

Draft
Record of Decision for RVAAP-03 Open Demolition Area #1

Ravenna Army Ammunition Plant
Ravenna, Ohio

Contract No. W912QR-08-D-0013
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Prepared for:



**US Army Corps
of Engineers ®**
Louisville District

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Shaw Environmental & Infrastructure, Inc., a CB&I company, has completed the *Draft Record of Decision for RVAAP-03 Open Demolition Area #1* at the Ravenna Army Ammunition Plant, Ravenna, Ohio. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy, principles, and procedures, utilizing justified and valid assumptions, was verified. This included review of data quality objectives; technical assumptions; methods, procedures and materials to be used; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets customer's needs consistent with law and existing United States Army Corps of Engineers policy.

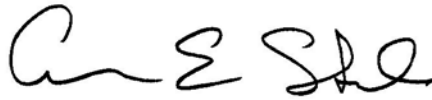
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ARNG—Army National Guard
 BRACD—Base Realignment and Closure Division
 OHARNG—Ohio Army National Guard
 RVAAP—Ravenna Army Ammunition Plant
 Shaw—Shaw Environmental & Infrastructure, Inc.
 USACE—United States Army Corps of Engineers
 USAEC—United States Army Environmental Command

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1 **Acronyms and Abbreviations**

2	AOC	area of concern
3	ARAR	applicable or relevant and appropriate requirement
4	bgs	below ground surface
5	Camp Ravenna	Camp Ravenna Joint Military Training Center
6	CERCLA	Comprehensive Environmental Response, Compensation and Liability
7		Act of 1980
8	CERCLIS	Comprehensive Environmental Response, Compensation and Liability
9		Information System
10	COC	chemical of concern
11	COPC	chemical of potential concern
12	EPA	U.S. Environmental Protection Agency
13	ERA	ecological risk assessment
14	FS	Feasibility Study
15	FWCUG	Facility-Wide Cleanup Goal
16	HHRA	human health risk assessment
17	IRA	Interim Removal Action
18	IRP	Installation Restoration Program
19	MD	munitions debris
20	MEC	munitions and explosives of concern
21	mg/kg	milligrams per kilogram
22	NCP	National Oil and Hazardous Substances Pollution Contingency Plan
23	NTA	National Advisory Committee for Aeronautics Test Area
24	O&M	operation and maintenance
25	OB	open burning
26	OD	open detonation
27	ODA1	Open Demolition Area #1
28	OHARNG	Ohio Army National Guard
29	Ohio EPA	Ohio Environmental Protection Agency
30	RAB	Restoration Advisory Board
31	RAO	remedial action objective
32	RCRA	Resource Conservation and Recovery Act
33	RI	Remedial Investigation
34	ROD	Record of Decision
35	RVAAP	Ravenna Army Ammunition Plant
36	SAIC	Science Applications International Corporation
37	Shaw	Shaw Environmental & Infrastructure, Inc.
38	SRC	site-related contaminant
39	TNT	trinitrotoluene
40	TSCA	Toxic Substances Control Act
41	U.S.	United States
42	U.S. Army	U.S. Department of the Army
43	USACE	U.S. Army Corps of Engineers
44	UXO	unexploded ordnance
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PART I: DECLARATION

A. Site Name and Location

This Record of Decision (ROD) addresses soil at the Open Demolition Area #1 (ODA1), Ravenna Army Ammunition Plant (RVAAP), Ravenna, Portage County, Ohio (**Figure 1**). ODA1 is identified in the United States (U.S.) Department of the Army (U.S. Army) Environmental Database for Restoration as RVAAP-03. The ODA1 area of concern (AOC) is located in the southwestern part of the RVAAP (**Figure 2**). The U.S. Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Identifier for the RVAAP is OH5210020736.

B. Statement of Basis and Purpose

The U.S. Army is the lead agency and has chosen the selected remedy for ODA1 soil in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on information contained in the Administrative Record file for ODA1.

The Ohio Environmental Protection Agency (Ohio EPA), the lead regulatory agency, approved the *Final Phase II Remedial Investigation and Feasibility Study for RVAAP-03 Open Demolition Area #1* (U.S. Army Corps of Engineers [USACE], 2013). The Remedial Investigation (RI) and Feasibility Study (FS) evaluated contaminated soil remedies at ODA1 and recommended Institutional Controls. The Ohio EPA concurs with the above recommendation. Work under this ROD is subject to the terms and conditions as set forth in the agreement between the Ohio EPA and the U.S. Army entitled *Director's Final Findings and Orders*, dated June 10, 2004 (Ohio EPA, 2004).

C. Assessment of the Site

The response action selected in this ROD is to protect public health, welfare, and the environment from actual or potential releases of hazardous substances into the environment.

D. Description of the Selected Remedy

The remedy described in this ROD addresses the remediation of soil at ODA1 at the RVAAP with concentrations of one chemical of concern (COC) exceeding the remedial goals for unrestricted land use. The timing for conducting remedial action at ODA1 has not yet been determined. Other AOCs at the RVAAP, including facility-wide groundwater, will be managed as separate actions by the U.S. Army.

The selected remedy addresses soil through institutional controls. The major components of the selected remedy, Alternative S2, Institutional Controls, include the following (descriptions of this and other remedial alternatives are presented in Sections II.I and II.J of this ROD):

- Access restrictions—Administrative policies that specify access controls, installing Seibert stakes, long-term maintenance, and monitoring; installing signage and structural access barriers to prevent vehicular traffic in the contaminated area; and restricting future property use (i.e., unrestricted land use);
- Land-use Restrictions—Prohibition of residential use of the property, vehicular traffic, and invasive (digging) activities without unexploded ordnance (UXO) support; and
- Five-Year Reviews.

E. Statutory Determination

The selected remedy is protective of human health and the environment, complies with federal and State laws and regulations that are applicable or relevant and appropriate to the remedial action, and is cost effective.

The remedy does not satisfy the statutory preference for treatment. The majority of treatment technologies and process options identified in the initial screening were eliminated from further consideration primarily due to their not being applicable for explosives, the only COC for the AOC, or their not being consistent with the anticipated future land use, Ohio Army National Guard (OHARNG) land use for military training. Any remaining treatment technologies were eliminated in the evaluation of process options due to high relative cost.

Because this remedy will result in the COC remaining on site above concentrations that allow for unrestricted use and exposure, Five-Year Reviews will be performed in compliance with CERCLA Section 121(c). These reviews will ensure that the remedy remains protective of human health and the environment consistent with the land use.

F. Record of Decision Data Certification Checklist

Table 1 provides the location of key remedy selection information contained in Part II, Decision Summary. Additional information can be found in the Administrative Record file for ODA1.

1 **Table 1**
2 **ROD Data Certification Checklist**

ROD Data Checklist Item	ROD Section	Section Start Page
COCs and their respective concentrations	II.G	10
Baseline risk represented by the COCs	II.G	10
Cleanup goals established for COCs and the basis for these goals	II.H	12
How source materials constituting principal threats are addressed	II.K	20
Current and reasonably anticipated future land-use assumptions used in the baseline risk assessment and ROD	II.F	10
Suitable potential land uses following the selected remedy	II.L.4	21
Estimated capital, annual O&M, and the total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected	II.L.3	21
Key factor(s) that led to selecting the remedy	II.L.1	20

3 *COC denotes chemical of concern.*
4 *O&M denotes operation and maintenance.*
5 *ROD denotes Record of Decision.*
6

7 **G. Authorizing Signatures and Support Agency Acceptance of Remedy**
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11 _____
12 William J. O'Donnell II, Branch Chief
13 Operational Army and Medical Branch
14 Department of the Army
15 Assistant Chief of Staff for Installation Management
16 Base Realignment and Closure Division (DAIM-ODB)
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Date

23 Scott Nally
24 Director
25 Ohio Environmental Protection Agency
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Date

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PART II: DECISION SUMMARY

A. Site Name, Location, and Description

The current RVAAP consists of 1,260 acres scattered throughout the OHARNG Camp Ravenna Joint Military Training Center, hereafter referred to as Camp Ravenna. Camp Ravenna is federally owned and licensed to the OHARNG for use as a military training site. The Ohio EPA is the lead regulatory agency for the remediation conducted by the U.S. Army under the U.S. Department of Defense Installation Restoration Program (IRP). The EPA CERCLIS Identifier for the RVAAP is OH5210020736.

