

**Final**

**Record of Decision  
for Soil and Dry Sediment at the  
RVAAP-49 Central Burn Pits**

**Ravenna Army Ammunition Plant  
Ravenna, Ohio**

**April 21, 2009**

**GSA Contract No. GS-10F-0076J  
Delivery Order No. W912QR-05-F-003**

**Prepared for:**



**US Army Corps  
of Engineers®**

**United States Army Corps of Engineers  
Louisville District**

**Prepared by:**



**SAIC Engineering of Ohio, Inc.  
8866 Commons Boulevard, Suite 201  
Twinsburg, Ohio 44087**

**REPORT DOCUMENTATION PAGE**

*Form Approved*  
OMB No. 0704-0188

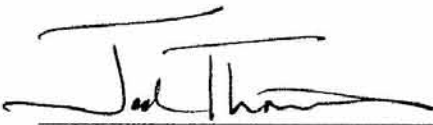
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| <b>1. REPORT DATE (DD-MM-YYYY)</b><br>21-04-2009  |                          | <b>2. REPORT TYPE</b><br>Technical |   | <b>3. DATES COVERED (From - To)</b><br>April 2009                    |  |
| <b>4. TITLE AND SUBTITLE</b><br>Final<br>Record of Decision<br>For Soil and Dry Sediment at the RVAAP-49 Central Burn Pits<br>Ravenna Army Ammunition Plant<br>Ravenna, Ohio  |                          |                                    |   | <b>5a. CONTRACT NUMBER</b><br>GSA Contract No. GS-10F-0076J          |  |
|   |                          |                                    |   | <b>5b. GRANT NUMBER</b><br>NA  |  |
|   |                          |                                    |   | <b>5c. PROGRAM ELEMENT NUMBER</b><br>NA                              |  |
|   |                          |                                    |   | <b>5d. PROJECT NUMBER</b><br>Delivery Order No. W912QR-05-F-003      |  |
|   |                          |                                    |   | <b>5e. TASK NUMBER</b><br>NA   |  |
|   |                          |                                    |   | <b>5f. WORK UNIT NUMBER</b><br>NA                                    |  |
| <b>6. AUTHOR(S)</b><br>Jed Thomas, P.E.   |                          |                                    |   | <b>8. PERFORMING ORGANIZATION REPORT NUMBER</b><br>3833.20090421.001 |  |
| <b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b><br>SAIC Engineering of Ohio, Inc.<br>8866 Commons Blvd, Suite 201<br>Twinsburg, Ohio 44087  |                          |                                    |   | <b>10. SPONSOR/MONITOR'S ACRONYM(S)</b><br>CELRL-ED-EE               |  |
| <b>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b><br>USACE - Louisville District<br>U.S. Army Corps of Engineers<br>600 Martin Luther King Jr., Place<br>PO Box 59<br>Louisville, Kentucky 40202-0059  |                          |                                    |   | <b>11. SPONSOR/MONITOR'S REPORT NUMBER(S)</b><br>NA                  |  |
|   |                          |                                    |   |  |  |
| <b>12. DISTRIBUTION/AVAILABILITY STATEMENT</b><br>Reference distribution page.  |                          |                                    |   |  |  |
| <b>13. SUPPLEMENTARY NOTES</b><br>None.   |                          |                                    |   |  |  |
| <b>14. ABSTRACT</b><br>This Record of Decision discusses previous investigations, human health and ecological risk, and the basis for the final remedy for soil and dry sediment at the Central Burn Pits. This ROD summarizes the findings of the Remedial Investigation Report Addendum No. 1 for the RVAAP-49 Central Burn Pits, includes the responsiveness summary from the public comment period and public meeting, and presents a preferred alternative (No Further Action) for chemical contaminants in soil and dry sediment. |                          |                                    |   |  |  |
| <b>15. SUBJECT TERMS</b><br>human health risk, cleanup goals, no further action, area of concern, ecological risk   |                          |                                    |   |  |  |
| <b>16. SECURITY CLASSIFICATION OF:</b>  |                          |                                    | <b>17. LIMITATION OF ABSTRACT</b><br>NA | <b>18. NUMBER OF PAGES</b><br>35                                     | <b>19a. NAME OF RESPONSIBLE PERSON</b><br>NA           |
| <b>a. REPORT</b><br>NA  | <b>b. ABSTRACT</b><br>NA | <b>c. THIS PAGE</b><br>NA          |   |  | <b>19b. TELEPHONE NUMBER (include area code)</b><br>NA |

**CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW**

Science Applications International Corporation (SAIC) has completed the Final Record of Decision for Soil and Dry Sediment at the RVAAP-49 Central Burn Pits 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 the customer's needs consistent with law and existing USACE policy.



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

4/20/09  
Date



W. Kevin Jago  
Independent Technical Review Team Leader

04-20-09  
Date

Significant concerns and the explanation of the resolution are as follows:

Internal SAIC Independent Technical Review comments are recorded on a Document Review Record per SAIC quality assurance procedure QAAP 3.1. This Document Review Record is maintained in the project file. Changes to the report addressing the comments have been verified by the Study/Design Team Leader. As noted above, all concerns resulting from independent technical review of the project have been considered.



Scott Armstrong  
Principal w/ A-E firm

April 21, 2009  
Date

**Final**

**Record of Decision**  
**for Soil and Dry Sediment at the**  
**RVAAP-49 Central Burn Pits**  
Volume One - Main Report  
Version 1.0

Ravenna Army Ammunition Plant  
Ravenna, Ohio

GSA Contract No. GS-10F-0076J  
Delivery Order No. W912QR-05-F-0033

**Prepared for:**  
U.S. Army Corps of Engineers  
600 Martin Luther King, Jr. Place  
Louisville, Kentucky 40202

**Prepared by:**  
SAIC Engineering of Ohio, Inc.  
8866 Commons Boulevard, Suite 201  
Twinsburg, Ohio 44087

April 21, 2009

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**Final Record of Decision for Soil and Dry Sediment**  
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**Ravenna Army Ammunition Plant**  
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Ohio EPA-NEDO = Ohio Environmental Protection Agency-Northeast District Office

Ohio EPA-SWDO = Ohio Environmental Protection Agency-Southwest District Office

OHARNG = Ohio Army National Guard

REIMS = Ravenna Environmental Information Management System

RVAAP = Ravenna Army Ammunition Plant

SAIC = Science Applications International Corporation

USACHPPM = United States Army Center for Health Promotion and Preventive Medicine

