarify if any summer sampling event is being contemplated in 2024 to investigate potentially higher concentrations from this well.

*Army Response:* Clarification. A summer sampling event for carbon tetrachloride at LL10mw-003 is not being proposed. Per the Ohio EPA letter dated April 19, 2023, which provided comments to the Draft Facility-wide Groundwater Annual Report for 2022, a statistical analysis of the historical carbon tetrachloride data through 2023 was completed for monitoring well LL10mw-003. The results of a Mann-Kendall Trend test indicate that the data do not show a statistically significant trend. The results of the statistical analysis are provided in Appendix J to the Draft Facility-wide Groundwater Annual Report for 2023. Based on the results of the statistical analysis, seasonal testing outside the FWGWMP Semi-Annual sampling events is not being proposed.



May 3, 2024

**TRANSMITTED ELECTRONICALLY**

Mr. Kevin Sedlak  
Restoration Program Manager  
ARNG-ILE Clean Up  
Camp James A Garfield JTC  
1438 State Route 534 SW  
Newton Falls, OH 44444

RE: US Army Ammunition Plt RVAAP  
Remediation Response  
Approval  
Remedial Investigation  
Remedial Response  
Portage County  
ID#267000859036

Sent via email to:

[Kevin.m.sedlak.ctr@mail.mil](mailto:Kevin.m.sedlak.ctr@mail.mil)

**Subject: Ohio EPA Comments on the Draft Facility-wide Groundwater Monitoring Program Plan RVAAP-66 Facility-wide Groundwater Addendum for 2024, dated February 12, 2024**

Dear Mr. Sedlak:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the *Draft Facility-Wide Ground Water Monitoring Program (FWGWMP) RVAAP-66 Facility-wide Groundwater Addendum for 2024 (Draft FWGWMP Addendum for 2024)*<sup>1</sup>, for the Former Ravenna Army Ammunition Plant (RVAAP), Portage and Trumbull Counties, Ohio dated February 12, 2024. The report was prepared for the United States Army Corps of Engineers on behalf of the National Guard Bureau by Leidos under Contract Number W912QR-21-D-0016. This document was received via email at Ohio EPA's Northeast District Office (NEDO), Division of Environmental Response and Revitalization (DERR) on February 13, 2024. Comments on the document based on Ohio EPA review are provided below. Please provide responses to the enclosed comments in accordance with the Directors Findings and Orders.

**GROUNDWATER COMMENTS**

1. Clarifications to the 2024 Sampling Scheme:

<sup>1</sup> <http://edocpub.epa.ohio.gov/publicportal/ViewDocument.aspx?docid=2804758>



The *Draft FWGWMP Addendum for 2024*, within Section 3.0 Scope of Work, references that a total of 58 wells have been selected for sampling during 2024. However, according to Table 3-1, a total of 60 wells appears selected for 2024 sampling.

Additionally, one temp well 071tw-001 installed at the RVAAP-71 Barn No. 5, was proposed to be deleted from 2024 sampling since the 2023 sampling indicated all Chemicals of Concern (COCs) were below applicable levels and the well was slated to be abandoned. According to Table 3-1, this 071tw-001 well is denoted as “The temporary well has been abandoned.” in one column and “This temporary well will be abandoned in 2024.” in another column. Section 3.1 Revisions To The 2024 Sampling Scheme indicates that “This temporary well will be abandoned in 2024.”

Please clarify if the total number of wells to be sampled per this *Draft FWGWMP Addendum for 2024* is supposed to be 58 wells or 60 wells, and please clarify if the temp well 071tw-001 was abandoned in 2023 or slated for abandonment in 2024. If the well is slated for abandonment, please submit to Ohio EPA such proposed activities in a well abandonment work plan or notice of proper well abandonment activities to be conducted.

**RISK COMMENTS**

2. Section 3.1: Revisions to the 2024 Sampling Scheme

For 2023 sampling, Ohio EPA risk recommended to continue sampling monitoring well LL10mw-003 at Load Line 10 for carbon tetrachloride; while the detections are below the MCL of 5.0 µg/L, the detections were on an upward trend and the current sampling in winter and fall is not the season in which the highest concentration was detected, which was summer.

2023	2022	2021	2020	2019	2018
Fall: below MCL	Fall: 2.9 µg/L	Winter: 3.5 µg/L	Fall: 2.6 µg/L	Fall: below MCL	June: 7.5J µg/L
Spring: 1.8 µg/L	Spring: 4 µg/L	Spring: 2.4 µg/L	Spring: 1.3J µg/L	Spring: below MCL	October: 6.7J µg/L

US Army Ammunition Plt RVAAP

May 3, 2024

Page 3 of 3

While the sampling at LL10mw-003 at Load Line 10 for carbon tetrachloride is proposed to be continued for the 2024 sampling events, please clarify if any summer sampling event is being contemplated in 2024 to investigate potentially higher concentrations from this well.

This *Draft Facility-Wide Ground Water Monitoring Program (FWGWMP) RVAAP-66 Facility-wide Groundwater Addendum for 2024* was reviewed by personnel from Ohio EPA. Additional information is necessary to approve the document.

If you have questions or would like to set up a meeting to discuss these comments, you can reach me at [liam.mcevoy@epa.ohio.gov](mailto:liam.mcevoy@epa.ohio.gov) or at (330) 963-1181.

Sincerely,



Liam P. McEvoy, PG

Geologist III

Division of Environmental Response and Revitalization

LPM/cm

ec: Angela Cobbs, Chenega Reliable Services  
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