Camp Ravenna is located in northeastern Ohio within Portage and Trumbull Counties, approximately 3 miles east-northeast of the city of Ravenna and approximately 1 mile northwest of the city of Newton Falls (**Figure 1**). The RVAAP portions of the property are located solely within Portage County. The RVAAP and Camp Ravenna occupy a parcel of property approximately 11 miles long and 3.5 miles wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry Roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east (**Figures 1 and 2**). Camp Ravenna is surrounded by several communities: Windham is to the north, Garrettsville is 6 miles to the northwest, Newton Falls is 1 mile to the southeast, Charlestown is to the southwest, and Wayland is 3 miles to the south.

When the RVAAP was operational, Camp Ravenna did not exist and the entire 21,683-acre parcel was a federal government-owned, contractor-operated, industrial facility. The RVAAP IRP encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP. References to the RVAAP in this document indicate the historical extent of the RVAAP, which is inclusive of the combined acreages of the current Camp Ravenna and the RVAAP, unless otherwise specifically stated.

The only industrial activities still performed at the RVAAP are environmental restoration, ordnance clearance, infrequent demolition of any UXO discovered during investigation and remediation activities, and building decontamination and demolition.

ODA1 is approximately 6 acres in size and is located in the southwestern quadrant of Camp Ravenna, north of Hinkley Creek (**Figure 3**), in the middle of and surrounded by the National Advisory Committee for Aeronautics Test Area (NTA). ODA1 consisted of an oval open burning (OB) and open detonation (OD) area, which was surrounded by a 25-foot-wide by 1.5-foot-tall earthen berm, and a plane storage area located on the south side of the AOC.

The U.S. Army is the lead agency for any remediation decisions, and any applicable cleanup at ODA1. These activities are being conducted under the IRP. The Ohio EPA is the lead regulatory agency.

1 **B. Site History and Enforcement Activities**

2 The RVAAP was constructed in 1940 and 1941 for depot storage and ammunition assembly/loading
3 and placed on standby status in 1950. Production activities resumed from 1954 to 1957 and again from
4 1968 to 1972. Demilitarization activities, including disassembly of munitions and explosives melt-out
5 and recovery, continued until 1992. In addition to production and demilitarization activities at the load
6 lines, other facilities at the RVAAP include sites that were used for burning, demolition, testing of
7 munitions, and other activities to support the RVAAP’s mission.

8 ODA1 was in operation from 1941 to 1949, and was primarily used for the thermal destruction of
9 munitions, explosives, and related materials by OB/OD operations. During the late 1940s through the
10 early 1950s, ODA1 was also used as a plane storage area for the NTA. ODA1 has been inactive and
11 access restricted since the cessation of OB/OD activities.

12 The following environmental reports have been completed for ODA1:

- 13 • *Ravenna Army Ammunition Plant Water Quality Surveillance Program* (U.S. Army Toxic
14 and Hazardous Materials Agency, 1980–1992);
- 15 • *Final Preliminary Assessment for Ravenna Army Ammunition Plant, Ravenna, Ohio* (U.S.
16 Army Center for Health Promotion and Preventive Medicine, 1996);
- 17 • *Phase I Remedial Investigation Report for Demolition Area 1 at the Ravenna Army*
18 *Ammunition Plant, Ohio* (Science Applications International, Inc. [SAIC], 2001);
- 19 • *Final OE/UXO Removal & Interim Removal Action Report for the Open Demolition Area #1*
20 (MKM Engineers, Inc., 2004);
- 21 • *Final Data Quality Objectives Report for the RVAAP-03 Open Demolition Area #1* (Shaw
22 Environmental & Infrastructure, Inc. [Shaw], 2009);
- 23 • *Final Digital Geophysical Mapping Report for RVAAP-34 Sand Creek Disposal Road*
24 *Landfill, RVAAP-03 Open Demolition Area #1, and RVAAP-28 Mustard Agent Burial Site*
25 (Shaw, 2011); and
- 26 • *Phase II Remedial Investigation and Feasibility Study for RVAAP-03 Open Demolition Area*
27 *#1, Draft Version 2.0* (Shaw, 2013).

28 **C. Highlights of Community Participation**

29 Using the RVAAP community relations program, the U.S. Army and the Ohio EPA have interacted
30 with the public through news releases, public meetings, reading materials, direct mailing, an internet
31 website, and receiving and responding to public comments. Specific items of the community relations
32 program include the following:

- 33 • **Restoration Advisory Board (RAB):** The U.S. Army established the RAB in 1996 to
34 promote community involvement in the U.S. Department of Defense environmental cleanup

activities and to allow the public to review and discuss the progress with decision makers. RAB meetings are held every two months and are open to the public.

- **RVAAP Community Relations Plan:** The RVAAP Community Relations Plan (USACE, 2003) was prepared to establish processes to keep the public informed of activities at the RVAAP. The plan is available in the Administrative Record at the RVAAP.
- **RVAAP Internet Website:** The U.S. Army established an internet website in 2004 for the RVAAP. This internet website is accessible to the public at www.rvaap.org.

In accordance with Section 117(a) of CERCLA and Section 300.430(f)(2) of the NCP, the U.S. Army released the *Proposed Plan for RVAAP-03 Open Demolition Area #1* (Shaw, 2013b) to the public in September 2013. The Proposed Plan and other project-related documents were made available to the public in the Administrative Record maintained at the RVAAP in Ravenna, Ohio and in the two Information Repositories at Reed Memorial Library in Ravenna, Ohio and Newton Falls Public Library in Newton Falls, Ohio. The notice of availability for the Proposed Plan was sent to the following media outlets: radio stations, television stations, and newspapers (*Newton Falls Press*, *Youngstown Vindicator*, *Warren Tribune-Chronicle*, *Akron Beacon Journal*, and *Ravenna Record Courier*) as specified in the RVAAP Community Relations Plan (USACE, 2003). The notice of availability initiated the 30-day public comment period beginning September XX, 2013 and ending October XX, 2013.

The U.S. Army held a public meeting on October XX, 2013 at the LOCATION TBD to present the Proposed Plan to the public. At this meeting, representatives of the U.S. Army provided information and answered questions about soil contamination at ODA1. A transcript of the public meeting is available to the public and has been included in the Administrative Record. Responses to the verbal and written comments received at this meeting and during the public comment period are included in the Responsiveness Summary, which is Part III of this ROD.

The U.S. Army considered public input from the public meeting on the Proposed Plan in selecting the remedial alternative to be used for soil at ODA1.

D. Scope and Role of Response Actions within AOC Strategy

The overall program goal of the IRP at the RVAAP is to clean up previously-contaminated lands to reduce contamination to concentrations that are not anticipated to cause risks, with primary emphasis on those areas that may impact human health and the environment. ODA1 is one of 54 AOCs in the IRP at the RVAAP. This ROD addresses soil and does not address other potentially contaminated media at ODA1. The selected remedy described in the ROD is consistent with the stated future action(s) to be performed at the RVAAP. Other media at ODA1, and other AOCs at the RVAAP, will be managed as separate actions or decisions by the U.S. Army and will be considered under separate RODs.

This ROD addresses soil at ODA1. The 2,4,6-trinitrotoluene (2,4,6-TNT) contamination in soil present at ODA1 poses a potential human health cancer risk greater than 1×10^{-5} and/or a hazard index greater than 1.0 for a Resident (Adult and Child) receptor for unrestricted land use. Implementation of the remedy described in this ROD will reduce the potential exposure pathways to contaminated soil through implementation of institutional controls.

E. Summary of Site Characteristics

Characteristics, nature and extent of contamination, and the conceptual site model of ODA1 are based on the various assessments and investigations conducted at ODA1 from 1980 through 2010 as presented in the RI/FS for ODA1 (Shaw, 2013a).