USACE = United States Army Corps of Engineers

USAEC = United States Army Environmental Command

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## ACRONYMS AND ABBREVIATIONS

|              |  |
|--------------|--|
| amsl         | above mean sea level   |
| AOC          | Area of Concern  |
| ARAR         | Applicable and Relevant or Appropriate Requirements                                  |
| BGS          | Below Ground Surface   |
| BRA          | Baseline Risk Assessment   |
| BRACD        | Base Realignment and Closure Division  |
| Camp Ravenna | Camp Ravenna Joint Military Training Center  |
| CBP          | Central Burn Pits  |
| CERCLA       | Comprehensive Environmental Response, Compensation, and Liability Act                |
| CERCLIS      | Comprehensive Environmental Response, Compensation, and Liability Information System |
| COC          | Chemical of Concern  |
| COPC         | Chemical of Potential Concern  |
| DFFO         | Director's Final Findings and Orders   |
| DNT          | Dinitrotoluene   |
| DoD          | U.S. Department of Defense   |
| EE/CA        | Engineering Evaluation/Cost Analysis   |
| EPC          | Exposure Point Concentration   |
| HHRA         | Human Health Risk Assessment   |
| IRP          | Installation Restoration Program   |
| MMRP         | Military Munitions Response Program  |
| NCP          | National Oil and Hazardous Pollution Contingency Plan                                |
| NFA          | No Further Action  |
| NGB          | National Guard Bureau  |
| OHARNG       | Ohio Army National Guard   |
| Ohio EPA     | Ohio Environmental Protection Agency   |
| OSHA         | Occupational Safety and Health Administration  |
| PCB          | Polychlorinated Biphenyl   |
| RAB          | Restoration Advisory Board   |
| REIMS        | Ravenna Environmental Information Management System                                  |
| RI           | Remedial Investigation   |
| ROD          | Record of Decision   |
| RVAAP        | Ravenna Army Ammunition Plant  |
| SARA         | Superfund Amendments and Reauthorization Act   |
| SVOC         | Semi-volatile Organic Compounds  |
| TCRA         | Time-Critical Removal Action   |
| U.S. Army    | U.S. Department of Army  |
| USACE        | U.S. Army Corps of Engineers   |
| USEPA        | U.S. Environmental Protection Agency   |
| UXO          | Unexploded Ordnance  |

## **PART I: THE DECLARATION**

---

### **A. SITE NAME AND LOCATION**

This Record of Decision (ROD) addresses soil and dry sediment contaminants at the Central Burn Pits (CBP), Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio (Figure 1). CBP is identified in the Army Environmental Database for Restoration as RVAAP-49. The RVAAP is located in east-central Portage County and southwestern Trumbull County, Ohio, approximately 4.8 km (3 miles) east-northeast of the city of Ravenna and approximately 1.6 km (1 mile) northwest of the city of Newton Falls. CBP is located in the east-central area of the RVAAP. The U.S. Environmental Protection Agency (USEPA) Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Identifier for the RVAAP is OH5210020736.

### **B. STATEMENT OF BASIS AND PURPOSE**

The U.S. Department of Army (U.S. Army) is the lead agency and presents the decision that No Further Action (NFA) is required for soil and dry sediment at CBP. The NFA decision is selected in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the National Oil and Hazardous Pollution Contingency Plan (NCP). This decision is based on information contained in the Administrative Record file (located at RVAAP) for CBP.

The Ohio Environmental Protection Agency (Ohio EPA), the lead regulatory agency, approved the *Remedial Investigation Report Addendum No. 1 for the RVAAP-49 Central Burn Pits at the Ravenna Army Ammunition Plant, Ravenna, Ohio* (U.S. Army Corps of Engineers [USACE] 2008a), which recommended NFA for soil and dry sediment at CBP. The decision that NFA is required for soil and dry sediment at CBP satisfies the requirements of the Ohio EPA Director's Final Findings and Orders (DFFO) (Ohio EPA 2004).


### **C. DESCRIPTION OF THE SELECTED REMEDY**

NFA under CERCLA is necessary for soil and dry sediment at CBP. Groundwater and surface water at CBP will be addressed under future CERCLA decisions. Land use controls will not be implemented as part of this decision. No chemicals of concern (COCs) were above cleanup goals [as established in the *Remedial Investigation Report Addendum No. 1 for RVAAP-49 Central Burn Pits* (USACE 2008b)] in soil and dry sediment for the most likely foreseeable future land use (National Guard Trainee) and the residential land use (Resident Subsistence Farmer).

**D. STATUTORY DETERMINATION**

NFA for soil and dry sediment is protective of human health and the environment and meets the statutory requirements for cleanup standards established in Section 121 of CERCLA. Because no contaminants of concern in soil and dry sediment at CBP exceeded cleanup goals for the most likely foreseeable future land use and the residential land use, and exposure does not pose a potential risk to human health or the environment, five-year reviews will not be required for soil and dry sediment.

**E. AUTHORIZING SIGNATURES AND SUPPORT AGENCY ACCEPTANCE**

  
\_\_\_\_\_  
William J. O'Donnell, Jr., Acting Branch Chief  
Operational Army and Medical Branch  
Department of the Army  
Assistant Chief of Staff for Installation Management  
Base Realignment and Closure Division (DAIM-ODB)

22 JUN 09  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Chris Korleski  
Director  
Ohio Environmental Protection Agency

7/15/09  
\_\_\_\_\_  
Date

## **PART II: DECISION SUMMARY**

---

### **A. SITE NAME, LOCATION, AND DESCRIPTION**

CBP was identified as an area of concern (AOC) at the RVAAP in the Preliminary Assessment (USACE 1996). When the RVAAP Installation Restoration Program (IRP) began in 1989, the RVAAP (CERCLIS Identification Number OH5210020736) was identified as a 21,419-acre installation. The property boundary was resurveyed by the Ohio Army National Guard (OHARNG) over a 2-year period (2002 and 2003) and the actual total acreage of the property was found to be 21,683 acres. As of February 2006, a total of 20,403 acres of the former 21,683 acre RVAAP have been transferred to the National Guard Bureau (NGB) and subsequently licensed to OHARNG for use as a military training site. The current RVAAP consists of 1,280 acres scattered throughout the OHARNG Camp Ravenna Joint Military Training Center (Camp Ravenna).