E.1 Topography/Physiography

Topography across ODA1 is relatively flat with little change in elevation. The elevation at ODA1 is approximately 1,085 feet above mean sea level. Currently, ODA1 occupies an open, gently sloping parcel of land that is bounded to the south, east, and west by woodlands. The berms around the OB/OD area are essentially removed and a low area immediately south and east of the former berm collects runoff during rainfall events. Surface water drains to Hinkley Creek to the south and west of the AOC (Shaw, 2013a).

E.2 Soils and Geology

The regional geology at the RVAAP consists of horizontal to gently dipping bedrock strata of Mississippian and Pennsylvanian age overlain by varying thicknesses of unconsolidated glacial deposits. Soils at ODA1 consist of the Fitchville silt loam series. This series exhibits 2 to 6 percent slopes, is somewhat poorly drained, and has low permeability. The surficial geology at ODA1 consists of the Lavery Till. In general, the clayey, silty Lavery Till consists of approximately 28 percent sand and 30 percent clay, but percentages can vary. ODA1 lies within the Sharon Conglomerate (Shaw, 2013a).

E.3 Hydrogeology

The depth to the water table at ODA1 has been observed from approximately 5 feet below ground surface (bgs) to 11 feet bgs. Shallow groundwater present in the unconsolidated glacial material is suspected to flow across the AOC from north to south, following topographic trends and surface water flow patterns. Deeper groundwater is likely to flow along strike of the regional buried bedrock valley (i.e., to the southwest) and off of the RVAAP property (Shaw, 2013a).

E.4 Ecology

ODA1 is within a dry, upland fields plant community and the dry, Early Successional Herbaceous Field Herbaceous Alliance. The Early Successional Herbaceous Field Herbaceous Alliance is associated with recently disturbed areas lacking sufficient recovery time for further successional (shrub) development. No sensitive habitats were identified on or near ODA1 during the natural heritage data searches. No Special Interest Areas have been designated within or include any portion of

ODA1. Based on planning-level survey data, no wetland areas were identified at ODA1. An abundance of wildlife is present at the RVAAP. There are currently no federally listed species or critical habitats at the RVAAP. State-listed species have been confirmed to be present on the RVAAP, although ODA1 has not been previously surveyed for rare species (Shaw, 2013a).

E.5 Nature and Extent of Contamination

The Phase I RI results, based on sampling conducted in 1999, indicated the primary media of concern were surface and subsurface soil (SAIC, 2001). Site-related contamination in soil was identified as explosives and metals. The Phase I RI identified human health as the primary factor for facilitating further remedial activities at ODA1 based on the present and continued use of the site for military training.

In conjunction with the Phase I RI, a munitions and explosives of concern (MEC) debris removal and Interim Removal Action (IRA) were conducted at ODA1 in 2000 and 2001 (MKM Engineers, Inc., 2004). The presence of MEC/munitions debris (MD) was identified on the ground surface at ODA1 during the Phase I RI. The objective of the removal action at ODA1 was to remove the MEC/MD, and the hazards associated with it, to a depth of 4 feet bgs, and to eliminate the human health exposure to explosives and metals identified in the Phase I RI.

Surface soils at the site, characterized as 0 to 1 foot bgs at the RVAAP, consist of silty loam. Previous surface soil samples collected at ODA1 focused primarily on identified potential source areas within the AOC boundaries. These source areas included the OB/OD area, plane storage areas, and low-lying drainage areas. Sample results indicated that surface soils had been impacted primarily by metals and low-level explosives, and the bulk of the contamination was concentrated around the south ditch and other isolated hotspots (Shaw, 2013a). Subsurface soils at the site, characterized as greater than 1 foot bgs at the RVAAP, consist mostly of fine sands with interbedded lenses of silty sands and silty clays.

Following the removal of soils from grids established during the 2000 to 2001 IRA, confirmatory composite samples from the base of these excavations indicated that subsurface soils were still impacted by metals (aluminum, arsenic, beryllium, chromium, copper, and lead) (Shaw, 2013a). The scope of the IRA was limited and no further removal was conducted at that time.

A review of the sampling program through the time of performance of the Data Quality Objectives Report (Shaw, 2009), indicated that previous activities (i.e., Phase I RI and IRA) have not adequately evaluated the primary media of concern (surface and subsurface soils) at ODA1 and additional information was needed to support selection of an environmental closure remedy for the site. A Phase II RI consisting of surface and subsurface soil sampling was conducted in 2010.

In addition, a geophysical survey was performed in 2010 with the primary objective for ODA1 of characterizing the anomaly density in the subsurface. The geophysical survey identified numerous distinct areas of extremely high anomaly density that surround the center of the ODA1 investigation area (Shaw, 2013a). Anomalies associated with the former berm around the OB/OD area likely contain

debris that was pushed or moved to clear the OB/OD area after each demolition shot. Further investigation at the AOC requires intrusive activities to characterize the buried anomalies and to substantiate whether potential MEC and/or MD are present. This additional investigation is not part of the current IRP and would likely be addressed under a separate contract or program.

Select Phase II RI soil sampling locations were biased based on the geophysical survey results. The Phase II RI results indicated site-related contaminants (SRCs) in surface and subsurface soils along the western, northern, and southern perimeters, and in the central portion of the AOC (Shaw, 2013a). Sediment and surface water were not evaluated during the Phase II RI, since there is no permanent surface water or sediment at ODA1 and ODA1 was not determined to be a source for impact to nearby sediment and surface water. Therefore, no further action is necessary for these media and remedial alternatives only address soil. Groundwater will be addressed in a separate decision under the RVAAP Facility-Wide Groundwater AOC (RVAAP-66). However, the selected remedy for soil at ODA1 must also be protective of groundwater (Shaw, 2013a).

E.6 Contaminant Fate and Transport

The SRCs found in the surface and subsurface soil samples during the Phase II RI were used as the primary contamination sources in the fate and transport assessment for ODA1. Fate and transport analysis indicates that some of the SRCs may leach from soil into the groundwater beneath the source. The SRCs that have the potential for impacting groundwater, based on leaching analysis and modeling and detection in soil samples collected from below the water table, include 2,4,6-TNT, 2-amino-4,6-dinitrotoluene, isophorone, antimony, arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, and thallium (Shaw, 2013a).

F. Current and Potential Future Land Uses

The planned future land use at ODA1 is Military Training. The OHARNG is currently unable to use the site for training purposes due to concerns related to MEC. The OHARNG does utilize the adjacent NTA for training purposes. Unrestricted land use is not planned for the RVAAP or ODA1, and is only evaluated in accordance with current requirements.

G. Summary of Site Risks

A human health risk assessment (HHRA) and an ecological risk assessment (ERA) were performed for ODA1. The risk assessments identify exposure pathways, COCs (if any), and provide a basis for the remedial decisions. This section of the ROD summarizes the results of the HHRA and ERA for ODA1, specifically for soil, as presented in detail in the *Phase II Remedial Investigation and Feasibility Study for RVAAP-03 Open Demolition Area #1*, Draft Version 2.0 (Shaw, 2013a) located in the Administrative Record and Information Repositories.

G.1 Human Health Risk Assessment

A HHRA was conducted to evaluate whether site conditions may pose a risk to current or future site receptors and to identify which, if any, site conditions need to be addressed in the FS. ODA1 is

currently restricted access, but the planned future use is Military Training. The National Guard Trainee receptor is the representative receptor for Military Training land use. Although unrestricted land use is not anticipated at the RVAAP or ODA1, the HHRA also evaluated the Resident (Adult and Child) receptor in accordance with CERCLA guidance.

The first step in the process is to identify chemicals of potential concern (COPCs) for human health by comparing site concentrations to soil background concentrations, eliminating essential nutrients, and comparing site concentrations to final facility-wide cleanup goals (FWCUGs). The FWCUGs at the 1×10^{-6} cancer risk level and noncarcinogenic risk hazard index using the 0.1 risk value for each of the receptors were selected. For the Resident (Adult and Child) receptor, the representative receptors for the unrestricted land-use scenario, 2,4,6-TNT was identified as a COPC in surface (0 to 1 foot bgs) and subsurface (1 to 13 feet bgs) soil. In addition for the Resident (Adult and Child) receptor, aluminum, antimony, arsenic, cadmium, copper, lead, silver, and thallium were identified as COPCs in subsurface soil. For the National Guard Trainee receptor, aluminum, arsenic, cobalt, and manganese were identified as COPCs in deep surface soil (0 to 4 feet bgs); and arsenic, barium, cadmium, and lead were identified as COPCs in subsurface soil (4 to 7 feet bgs).

The second step in the process is to identify COCs by comparing SRCs to specific FWCUGs and using a “sum of ratios” approach to account for cumulative effects from exposure to multiple chemicals. The FWCUGs at the 1×10^{-5} cancer risk level and noncarcinogenic risk hazard index using the 1 risk value for each of the receptors during the Phase II RI were selected. In subsurface soil for the Resident (Adult and Child) receptor, 2,4,6-TNT was identified as a COC at one soil sampling location (DA1sb-070) at the 1- to 4-foot bgs interval. The area of contamination addressed by this ROD is shown in **Figure 4**. No other COCs for soil for the Resident (Adult and Child) receptor and no COCs for soil for the National Guard Trainee receptor were identified.

G.2 Ecological Risk Assessment

An ERA was conducted to evaluate the potential for adverse ecological effects to ecological receptors from SRCs at ODA1 to determine if any ecological receptors need to be recommended for further evaluation in the FS. The ERA included characterizing the ecological communities in the vicinity of the site, determining the particular contaminants present, identifying pathways for receptor exposure, and estimating the magnitude of the likelihood of potential adverse effects to identified receptors.

Elevated concentrations of SRCs were detected and the potential for localized ecological impacts cannot be completely discounted. However, given the fact that the terrestrial area evaluated for ODA1 is approximately 6 acres in size, and that the ERA uses a highly conservative assumption, it is unlikely that exposure to the surface soil chemical of potential ecological concern identified in the ERA would adversely impact populations of ecological receptors at ODA1. Therefore, no further investigation or action is considered necessary at ODA1 for ecological purposes.

G.3 Basis for Action Statement

Results of the risk assessment for ODA1 indicate that there are no risks from exposure to soil under current and anticipated future land use by the OHARNG for Military Training. Results of the risk assessment for ODA1 indicate that exposure to subsurface soil under the Unrestricted Land Use scenario may result in unacceptable risks to the Resident (Adult and Child) receptor, unless remediation is undertaken to reach established cleanup goals. As the Unrestricted Land Use scenario is not likely for ODA1, the response action selected in this ROD is necessary to protect the OHARNG from MEC.

H. Remedial Action Objectives

The remedial action objective (RAO) references cleanup goals and target risk levels that are considered protective of human health under current and reasonably anticipated future use scenarios. The RAO for this remedy at ODA1 is to prevent direct human contact with the COC, 2,4,6-TNT, in soil at concentrations greater than the remedial goals. The remedial goals are presented in **Table 2**. The remedy must also comply with applicable or relevant and appropriate requirements (ARARs) and to-be-considered guidance.

Table 2
Identification of Remedial Goals for ODA1 Subsurface Soil for Unrestricted Land Use

Analyte	Receptor	Noncancer Final FWCUG Hazard Index = 1	Cancer Final FWCUG 10^{-5}
2,4,6-TNT	Resident Receptor, Adult and Child	36.5 mg/kg	284 mg/kg

FWCUG denotes facility-wide cleanup goal.

mg/kg denotes milligrams per kilogram.

TNT denotes trinitrotoluene.

No further action is warranted for the Unrestricted Land Use scenario for the Resident (Adult and Child) receptor for surface soil (0 to 1 foot bgs) because the HHRA did not identify any COCs. No further action for soil is warranted for the National Guard Trainee for the OHARNG future land use of military training because the HHRA did not identify any COCs.

This ROD does not address any MEC issues that may remain at ODA1, as any MEC issues would be investigated under a separate program, for example, the Military Munitions Response Program. Therefore, no RAOs were developed involving MEC.

I. Description of Alternatives

The FS developed and evaluated remedial alternatives for soil at ODA1 based on the RI results. Four remedial alternatives were developed:

- No Action;
- Institutional Controls;

- Excavation and On-Site Capping; and
- Excavation and Off-Site Disposal.

This section includes a description of the various components of the four remedial alternatives identified in the FS, including land-use controls and monitoring, removal, and disposal and handling. Any alternative protective of the Resident (Adult and Child) receptor would also be protective of the National Guard receptors, given the COC.

I.1 Alternative S1, No Action

This remedial alternative provides no further remedial action and is required under NCP as a baseline for comparison with other remedial alternatives. Under this alternative, contaminated soil would remain in place. No action would be taken to reduce the hazards present at ODA1 to potential human or ecological receptors. Five-Year Reviews would not be conducted in accordance with CERCLA 121(c). This alternative will not have capital or operation and maintenance (O&M) costs.

I.2 Alternative S2, Institutional Controls

Institutional controls include access and land-use restrictions, and long-term monitoring, which would reduce the potential for exposure to contaminated soil at ODA1. Under this alternative, contaminated soil would remain in place. No action would be taken to reduce the hazards present at ODA1 to potential human or ecological receptors. Off-site migration of the contaminant would not be mitigated under the Institutional Controls alternative.

Under this alternative, institutional restrictions to control access to contaminated areas by implementing administrative policies that specify access controls, installing Seibert stakes, long-term maintenance, and monitoring, would be implemented at ODA1. Administrative policies would include restricting future property use within the contaminated area of ODA1 that would result in any unacceptable risks. It should be noted that besides the fencing installed around the RVAAP property, no access controls exist at ODA1, and the area is accessible to those who do have access to the RVAAP. In addition, maintenance of the facility's perimeter fence is not a component of this alternative.

Land-use restrictions would include prohibition of residential use of the property, vehicular traffic, and invasive (digging) activities. These restrictions would be incorporated into the Property Management Plan and subsequent facility Master Plan. All restrictions would be incorporated into any real property documents should the property be transferred. Any restrictions or land-use controls would need to be properly managed, including compliance documentation through inspections and an annual report to the Ohio EPA.

This alternative includes the following components:

- Installing Seibert stakes;

- Installing warning/restrictive signs around areas of contamination;
- Regulating intrusive activities into staked areas;
- Not allowing intrusive activities without UXO support;
- Maintaining Seibert stake integrity;
- Implementing land-use restrictions for the Resident (Adult and Child) receptor;
- Installing and maintaining signage and structural access barriers to prevent vehicular traffic;
- Conducting maintenance; and
- Performing Five-Year Reviews.

I.3 Alternative S3, Excavation and On-Site Capping

This alternative would involve the excavation of contaminated subsurface soil from one discrete area with elevated concentrations of 2,4,6-TNT and consolidation in a lined and capped stockpile. Surface controls would be necessary to prevent erosion damage and to control runoff or other disturbances to the cap. Following excavation of the contaminated subsurface soil, clean backfill would be placed in the excavated area.

This alternative would also require the use of institutional controls to prevent access and invasive activities in the capped area, as well as land-use controls to prevent the use of the capped area by the National Guard Trainee, National Guard Range Maintenance Soldier, National Guard Dust/Fire Control Worker, and Resident (Adult and Child) receptors.

The construction would be complete within a few months; however, monitoring would need to continue in perpetuity. Therefore, the time to achieve RAOs would be approximately 6 months.

This alternative includes the following components:

- Excavating a discrete area of contaminated subsurface soil with UXO support;
- Off-site disposing of soils exceeding Toxic Substances Control Act (TSCA) and/or Resource Conservation and Recovery Act (RCRA) criteria;
- Consolidating soils in on-site stockpile(s) on an impermeable liner;
- Replacing excavated material with compacted clean backfill;
- Installing a cap of asphalt pavement or clay over the consolidated and graded stockpile;
- Installing surface water diversion and runoff controls for the cap;
- Regulating intrusive activities into the cap;
- Maintaining cap integrity;

- Implementating land-use restrictions for the National Guard Trainee, National Guard Range Maintenance Soldier, National Guard Dust/Fire Control Worker, and Resident (Adult and Child) receptors;
- Installing and maintaining signage and structural access barriers to prevent vehicular traffic;
- Periodic groundwater monitoring to ensure the remedy does not impact groundwater;
- Conducting maintenance; and
- Performing Five-Year Reviews.