Camp Ravenna is in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 km (3 miles) east northeast of the city of Ravenna and approximately 1.6 km (1 mile) northwest of the city of Newton Falls. The RVAAP portions of the property are solely located within Portage County. Camp Ravenna/RVAAP is a parcel of property approximately 17.7 km (11 miles) long and 5.6 km (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 (see Figures 1 and 2). Camp Ravenna is surrounded by several communities: Windham on the north; Garrettsville 9.6 km (6 miles) to the northwest; Newton Falls 1.6 km (1 mile) to the southeast; Charlestown to the southwest; and Wayland 4.8 km (3 miles) to the south.

When the RVAAP was operational, Camp Ravenna did not exist and the entire 21,683-acre parcel was a 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 include the historical extent of the RVAAP, consisting of the combined acreages of the current Camp Ravenna and RVAAP, unless otherwise specifically stated.

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

CBP is located in the east-central area at the intersection of Paris-Windham Road and Lumber Yard Road, and is approximately 20 acres in size (see Figures 2 and 3). The AOC is bordered by old railroad beds to the north (Track 39) and south (Track 33), and Sand Creek to the west-northwest. Burn areas and burn pits are located primarily near Lumber Yard Road.

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

## **B. SITE HISTORY AND ENFORCEMENT ACTIVITIES**

RVAAP was constructed in 1940 and 1941 for depot storage and ammunition assembly/loading and placed on standby status in 1950. Production activities resumed from 1954 to 1957 and from 1968 to 1972. Demilitarization activities, including disassembly of munitions and explosives melt-out and recovery, continued until 1992.

CBP was originally used as a lumber and building materials storage area. CBP was later used for open burning of non-explosive wastes (e.g., electrical components, wooden boxes, and scrap). Operation of the burn pits is believed to have started shortly after RVAAP began operations, and continued through the mid-1970s, although actual dates are unknown. In addition, disposal of non-hazardous waste material (e.g., concrete, metal, excess fill dirt and gravel) occurred at CBP. Those materials were placed in various piles and elongated berms throughout the AOC.

### **B.1 Central Burn Pits Remedial Investigations**

CBP was the subject of two previous Remedial Investigations (RIs). The Phase I RI activities and results were documented in the *Remedial Investigation Report for the Central Burn Pits* (RVAAP-49) (USACE 2005a). The Supplemental Phase II RI activities and results were documented in the *Remedial Investigation Report Addendum No. 1 for the RVAAP-49 Central Burn Pits* (USACE 2008b). The purpose of the investigations was to confirm whether contamination was present at the AOC, to determine the nature and extent of chemicals of potential concern (COPCs), and to evaluate chemical risks and hazards to human and ecological receptors.

Results of the Supplemental Phase II RI indicated two debris piles (designated as Piles M and N, Figure 3) were high enough to warrant further action. The U.S. Army and Ohio EPA remediated these two debris piles under a Non-Time Critical Removal Action (TCRA) due to likelihood of contaminant dispersal and migration from the piles to surrounding environmental media. The removal action followed the guidelines of USEPA (USEPA 2000). Consequently, an Engineering Evaluation/Cost Analysis (EE/CA) (USACE 2007b) was developed.

### **B.2 Central Burn Pits Removal Action for Piles M and N**

The purpose of the EE/CA was to develop a removal action objective, establish cleanup goals (presented in Table 1), and evaluate alternatives for removal of Piles M and N. This evaluation included assessing applicable remedial technologies, identifying Applicable and Relevant or Appropriate Requirements (ARARs), and comparing cost estimates. Two removal action alternatives were developed 1) No Action and 2) Excavation of Waste Piles with Off-site Treatment and Disposal.

At the completion of the analysis, the EE/CA recommended proceeding with Removal Action Alternative 2: Excavation of Waste Piles with Off-site Treatment and Disposal.

**Table 1. Removal Action Cleanup Goals for Piles M and N**

| <b>Location</b> | <b>Parameter</b>     | <b>Supplemental Phase II RI Results<sup>1</sup><br/>(mg/kg)</b> | <b>Removal Action Cleanup Goal<br/>(mg/kg)</b> |
|-----------------|----------------------|---|--|
| Pile M          | Lead, Total          | 8,560   | 400  |
| Pile N          | Chromium, hexavalent | 25  | 16   |

<sup>1</sup> Results are for multi-increment samples collected for each debris pile.  
RI = Remedial Investigation.

An Action Memorandum (USACE 2007a) was issued for public comment that presented the selected removal action alternative for Piles M and N with off-site treatment and disposal. This Action Memorandum was issued for a 30-day public comment period from March 7, 2007 to April 5, 2007. Following review and concurrence by the Ohio EPA, the Action Memorandum was signed by the U.S. Army on August 9, 2007.

The CBP Removal Action Work Plan (USACE 2007c) was developed to detail implementation of the Pile M and N non-TCRA in accordance with the EE/CA and Action Memorandum. Implementation of the removal action work plan took place from October 2007 to March 2008 and the non-TCRA attained removal action cleanup goals and removal action objectives. Table 2 presents the debris removal tonnages from Piles M and N.

**Table 2. Pile M and N Removal Totals**

| <b>Debris Pile</b> | <b>Waste Volume (tons)</b> |                  |              |
|--------------------|----------------------------|------------------|--------------|
|                    | <b>Non-hazardous</b>       | <b>Hazardous</b> | <b>Total</b> |
| Pile M             | 496                        | 50               | 546          |
| Pile N             | 157                        | 0                | 157          |

Additional details of the removal action are in the *Removal Action Report for the RVAAP-49 Central Burn Pits* (USACE 2008c).

### **C. COMMUNITY PARTICIPATION**

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

*Restoration Advisory Board (RAB)*: The U.S. Army established a RAB in 1996 to promote community involvement in the U. S. Department of Defense (DoD) environmental clean-up activities

and 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.

*The 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.

*The 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](http://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 Soil and Dry Sediment at the RVAAP-49 CBP* (USACE 2008a) to the public on December 8, 2008. The Proposed Plan and other project-related documents were made available to the public in the Administrative Record maintained at the RVAAP and in the Information Repositories at Reed Memorial Library in Ravenna, Ohio and the Newton Falls Public Library in Newton Falls, Ohio. A notice of availability for the Proposed Plan was sent to these media outlets as specified in the RVAAP Community Relations Plan (USACE 2003): radio stations, television stations, and newspapers (e.g., *Newton Falls Weekly Villager*, *Youngstown Vindicator*, *Warren Tribune Chronicle*, *Akron Beacon Journal*, and *Ravenna Record Courier*). The notice of availability initiated the 30-day public comment period beginning December 8, 2008, and ending January 7, 2009.

The U.S. Army held a public meeting on December 16, 2008 at the Newton Falls Community Center to present the Proposed Plan to the public. At this meeting, representatives of the U.S. Army provided information and answered questions about soil and dry sediment contamination at CBP. A transcript of the public meeting is available to the public and has been included in the Administrative Record. Additionally, written comments were also received during the 30-day public comment period. Responses to the verbal and written comments received are included in the Responsiveness Summary, which is Part III of this ROD.

The U.S. Army considered public input on the Proposed Plan in selecting NFA for soil and dry sediment at CBP.

#### **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. CBP is one of 51 AOCs at RVAAP. This ROD addresses soil and dry sediment and does not address other media in CBP. The selected remedy described in this ROD is consistent with the stated future action(s) to be performed at the RVAAP. Other media at CBP, and other AOCs at the RVAAP, will be addressed under separate actions or decisions by the U.S. Army, and will be considered under separate RODs.

Following the removal of debris piles M and N as outlined in the EE/CA and Action Memorandum, the exposure point concentrations (EPCs) for contamination present in soil and dry sediment at CBP are below risk-based cleanup goals; therefore, the residual contaminants do not pose a potential risk to human health or the environment. Therefore no principal threat has been identified for these media.

## **E. SUMMARY OF SITE CHARACTERISTICS**

Physical Characteristics, nature and extent of contamination, and conceptual site model for CBP are based on the investigations conducted in this AOC.

### **E.1 Topology/Physiography**

The topography across the majority of CBP is relatively flat due to historical grading and fill activities performed to create a lumber and building materials storage area. Undisturbed topography is characterized by gently undulating contours. Sand Creek forms the western AOC boundary. Elevations vary from 292 m to 298 m (960-980 ft) above mean sea level (amsl). Structural features include former rail lines Track 39 and Track 33. Other features include debris piles and berms in the central portion and burn areas in the eastern portion of the AOC. These debris piles and berms are placed materials (many were dumped over a period of time from other areas of RVAAP) and are not conventional environmental media. Visual observations of the debris piles and berms show they consist primarily of gravel and excess fill dirt. Some piles and berms contain residues from former burning operations at CBP.

### **E.2 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.

Soil within CBP consists primarily of Mahoning silt loams, Trumbull silt loams, and Ellsworth silt loams. The Ellsworth silt loam is found near the southwestern boundary of the AOC. The Trumbull silt loam is found in the eastern portion of the AOC. The Mahoning silt loam covers the remainder of CBP (western and extreme eastern boundary). These soils are nearly level to gently sloping and are poorly drained (USDA 1978).

### **E.3 Hydrogeology**

The water table is shallow at CBP. The highest elevation within CBP is located near the southwestern portion of the AOC, which decreases towards the north. Sand Creek is located adjacent to the northwestern boundary of CBP. Surface water intermittently flows in several drainage ditches located within the AOC. Flow in the drainage ditches occurs during precipitation events, and flow



directions follow the general topographic slope toward Sand Creek. The ditches tend to hold water for extended periods due to the low permeability of most soil at CBP.

#### **E.4 Ecology**

The dominant cover types at the RVAAP are forests and old fields of various ages. Much of the land at the RVAAP was cleared for agriculture before government acquisition of the property in the 1940s. Over 80 percent of the RVAAP is now in forest. Habitat at CBP includes second-growth forest, old fields, open grassy areas, and floodplains associated with Sand Creek.

A diversity of wildlife and plants has been observed at CBP. State-endangered, State-threatened, State species of concern, and State special interest species have been identified at the RVAAP. CBP has not been previously surveyed for State-listed species; therefore, none have been documented at CBP. No federally listed species have been identified at RVAAP.

#### **E.5 Nature and Extent**

The nature and extent of contamination at CBP was evaluated during the Phase I RI and Supplemental Phase II RI. Soil sampling during the Phase I RI identified occasional detectable concentrations of polychlorinated biphenyl (PCBs), explosives, propellants, pesticides, and metals. Debris berms and piles sampled in the Supplemental Phase II RI and were found to have detections of metals that warranted the removal of 2 debris piles (as described in Section B.2).

This data effectively determined the nature and extent of contamination in soil and dry sediment at CBP. Contamination of other media (groundwater, surface water, and wet sediment) and other AOCs are known to be present at the RVAAP. However, those media and AOCs are being addressed separately from this ROD.

#### **E.6 Contaminant Fate and Transport**

The *Remedial Investigation Report for the Central Burn Pits (RVAAP-49)* (USACE 2005a) concluded no potential impact to groundwater from COCs in soil at this AOC. The addition of the Supplemental Phase II RI data did not change these conclusions. Based on contamination concentrations found in soil, leaching from the soil to groundwater is not a significant migration pathway. Inorganic chemical concentrations were less than USEPA Region 9 PRGs or RVAAP background in all but one sample from one well. No organic chemicals were detected in the groundwater, indicating that leaching and migration within groundwater has not occurred to date.

Actions to remediate soil to ensure protection of groundwater are not required. The primary contaminant migration pathways of concern for contaminants at CBP are overland runoff and transport in surface drainage channels, including Sand Creek. The CBP RI Report (USACE 2005a) concluded that the overall significance of this migration pathway is minimized because of the flat topography of the site, heavy vegetation, and the low concentrations of contaminants in soil and

sediment. Chemical concentrations in surface water samples collected in Sand Creek were less than RVAAP background values or USEPA Region 9 PRGs. Studies of the adjacent Sand Creek ecosystem indicate no adverse ecological impacts and healthy biological indices.

## **F. CURRENT AND POTENTIAL FUTURE SITE AND RESOURCES USE**

CBP will most likely not be released for residential, commercial, or industrial use. The AOC has been identified for future use by OHARNG. The most reasonable foreseeable future land use for CBP is National Guard dismantled training – no digging.