I.4 Alternative S4, Excavation and Off-Site Disposal

This alternative would involve the excavation of contaminated subsurface soil from a discrete area and permanent disposal in a RCRA-permitted landfill as nonhazardous, hazardous, or TSCA waste, depending on waste characterization. Following excavation of the contaminated subsurface soil, clean backfill would be placed in the excavated area.

This alternative would support the planned Military Training land use (i.e., National Guard Trainee receptor and the Resident [Adult and Child] receptor) Unrestricted Land Use. The time to achieve RAOs would be approximately 4 months.

This alternative includes the following components:

- Excavating a discrete area of contaminated subsurface soil with UXO support;
- Temporary storing soil on site via stockpiling for characterization;
- Disposing of excavated soil off site at a RCRA and/or TSCA permitted landfill; and
- Replacing excavated material with compacted clean backfill.

J. Summary of Comparative Analysis of Alternatives

The alternatives were evaluated with respect to the nine comparative analysis criteria outlined by CERCLA (**Table 3**). The nine criteria are categorized into three groups: Threshold Criteria, Primary Balancing Criteria, and Modifying Criteria. These criteria groups are as follows:

Threshold Criteria must be met for the alternative to be eligible for selection as a remedial option:

1. Overall Protection of Human Health and the Environment.
2. Compliance with ARARs.

Primary Balancing Criteria are used to weigh major trade-offs among alternatives:

3. Long-term Effectiveness and Permanence.
4. Reduction of Toxicity, Mobility, or Volume Through Treatment.
5. Short-term Effectiveness.

6. Implementability.
7. Cost.

Modifying Criteria may be considered to the extent that information is available during development of the FS, but can be fully considered only after public comment on the Proposed Plan:

8. State Acceptance.
9. Community Acceptance.

Table 3
CERCLA Evaluation Criteria

Overall Protection of Human Health and the Environment considers whether or not an alternative provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Compliance with ARARs considers how a remedy will meet all the applicable or relevant and appropriate requirements of other federal and State environmental statutes and/or provide grounds for invoking a waiver.

Long-term Effectiveness and Permanence considers the magnitude of residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Reduction of Toxicity, Mobility, or Volume Through Treatment considers the anticipated performance of the treatment technologies that may be employed in a remedy.

Short-term Effectiveness considers the speed with which the remedy achieves protection, as well as the potential to create adverse impacts on human health and the environment that may result during the construction and implementation period.

Implementability considers the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the solution.

Cost considers capital costs and O&M costs associated with the implementation of the alternative.

State Acceptance indicates whether the State concurs with, opposes, or has no comment on the preferred alternative.

Community Acceptance will be addressed in the ROD following a review of the public comments received on the RI/FS, and the Proposed Plan.

ARAR denotes applicable or relevant and appropriate requirement.

CERCLA denotes Comprehensive Environmental Response, Compensation, and Liability Act.

FS denotes Feasibility Study.

O&M denotes operation and maintenance.

RI denotes Remedial Investigation.

ROD denotes Record of Decision.

J.1 Overall Protection of Human Health and the Environment

This criterion must be met for an alternative to be considered for final selection. Alternative S1, No Action, will not reduce the short- or long-term risks for human or environmental receptors from potential exposure to the COC in soil. Alternative S2, Institutional Controls, with land-use controls will reduce the short-term risks for human or environmental receptors from potential exposure to the COC. Alternative S3, Excavation and On-Site Capping, and Alternative S4, Excavation and Off-Site Disposal, provide long-term protection of human health by removing the source of contamination from potential human exposure through ingestion, inhalation, or contact. These two alternatives also eliminate the mobility of COCs from the impacted soils; therefore, protect environmental receptors from potential exposure to COC-impacted media. Removing the most grossly contaminated soil will

1 reduce the toxicity, mobility, and volume of the COC at ODA1 and protect the Resident (Adult and
2 Child) receptor in the long term. Alternative S2, Institutional Controls, and Alternative S3, Excavation
3 and On-Site Capping, result in restricted land use for the National Guard Trainee and the Resident
4 (Adult and Child) receptors, and requires the capped area to be off-limits to vehicular traffic. The
5 institutional controls would be implemented through the RVAAP in concurrence with the Ohio EPA.
6 These alternatives would provide protection of human health through AOC-perimeter fencing and
7 warning signs, institutional controls placed on the use of on-site soils, and structural barriers around
8 the capped areas (Alternative S3). Short-term exposure risks will be mitigated through the use of best
9 management practices, Occupational Safety and Health Administration training, and the use of
10 appropriate personal protective equipment.

11 **J.2 Compliance with ARARs**

12 This criterion must be met for an alternative to be considered for final selection. CERCLA Section 121
13 specifies that remedial actions must comply with requirements or standards under federal or more
14 stringent State environmental laws that are “applicable or relevant and appropriate to the hazardous
15 substances or particular circumstances at the site.” These include action-, location-, and chemical-
16 specific ARARs. Each alternative, except Alternative S1, No Action, could be designed and
17 implemented to meet respective ARARs.

18 **J.3 Long-Term Effectiveness and Permanence**

19 Alternative S4, Excavation and Off-Site Disposal, would afford the highest degree of long-term
20 effectiveness and permanence. Alternative S4 would provide for removal of the COC whose
21 concentrations are greater than acceptable risk levels. The alternative would reduce risk to levels in
22 accordance with RAOs and could be implemented in approximately 6 months.

23 The long-term effectiveness and permanence of Alternative S2, Institutional Controls, and Alternative
24 S3, Excavation and On-Site Capping, would be less reliable because contaminated soil would remain
25 on site and long-term controls would be necessary to prevent disturbance to the cap. The cap would
26 require about 1 to 2 months longer to implement than Alternative S4, Excavation and Off-Site
27 Disposal. Long-term maintenance of the Seibert stakes or cap would be required as long as the COC
28 remains at ODA1 and above acceptable risk levels. Alternative S1, No Action, is neither effective nor
29 permanent in the long term.

30 **J.4 Reduction of Toxicity, Mobility, or Volume**

31 None of the remedial alternatives include treatment as a principal element; therefore, universal
32 reduction of toxicity, mobility, and volume cannot be achieved. Although Alternative S4, Excavation
33 and Off-Site Disposal, will permanently reduce the toxicity, mobility, and volume of the COC in soil at
34 ODA1, the reduction would not be achieved through treatment. The removed material would simply be
35 transferred to a new location. Alternative S3, Excavation and On-Site Capping, would reduce the
36 mobility of the COC by preventing infiltration of precipitation; however, not through treatment.

1 Alternative S1, No Action, and Alternative S2, Institutional Controls, do not reduce the toxicity,
2 mobility, or volume of the COC in the soil at ODA1.

3 **J.5 Short-Term Effectiveness**

4 Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse
5 impacts that may be posed to workers, the community, and environment during construction and
6 operation of the remedy until cleanup goals are achieved. Alternative S2, Institutional Controls, and
7 Alternative S3, Excavation and On-Site Capping, would have the greatest short-term effectiveness
8 because they would present the least risk to the community by maintaining the majority of
9 contaminated soils on site. Alternative S4, Excavation and Off-Site Disposal, would require potential
10 exposure controls, but could be effective in the short term and would be completed in less time than
11 Alternative S3, but not Alternative S2. Alternative S1, No Action, is not effective in the short term.

12 **J.6 Implementability**

13 Alternative S1, No Action, would involve no implementability issues. Alternative S2, Institutional
14 Controls, would be easy to implement by installing Seibert stakes and establishing administrative
15 controls. Alternative S3, Excavation and On-Site Capping, would be moderately easy to implement by
16 requiring excavation of the discrete area and materials handling for consolidation and capping.
17 Alternative S4, Excavation and Off-Site Disposal, would be moderately easy to implement by
18 requiring excavation of the discrete area and materials handling.