## **G. SUMMARY OF SITE RISKS**

The baseline risk assessment (BRA) estimated what risks CBP poses to both human and ecological receptors under current conditions. The BRA identified the exposure pathways, contaminants of concern, if any, and provides a basis for the remedial decisions. This section of the ROD summarizes the results of the BRA for CBP, specifically for soil and dry sediment, as presented in detail in the following documents located in the Administrative Record and Information Repositories:

- *Remedial Investigation Report for the Central Burn Pits (RVAAP-49) (USACE 2005a).*
- *Remedial Investigation Report Addendum No. 1 for the RVAAP-49 Central Burn Pits (USACE 2008b).*

### **G.1 Human Health Risk Assessment**

A baseline human health risk assessment (HHRA) was performed during the RI (USACE 2005a) and RI Addendum (USACE 2008b) to evaluate potential risks and hazards from current and predicted future exposures to contaminated media at CBP. A National Guard Trainee, National Guard resident/trainer, National Guard Dust/Fire Control Worker, Security Guard/Maintenance Worker, Hunter, Resident Subsistence Farmer (adult and child) and Trespasser (adult and juvenile) were evaluated to cover a range of possible land uses.

The National Guard Trainee was identified as the most sensitive receptor under the intended future land use. The HHRA evaluated the Resident Farmer land use scenario to provide a full comparative range of risks under an unrestricted land use scenario. Receptors, other than those associated with the National Guard future land use, are not anticipated. Therefore, this HHRA summary focuses on health effects for National Guard land use. Risk information for other land use scenarios and receptors is located in the RI and RI Addendum.

Because the National Guard Trainee is assumed to have the highest levels of exposure to contaminants among the four National Guard receptors, the preliminary cleanup goals established for the National Guard Trainee are also protective of other National Guard receptors. The National Guard Trainee is assumed to be exposed to deep surface soil (0-4 ft below ground surface [BGS]), surface

water, sediment, and groundwater. Direct contact (e.g., ingestion, dermal contact, and inhalation) exposure pathways were evaluated.

Two COCs were identified in soils and dry sediment for the National Guard Trainee. Neither of these COCs (arsenic and manganese) was identified for evaluation of remedial alternatives because the EPCs are less than background and/or National Guard Trainee preliminary cleanup goals developed for these chemicals. Additionally, two COCs [arsenic and benzo(a)pyrene] were identified in soils and dry sediment for the Resident Subsistence Farmer. These COCs were not identified for remedial alternatives because the EPCs in soil and dry sediment are less than background, and/or Resident Subsistence Farmer preliminary cleanup goals.

## **G.2 Ecological Risk Assessment**

The ecological risk assessment for CBP evaluated risk to plants, soil invertebrates, various species of wildlife, aquatic life, and sediment-dwelling animals from contaminants in soil, surface water, and sediment (USACE 2005b). Ecological COCs identified for surface soil are arsenic, cadmium, chromium, lead and zinc. The RI Addendum (USACE 2008) presents a weight-of-evidence evaluation that concludes no quantitative ecological cleanup goals are required at CBP. This weight-of-evidence is based on: (1) the relatively low ecological risk present (small HQs) in surface soil, (2) the absence of any ecologically important resources as determined by site walk-overs and consultations with the resource managers at RVAAP, (3) the healthy stream ecology in nearby Sand Creek, including full attainment status, downstream of CBP as measured in the Facility-wide Biological and Surface Water Study (USACE 2005b), and (4) other considerations, such as comparison of the benefit from reduction of quantitative ecological risk by extensive soil excavation compared to extensive alteration or destruction of viable ecological habitat at CBP.

## **H. DOCUMENTATION OF NO SIGNIFICANT CHANGE**

The *Proposed Plan for Soil and Dry Sediments at RVAAP-49 Central Burn Pits* (USACE 2008a) was released for public comment on December 8, 2008. The Proposed Plan recommends NFA for soil and dry sediment at CBP. No significant changes, as originally identified in the Proposed Plan, were necessary or appropriate following the conclusion of the public comment period.

## **PART III: RESPONSIVENESS SUMMARY FOR PUBLIC COMMENTS ON THE U.S. ARMY PROPOSED PLAN FOR SOIL AND DRY SEDIMENTS AT THE RVAAP-49 CENTRAL BURN PITS**

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### **A. OVERVIEW**

On December 8, 2008, the U.S. Army released the *Proposed Plan for Soil and Dry Sediment at the RVAAP-49 Central Burn Pits* (USACE 2008a) for public comment. A 30-day public comment period was held from December 8, 2008 to January 7, 2009. The U.S. Army hosted a public meeting on December 16, 2008 to present the Proposed Plan and take questions and comments from the public for the record. The U.S. Army recommended NFA for soil and dry sediment at CBP. During the public meeting, Ohio EPA concurred with the recommendation of NFA. One written comment and several oral comments were received at the public meeting and are addressed under Section B. Additionally, written comments were provided during the public comment period.

Based on comments received, the community voiced few objections to the NFA recommendation. All public input was considered during the selection of the final decision.

### **B. SUMMARY OF PUBLIC COMMENTS AND AGENCY RESPONSES**

Comments were received verbally during the public meeting. One written comment was received at the time of the public meeting. Multiple written comments were received 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: document availability, acreage, contaminants, cleanup levels, ecological sampling, wet sediment, and other AOCs. 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.

##### **B.1.1 Document Availability**

Comment: One commenter indicated they did not know where to find the results for soil and dry sediment testing at CBP.

Response: The documents are available at the Information Repositories which are listed in the Proposed Plan. The documents are also available on the public website.

### **B.1.2 Acreage**

Comment: One commenter asked what percentage the cleanup effort at CBP represents with respect to the total area of burning pits within the approximate 22,000 acres of RVAAP.

Response: CBP has an area of approximately 20 acres. The actual area used for burning was only a fraction of that total. Other burning grounds at RVAAP include the Winklepeck Burning Grounds, which is approximately 200 acres, and the Erie Burning Grounds, which is approximately 65 acres; however, these AOCs were used for open burning of explosives-contaminated materials. CBP was used for the burning of non-explosives contaminated materials. The percentage of CBP used as a burning ground is a very small percentage of the total area of burning grounds at RVAAP.

### **B.1.3 Contaminants**

Comment: One commenter asked if the soils and dry sediments had been sampled for perchlorate.

Response: Limited sampling for perchlorate has been performed based on guidelines from the U.S Department of Defense (DoD) and the Army. In general, perchlorates are associated with rockets and pyrotechnic munitions. RVAAP did not handle much of that type of munitions. RVAAP primarily handled high explosives used in large caliber munitions and general purpose bombs.

### **B.1.4 Cleanup Levels**

Comment: One commenter asked if there would be funds available from the Army to perform a cleanup effort beyond the requirements for the current proposed future land use.

Response: In general, the policy regarding cleanup beyond the current proposed land use is the responsibility of OHARNG. The Army can consider cleanup levels, but costs, level of effort, time, and long-term monitoring requirements restrict the practical cleanup level. If a small amount of cleanup is required to achieve a residential or un-restricted land use, the Army may spend additional funds.

### **B.1.5 Ecological Sampling**

Comment: One commenter asked if tissue sampling was performed on the fauna taken from Sand Creek.

Response: Benthic surveys were performed and water quality samples were collected but no tissue sampling was performed. The results of studies performed by Ohio EPA and USACE show that Sand Creek is a very healthy stream.

### **B.1.6 Wet Sediment**

Comment: One commenter asked why remedial action is proceeding for soils and dry sediments prior to remedial action for wet sediments.

Response: Wet sediments will be part of the scope of the future actions and decisions related to surface water. This particular scope just addresses the soils and sediments that currently that lie above the waterline.

### **B.1.7 Other AOCs**

Comment: One commenter asked if the cleanup was finished at Winklepeck Burning Ground and Erie Burning Ground.

Response: The cleanup at Winklepeck Burning Grounds and Erie Burning Grounds are currently being conducted as part of the Installation Restoration Program.

## **B.2 Written Comments**

### **B.2.1 Proposed Plan Figures**

Comment: One commenter indicated that Figure 3 of the Proposed Plan had an arrow in the legend that was incorrectly labeled as “railroad” and should be labeled as “flow direction” in Sand Creek.

Response: The legend of Figure 3 in the *Proposed Plan for Soil and Dry Sediment at the RVAAP-49 Central Burn Pits* was confirmed to have an arrow incorrectly labeled as a “railroad”. Instead this arrow represents “flow direction” for surface water. This figure has been corrected for use in future documents (e.g., this ROD).

### **B.2.2 Testing for Dioxins and Furans**

Comment: The document identifies PCBs as contaminants of concern at the burn pits. It also describes historical burning of wooden boxes, and ammunition boxes are an expected source of PCBs in the waste stream. However, there is no discussion of testing for and expected human health risks associated with products of incomplete combustion such as dioxins and furans that frequently result from burning PCBs.

Response: The presence of PCBs was assessed by the CBP RI. The CBP HHRA identified one PCB, Aroclor-1254, as a chemical of potential concern for soil. However, Aroclor-1254 was not identified as a chemical of concern for soil because the concentrations detected did not exceed the risk-based cleanup goal. Based on the low detected concentrations in soil, PCBs are not considered to be a primary source of dioxins and furans in this area.

### **B.2.3 Asbestos Sampling**

Comment: The document does not discuss soil test results for asbestos, a contaminant commonly associated with demolition debris. For industrial applications, the Occupational Safety and Health Administration (OSHA) has defined an asbestos-containing material as any material with greater than 1% bulk concentration of asbestos. However, it is important to note that 1% is not a health-based level but instead represents the practical detection limit in the 1970s when the regulations were made. Counting fibers using the regulatory definitions does not adequately describe the risk of health effects as fiber size, shape, and composition can contribute collectively to risks in ways that are still being studied. For example, shorter fibers appear to deposit preferentially in the deep lung, and longer fibers can disproportionately increase the risk of mesothelioma, a form of cancer caused by exposure to asbestos.

Response: Based on known operational history and visual inspection, the CBP debris piles and berms consist primarily of gravel and excess fill dirt. Miscellaneous construction/demolition materials were observed at CBP during the September 2005 field reconnaissance, which included glass, concrete, metal, ceramics, and railroad ties. None of the materials observed are typical asbestos-containing materials such as fireproofing, roof or flooring tiles, acoustical insulation materials, or pipe coverings. Since no sources of asbestos-containing materials were observed at the CBP, asbestos sampling was not included in the RI.

### **B.2.4 Additive and Cumulative Risks**

Comment: The document does not discuss expected human health, environmental, and ecological impacts and emissions from ongoing and future military activities at the site. Assessment of risks incorrectly assumes that no additional contamination will occur at the site from the handling, use, and disposal of munitions.

Response: The investigations conducted at the RVAAP have been completed following the CERCLA regulations and methods. As part of the investigation under CERCLA, baseline risks were evaluated for potential future use. Baseline risks are risks that might occur if no remediation or institutional controls were applied. Remedial activities for soil and dry sediment at the CBP were conducted to allow for unrestricted future use based on a conservative residential scenario. Any future impacts will be addressed in accordance with appropriate Army, Federal, State and local regulations.

### **B.2.5 Expected Range Maintenance, Burning, and Fires**

Comment: The document does not discuss expected emissions factors and risks to human health and the environment associated with exposure to air emissions resulting from military range maintenance, prescribed burning, and fires at the pits site.

Response: Future impacts to the site from military training use will be monitored in accordance with appropriate Army, Federal, State, and local methodologies, programs, and requirements.

### **B.2.6 Dinitrotoluene Isomers**

Comment: If Dinitrotoluene (DNT) was identified as a contaminant of concern, it is important that testing be conducted for all 6 isomers of DNT (2,s-DNT, 2,s-DNT, 2,6-DNT, 2,4-DNT, 3,4-DNT, and 3,s-DNT). The fate and transport and toxicity of the isomers vary. For example, unlike 2,4- and 2,-6-DNT, the other isomers of DNT have not been shown to biodegrade.

Response: The CBP investigations included analysis in soil and dry sediment for the regulated DNT isomers, 2,4-DNT and 2,6 DNT. DNTs were not identified as chemicals of concern for CBP soil or dry sediment because the concentrations detected did not exceed preliminary cleanup goal concentrations.

### **B.2.7 Incomplete Ecological Data**

Comment: The ecological survey should be conducted before the proposed plan is finalized in the event sensitive systems and/or protected species are identified.

Response: Ecological concerns for the CBP were addressed by the Screening-level Ecological Risk Assessment (SERA), which is available in the original RI Report (USACE 2005a). No sensitive ecosystems or protected species were identified at the CBP.