19 **J.7 Cost**

20 Costs were estimated for comparison purposes only and are expected to provide an accuracy of
21 +50 percent to -30 percent. The estimated costs for each of the alternatives are shown in **Table 4**.
22 Alternative S1, No Action, does not have capital or O&M costs. The capital costs for Alternative S2,
23 Institutional Controls, has the lowest capital costs. The capital costs for Alternative S4, Excavation and
24 Off-Site Disposal, are lower compared to Alternative S3, Excavation and On-Site Capping, and there
25 are no O&M costs for Alternative S4.

26 **Table 4**
27 **Estimated Costs of Alternatives**

Alternative	Capital Cost	O&M Cost	Operation Time Frame	Total Present Worth Cost
S1	\$0	\$0	Not Applicable	\$0
S2	\$107,990	\$61,168	30 years	\$133,292
S3	\$525,046	\$1,118,845	30 years	\$952,019
S4	\$351,504	\$0	Not Applicable	\$351,504

28 *O&M denotes operation and maintenance.*
29

J.8 State Acceptance

State acceptance was evaluated formally after the public comment period on the Proposed Plan. The Ohio EPA concurs that Alternatives S1, No Action; S2, Institutional Controls; and S3, Excavation and On-Site Capping, do not provide adequate protection of human health and the environment for Unrestricted Land Use. Alternative S4, Excavation and Off-Site Disposal, is protective of human health for Unrestricted Land Use. Given that Unrestricted Land Use is unlikely and the corresponding high relative costs of Alternatives S3 and S4, the Ohio EPA concurs that Alternative S2, Institutional Controls, is sufficiently protective for the planned Military Training Land Use. **EDIT FOR ACTUAL OHIO EPA COMMENTS AFTER PP.**

J.9 Community Acceptance

Community acceptance was evaluated formally after the Proposed Plan public comment period. During the public meeting, the community voiced few objections to Alternative S2, Institutional Controls, as indicated in Part III of this ROD, the Responsiveness Summary. **EDIT FOR ACTUAL PUBLIC COMMENTS AFTER PP.**

Table 5 summarizes the comparative analysis of remedial alternatives for ODA1 from the FS.

Table 5
Comparative Analysis of Remedial Action Alternatives for ODA1, Resident (Adult and Child) Receptor
Unrestricted Land Use Scenario

Evaluation Criteria	S1, No Action	S2, Institutional Controls	S3, Excavation and On-Site Capping	S4, Excavation and Off-Site Disposal
Protective of Human Health and Environment	No	Yes	Yes	Yes
Complies with ARARs	No	Yes	Yes	Yes
Effective and Permanent	No	No	Yes	Yes
Reduces Toxicity, Mobility, or Volume	No	No	No	Yes
Short-Term Effectiveness	Unacceptable	Acceptable	Acceptable	Acceptable
Implementable	Yes	Yes	Yes	Yes
Costs				
Capital	\$0	\$107,990	\$525,046	\$351,504
Nondiscounted O&M	\$0	\$61,168	\$1,118,845	\$0
Total Present Worth	\$0	\$133,292	\$952,019	\$351,504
State Acceptance	Unacceptable	Acceptable	Acceptable	Acceptable
Community Acceptance	Unacceptable	Acceptable	Unacceptable	Acceptable

ARAR denotes applicable or relevant and appropriate requirement.

O&M denotes operation and maintenance.

K. Principal Threat Wastes

Principal threat wastes, as defined by EPA, are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. There are no principal threat wastes identified for ODA1.

L. Selected Remedy

Alternative S2, Institutional Controls, is the selected remedy at ODA1. This alternative involves the implementation of institutional controls for the area of soil with concentrations of the COC that are greater than cleanup goals for the Resident (Adult and Child) receptor. This remedial action will protect the Resident (Adult and Child) receptor, and subsequently the National Guard receptors for Military Training Land Use, from direct contact with the contaminated soil.

The cost for the alternative is estimated to be \$133,292. Five-Year Reviews will be conducted in accordance with CERCLA 121(c) to ensure protectiveness of the remedy. The remedial action includes a 30-year O&M period to account for the post-implementation activities, including land-use controls. This remedy is consistent with the planned Military Training Land Use at ODA1.

Although the planned future land use for ODA1 is Military Training and no further action for soil is warranted for National Guard receptors, this alternative will also be protective of the Resident (Adult and Child) receptor.

L.1 Rationale for the Selected Remedy

The U.S. Army, in coordination with the Ohio EPA, is recommending Alternative 2, Institutional Controls, be implemented as the remedial action for soil at ODA1. This alternative was selected due to its expediency, consistency with approved future land use, low relative cost, feasibility, and implementability. The selected remedy meets the threshold criteria.

L.2 Description of the Selected Remedy

This alternative, Institutional Controls, includes access and land-use restrictions, and long-term monitoring, which would reduce the potential for exposure to contaminated soil at ODA1.

Access Restrictions

Institutional restrictions to control access to the contaminated area by implementing administrative policies that specify access controls, installing Seibert stakes, long-term maintenance, and monitoring, would be implemented at ODA1. Signage and structural access barriers to prevent vehicular traffic in the contaminated area will be installed. Administrative policies would include restricting future property use within the contaminated area of ODA1 that would result in any unacceptable risks (i.e., unrestricted land use). It should be noted that besides the fencing installed around the RVAAP, no access controls exist at ODA1, and the area is accessible to those who do have access to the RVAAP. In addition, maintenance of the facility's perimeter fence is not a component of this alternative.

Land-Use Restrictions

Land-use restrictions would include prohibition of residential use of the property, vehicular traffic, and invasive (digging) activities without UXO support. These restrictions would be incorporated into the Property Management Plan and subsequent facility Master Plan. All restrictions would be incorporated into any real property documents should the property be transferred. Any restrictions or land-use controls would need to be properly managed, including compliance documentation through inspections and an annual report to the Ohio EPA.

Five-Year Reviews

As the contaminated soil will remain in place at ODA1, Five-Year Reviews will be conducted to evaluate the effectiveness of the remedy. Institutional controls will be maintained until the concentrations of hazardous substances in the soil are reduced to levels that allow for unrestricted use.

The U.S. Army is responsible for implementation, maintenance, periodic reporting, and enforcement of this remedy. Although the U.S. Army may transfer these responsibilities to another party by contract, property transfer agreement, or through other means, the U.S. Army remains responsible for remedy integrity to include (1) CERCLA 121(c) Five-Year Reviews; (2) notification of the appropriate regulators and/or local government representatives of any known deficiencies or violations of the institutional controls; (3) provisions of access to the property to conduct any necessary response; (4) the ability to change, modify, or terminate institutional controls and any related deed or lease provisions; and (5) assurance that the objectives of the institutional controls are met to maintain remedy protectiveness.

L.3 Summary of the Estimated Remedy Costs

The total capital cost of this alternative is estimated at \$107,990, while the total annual O&M costs are estimated at \$61,168 (nondiscounted). The total present worth of capital and annual O&M costs is approximately \$133,292 calculated over 30 years at a discount rate of 7 percent.

L.4 Expected Outcomes of the Selected Remedy

Implementation of the selected remedy will allow for the planned Military Training Land Use at ODA1.

M. Statutory Determination

Based on information currently available, the U.S. Army believes the selected remedy meets the threshold criteria and provides the best option among the other alternatives with respect to balancing and modifying criteria. The selected remedy satisfies the statutory requirements of CERCLA Section 121 and the NCP, as described below.

M.1 Protection of Human Health and the Environment

Human exposure to site COCs will be eliminated or controlled to levels that are protective through the implementation of institutional controls at ODA1.

M.2 Compliance with ARARs

The selected remedy will comply with the location-specific ARARs listed in **Appendix A**. The selected remedy does not have action-specific ARARs as there is no construction activity performed under the alternative. Chemical-specific ARARs are those remedial goals for the COC listed in **Table 2**. Chemical-specific ARARs for other receptors and other constituents are the Final FWCUGs.

M.3 Cost Effectiveness

The selected remedy meets the statutory requirement for a cost-effective remedy. Cost effectiveness is concerned with the reasonableness of the relationship between the effectiveness afforded by each alternative and its costs compared to other available options. Alternative S2 is considered to be cost effective. **Table 4** provides the costs of the selected remedy compared to the other alternatives evaluated.