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## REFERENCES

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- Ohio EPA (Ohio Environmental Protection Agency) 2004. *Director's Final Findings and Orders in the Matter of U.S. Department of the Army, Ravenna Army Ammunitions Plant*. June 2004.
- USACE (U.S. Army Corps of Engineers) 1996. *Preliminary Assessment for the Ravenna Army Ammunition Plant, Ravenna, Ohio*. February 1996.
- USACE 2003. *Ravenna Army Ammunition Plant, Ravenna, Ohio, Community Relations Plan*. September 2003.
- USACE 2005a. *Remedial Investigation Report for the Central Burn Pits (RVAAP-49) at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. September 2005.
- USACE 2005b. *Facility-wide Biological and Water Quality Study 2003, Ravenna Army Ammunition Plant, Part I - Streams and Part II - Ponds*. Pp. 144 and appendices. November 2005.
- USACE 2007a. *Action Memorandum for Central Burn Pits at Ravenna Army Ammunition Plant in Ravenna, Ohio*. June 2007.
- USACE 2007b. *Engineering Evaluation/Cost Analysis for Central Burn Pits at Ravenna Army Ammunition Plant in Ravenna, Ohio*. January 2007.
- USACE 2007c. *Removal Action Work Plan for the Central Burn Pits at Ravenna Army Ammunition Plant in Ravenna, Ohio*. September 2007.
- USACE 2008a. *Proposed Plan for Soil and Dry Sediment at the RVAAP-49 Central Burn Pits at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. October 2008.
- USACE 2008b. *Remedial Investigation Report Addendum No. 1 for the RVAAP-49 Central Burn Pits at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. June 2008.
- USACE 2008c. *Removal Action Report for the RVAAP-49 Central Burn Pits at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. December 2008.
- USDA (U.S. Department of Agriculture) 1978. *Soil Survey of Portage County, Ohio*. 1978.
- USEPA (U.S. Environmental Protection Agency) 2000. *Use of Non-Time Critical Removal Authority in Superfund Response Actions under CERCLA*. February 2000.

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## **FIGURES**

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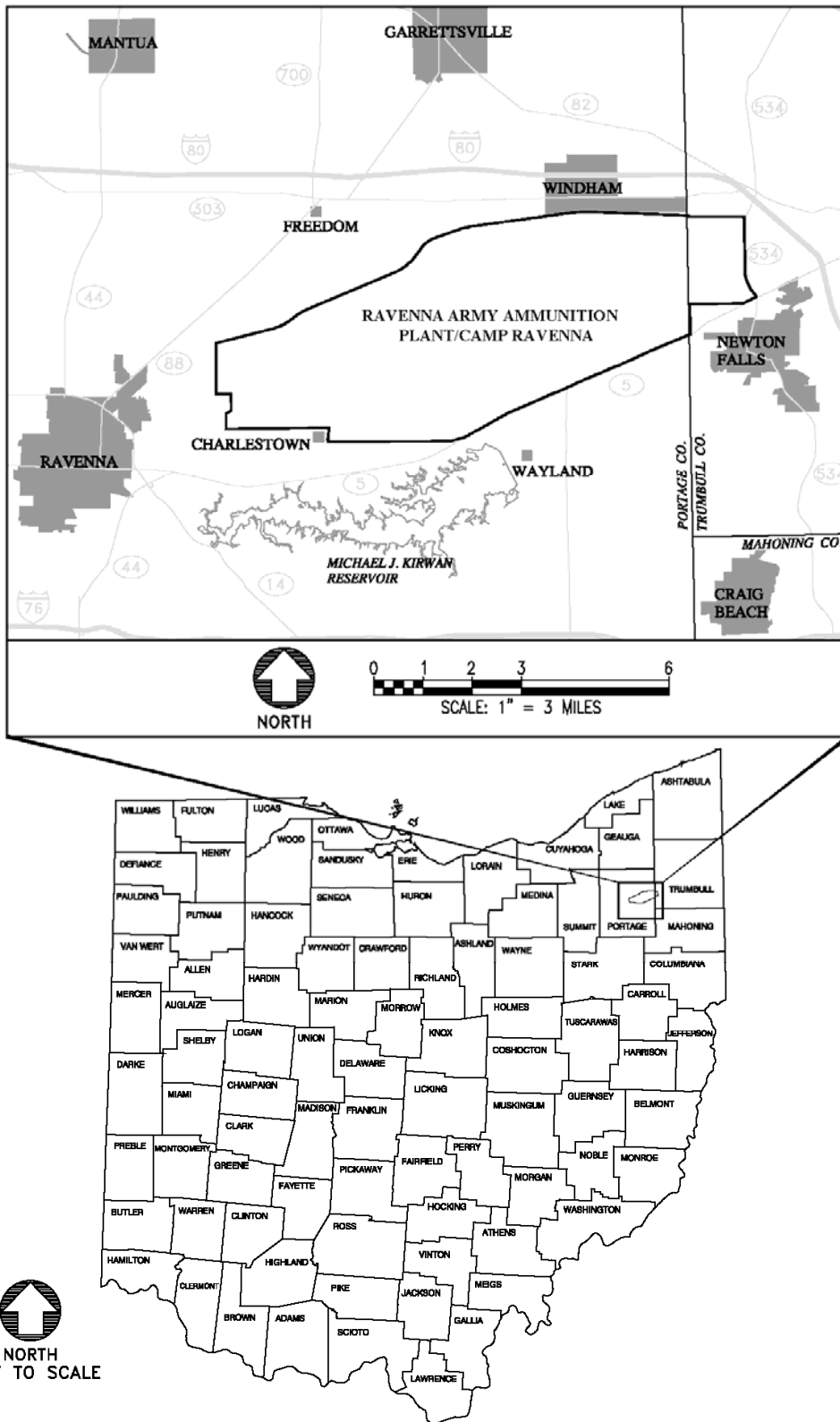
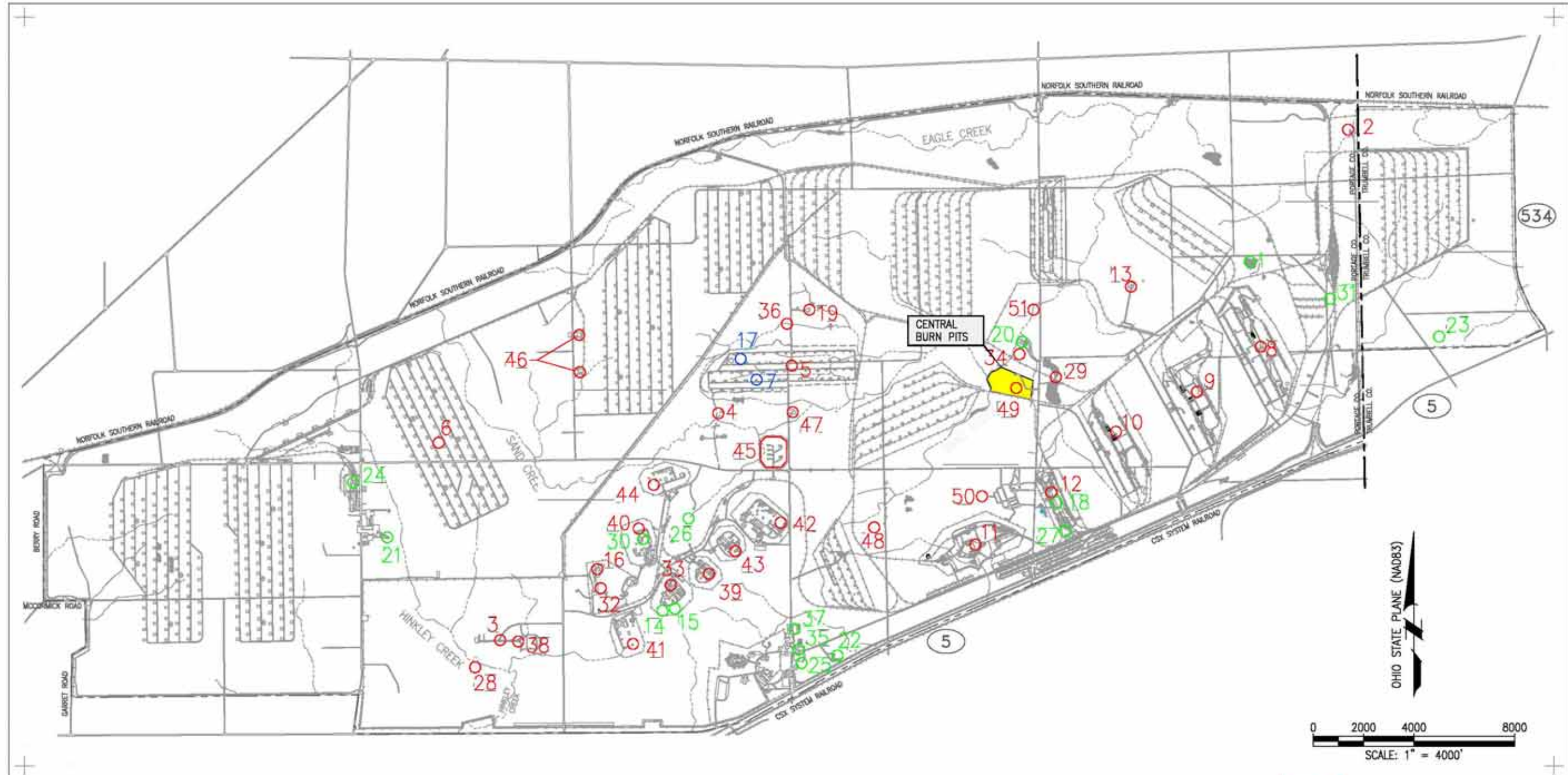