M.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

The selected remedy is not a permanent solution or alternative treatment technology. No treatment technologies were included in the remedial alternatives evaluated for ODA1.

M.5 Preference for Treatment as a Principal Element

The remedy does not satisfy the statutory preference for treatment. No treatment technologies were included in the remedial alternatives evaluated for ODA1.

M.6 Five-Year Review Requirements

Five-Year Reviews will be conducted in compliance with CERCLA Section 121(c) and the NCP Section 300.430(f)(4)(ii). Five-Year Reviews are required until such a time as ODA1 allows for unrestricted access.

N. Documentation of No Significant Change

The Proposed Plan for ODA1 was released for public comment in MONTH YEAR. The Proposed Plan identified Alternative S2, Institutional Controls, as the recommended alternative for soil at ODA1. After the public comment period, no significant changes regarding the recommended alternative, as originally identified in the Proposed Plan, were necessary or appropriate.

PART III: RESPONSIVENESS SUMMARY FOR PUBLIC COMMENTS ON THE PROPOSED PLAN FOR ODA1 AT RAVENNA ARMY AMMUNITION PLANT, RAVENNA, OHIO

A. Overview

In September 2013, the U.S. Army released the *Proposed Plan for Open Demolition Area #1 at the Ravenna Army Ammunition Plant* for public comment. A 30-day public comment period was held between September XX, 2013 and October XX, 2013. The U.S. Army hosted a public meeting on October XX, 2013, to present the preferred alternative and take questions and comments from the public for the record.

The preferred alternative for ODA1 that was proposed by the U.S. Army in the Proposed Plan, and presented during the public meeting was Alternative S2, Institutional Controls. During the public meeting, the Ohio EPA concurred with the recommendation of this alternative. Several oral comments were received at the public meeting and are addressed under Section B. Written comments received during the public comment period are also addressed under Section B.

Based on comments received, the community voiced few objections to institutional controls and this alternative is selected as the final remedy for soil at ODA1 in this ROD.

B. Summary of Public Comments and Agency Responses

Comments were received verbally during the public meeting or in writing during the 30-day public comment period.

B.1 Oral Comments from Public Meeting

Oral comments received during the public meeting are grouped together in the following general topic categories: **SUBJECTS TBD**. The transcript from the meeting was incorporated into the Administrative Record. Oral comments and responses are paraphrased, as required for brevity and presentation in this section.

1. SUBJECT

Comment: .

Response: .

2. SUBJECT

Comment: .

Response: .

B.2 Written Comments

Written comments received during the public comment period are grouped together in the following general topic categories: **SUBJECTS TBD**. Each comment was reformatted, where appropriate, for presentation in this section. Each comment is followed by a response.

- 1
2 1. SUBJECT
3 Comment: .
4 Response: .
5
6 2. SUBJECT
7 Comment: .
8 Response: .

9 **C. Technical and Legal Issues**

10 There were no technical or legal issues raised during the public comment period.
11

1 REFERENCES

- 2 MKM Engineers, Inc. (MKM), 2004. *Final OE/UXO Removal & Interim Removal Action Report for*
3 *the Open Demolition Area # 1*, March.
- 4 Ohio Environmental Protection Agency (Ohio EPA), 2004. *Director's Final Findings and Orders*,
5 June 10.
- 6 Science Applications International Corporation (SAIC), 2001. *Phase I Remedial Investigation Report*
7 *for Demolition Area 1 at the Ravenna Army Ammunition Plant, Ohio*, December.
- 8 Shaw Environmental & Infrastructure, Inc. (Shaw), 2009. *Final Data Quality Objectives Report for the*
9 *RVAAP-03 Open Demolition Area #1*, October.
- 10 Shaw, 2011. *Digital Geophysical Mapping Report for the RVAAP-34 Sand Creek Disposal Road*
11 *Landfill, RVAAP-03 Open Demolition Area #1, and RVAAP-28 Mustard Agent Burial Site*, Final
12 Version 1.0, January.
- 13 Shaw, 2013a. *Phase II Remedial Investigation and Feasibility Study for RVAAP-03 Open Demolition*
14 *Area #1*, Draft Version 2.0. September.
- 15 Shaw, 2013b. *Proposed Plan for RVAAP-03 Open Demolition Area #1*, Draft, September.
- 16 U.S. Army Corps of Engineers (USACE), 2003. *Ravenna Army Ammunition Plant, Ravenna, Ohio,*
17 *Community Relations Plan*, prepared by the U.S. Army Corps of Engineers, September.
- 18 USACE, 2013. *Phase II Remedial Investigation and Feasibility Study for RVAAP-03 Open Demolition*
19 *Area #1*, Final.
- 20 U.S. Army Center for Health Promotion and Preventive Medicine. 1996. *Final Preliminary Assessment*
21 *for Ravenna Army Ammunition Plant, Ravenna, Ohio*, February.
- 22 U.S. Army Toxic and Hazardous Materials Agency, 1980–1992. *Ravenna Army Ammunition Plant*
23 *Water Quality Surveillance Program*.
- 24 U.S. Environmental Protection Agency (EPA), 1999. *A Guide to Preparing Superfund Proposed*
25 *Plans, Records of Decision, and Other Remedy Selection Decision Documents*, EPA 540-R-98-031,
26 *OSWER 9200.1-23P*, July.

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FIGURES

2



Note:
The scale is for the Upper Map Only
Showing the RVAAP Location



**U.S. ARMY
CORPS OF ENGINEERS**
LOUISVILLE DISTRICT

INSTALLATION RESTORATION PROGRAM

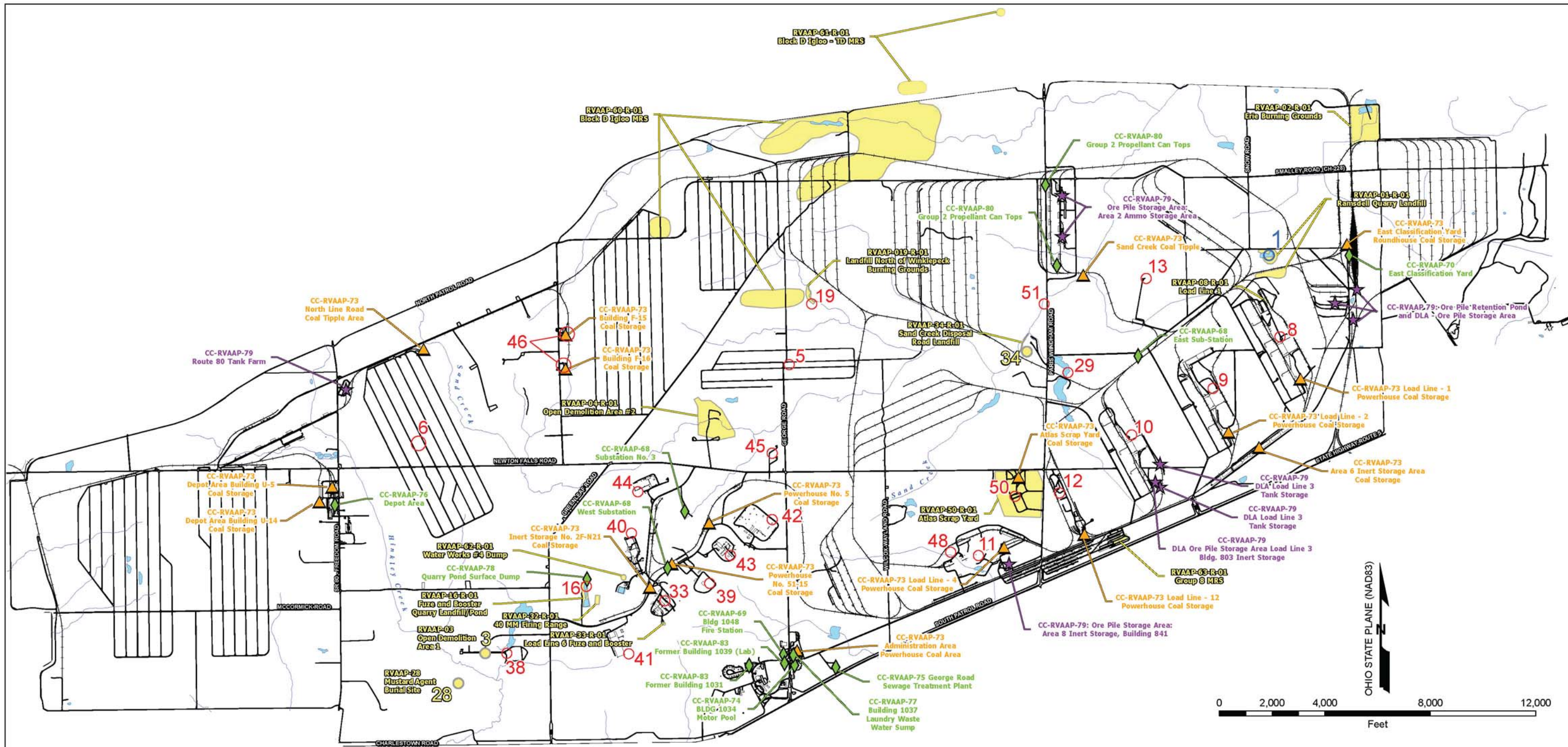
RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO



Shaw Environmental & Infrastructure, Inc.
(A CBI Company)
150 Royall Street
Canton, MA 02021

FIGURE 1 RVAAP INSTALLATION LOCATION MAP

2



LEGEND OF SITES									
IRP SITES (29 SITES)									
RVAAP-01	RAMSDELL QUARRY LANDFILL	RVAAP-33	LOAD LINE 6	RVAAP-67	FACILITY-WIDE SEWERS	MMRP SITES (14 SITES)			
RVAAP-03	OPEN DEMOLITION AREA 1	RVAAP-34	SAND CREEK DISPOSAL ROAD LANDFILL	COMPLIANCE RESTORATION SITES (13 SITES)		RVAAP-001-R-01	RAMSDELL QUARRY LANDFILL MRS	○	CERCLA
RVAAP-05	WINKLEPECK BURNING GROUNDS	RVAAP-38	NACA TEST AREA	CC-RVAAP-68	ELECTRIC SUBSTATIONS (E.W.No.3)	RVAAP-002-R-01	ERIE BURNING GROUNDS MRS	○	RCRA
RVAAP-06	C BLOCK QUARRY	RVAAP-39	LOAD LINE 5	CC-RVAAP-69	BUILDING 1048 - FIRE STATION	RVAAP-004-R-01	OPEN DEMOLITION AREA #2 MRS	■	MMRP SITES
RVAAP-08	LOAD LINE 1	RVAAP-40	LOAD LINE 7	CC-RVAAP-70	EAST CLASSIFICATION YARD	RVAAP-008-R-01	LOAD LINE 1 MRS	◆	COMPLIANCE RESTORATION SITES - APPROVED
RVAAP-09	LOAD LINE 2	RVAAP-41	LOAD LINE 8	CC-RVAAP-72	FACILITY-WIDE USTS (45 SITES)	RVAAP-010-R-01	FUZE AND BOOSTER QUARRY MRS	★	DLA ORE STORAGE AREAS (7 SITES)
RVAAP-10	LOAD LINE 3	RVAAP-42	LOAD LINE 9	CC-RVAAP-73	FACILITY-WIDE COAL STORAGE	RVAAP-019-R-01	LANDFILL NORTH OF WINKLEPECK MRS	▲	COAL STORAGE AREAS (17 SITES)
RVAAP-11	LOAD LINE 4	RVAAP-43	LOAD LINE 10	CC-RVAAP-74	BUILDING 1034 MOTOR POOL HYDRAULIC LIFT	RVAAP-022-R-01	40MM FIRING RANGE MRS	●	AOC UNDER A/E SERVICES CONTRACT
RVAAP-12	LOAD LINE 12	RVAAP-44	LOAD LINE 11	CC-RVAAP-75	GEORGE ROAD SEWAGE TREATMENT PLANT	RVAAP-023-R-01	FIRESTONE TEST FACILITY MRS		
RVAAP-13	BLDG 1200 AND DILLUTION/SETTLING POND	RVAAP-45	WET STORAGE AREA	CC-RVAAP-76	DEPOT AREA	RVAAP-034-R-01	SAND CREEK DUMP MRS		
RVAAP-16	FUZE AND BOOSTER QUARRY LANDFILL/PONDS	RVAAP-46	BUILDINGS F-15 AND F-16	CC-RVAAP-77	BUILDING 1037 LAUNDRY WASTE WATER SUMP	RVAAP-040-R-01	ATLAS SCRAP YARD MRS		
RVAAP-19	LANDFILL NORTH OF WINKLEPECK BURNING GROUND	RVAAP-48	ANCHOR TEST AREA	CC-RVAAP-78	QUARRY POND SURFACE DUMP	RVAAP-050-R-01	BLOCK D IGLOO MRS		
RVAAP-23	MUSTARD AGENT BURIAL SITE	RVAAP-50	ATLAS SCRAP YARD	CC-RVAAP-79	DLA ORE STORAGE SITES	RVAAP-051-R-01	BLOCK D IGLOO -TD MRS		
RVAAP-29	UPPER AND LOWER COBBS POND	RVAAP-51	DUMP ALONG PARIS-WINDHAM ROAD	CC-RVAAP-80	GROUP 2 PROPELLANT CAN TOPS	RVAAP-062-R-01	WATER WORKS #4 DUMP MRS		
		RVAAP-56	FACILITY-WIDE GROUNDWATER	CC-RVAAP-83	FORMER BUILDINGS 1031 AND 1039	RVAAP-063-R-01	GROUP 8 MRS		

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

Figure 2
RVAAP
Facility Map



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FIGURE 3 SITE FEATURES ON AERIAL PHOTOGRAPH

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\\wpbtrg01\arcgis\prod3\WAMMS\Ravenna\GIS Documents\Project Maps\AE\PropPlan\RVAAP_03_Fig4_ODA1_PropExcavationGrids_PP.mxd; Analyst: bryan.lmuske; Date: 8/13/2013 3:33:46 PM



**FIGURE 4 ESTIMATED AREA OF CONTAMINATION FOR THE
RESIDENT FARMER (ADULT AND CHILD) LAND USE SCENARIO**

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APPENDIX A
DESCRIPTION OF ARARS

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Table A-1

**Location-Specific ARARs and TBC Guidance for Remediation of Soils at ODA1 with Alternative S2, Institutional Controls
Open Demolition Area #1
Ravenna Army Ammunition Plant, Ravenna, Ohio**

Action	Requirements	Prerequisite	Citation(s)
Threatened and Endangered Species	Affords protection to species of wildlife within the State that may be found to be in jeopardy. Prohibits the taking, possession, transportation, or sale of endangered species.	<u>Relevant and Appropriate:</u> Several State-listed species have been observed at the RVAAP. There are no known documented sightings of rare or threatened and endangered species at the site.	Endangered Species Conservation Act RSA 212-A
	Prohibits removal or destruction of endangered animal species.	<u>Relevant and Appropriate:</u> There are no known documented sightings of rare or threatened and endangered species at the site.	ORC 1531.25 and OAC 1501-31-23
	Affords protection to plant species in the State that are threatened by the loss, drastic modification, or severe curtailment of their habitats.	<u>Relevant and Appropriate:</u> Several State-listed species have been observed at the RVAAP. There are no known documented sightings of rare or threatened and endangered species at the site.	Native Plant Protection RSA 217-A
	Prohibits removal or destruction of endangered plant species.	<u>Relevant and Appropriate:</u> No endangered plant species have been documented at the site.	ORC 1518.02 and OAC 1501-18-1

ARAR denotes applicable or relevant and appropriate requirement.

OAC denotes Ohio Administrative Code.

ODA1 denotes Open Demolition Area #1 area of concern.

ORC denotes Ohio Revised Code.

RSA denotes Revised Statutes Annotated.

RVAAP denotes Ravenna Army Ammunition Plant.

TBC denotes to be considered.

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1 **COMMENT RESPONSE TABLE**

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