Figure 1. General Location and Orientation of RVAAP/Camp Ravenna

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File: W:\CAD\_Gov\Wavena\PRC 2005\Location Map\RVAMP Site.dwg Layout: Central Burn User: Williams Jun 20, 2007 - 10:01am



**LEGEND:**

|  |  |   |   |
|--|--|---|---|
| 1..... RAMSDALL QUARRY LANDFILL                | 13..... BUILDING 1200 AND DILUTION/SETTLING POND     | 25..... BUILDING 1034 MOTOR POOL WASTE OIL TANK     | 37..... PESTICIDE STORAGE BUILDING T-4452 |
| 2..... ERIE BURNING GROUNDS                    | 14..... LOAD LINE 8, EVAPORATION UNIT                | 26..... FUZE BOOSTER AREA SETTLING TANKS            | 38..... NACA TEST AREA                    |
| 3..... DEMOLITIONS AREA #1                     | 15..... LOAD LINE 6, TREATMENT PLANT                 | 27..... BUILDING 854 PCB STORAGE                    | 39..... LOAD LINE 5/FUZE LINE 1           |
| 4..... OPEN DEMOLITIONS AREA #2                | 16..... FUZE AND BOOSTER QUARRY LANDFILL/PONDS       | 28..... MUSTARD AGENT BURIAL SITE                   | 40..... LOAD LINE 7/BOOSTER LINE 1        |
| 5..... WINKLEPECK BURNING GROUNDS              | 17..... DEACTIVATION FURNACE                         | 29..... UPPER AND LOWER COBB'S POND COMPLEX         | 41..... LOAD LINE 8/BOOSTER LINE 2        |
| 6..... C BLOCK QUARRY                          | 18..... LOAD LINE 12 PINK WASTEWATER TREATMENT       | 30..... LOAD LINE 7 PINK WASTEWATER TREATMENT PLANT | 42..... LOAD LINE 9/DETONATOR LINE        |
| 7..... BUILDING 1601 HAZARDOUS WASTE STORAGE   | 19..... LANDFILL NORTH OF WINKLEPECK BURNING GROUND  | 31..... ORE PILE RETENTION POND                     | 43..... LOAD LINE 10/PERCUSSION ELEMENT   |
| 8..... LOAD LINE 1 AND DILUTION/SETTLING POND  | 20..... SAND CREEK SEWAGE TREATMENT PLANT            | 32..... 40- AND 60-MM FIRING RANGE                  | 44..... LOAD LINE 11/ARTILLERY PRIMER     |
| 9..... LOAD LINE 2 AND DILUTION/SETTLING POND  | 21..... DEPOT SEWAGE TREATMENT PLANT                 | 33..... FIRESTONE TEST FACILITY                     | 45..... WET STORAGE AREA                  |
| 10..... LOAD LINE 3 AND DILUTION/SETTLING POND | 22..... GEORGE ROAD SEWAGE TREATMENT PLANT           | 34..... SAND CREEK DISPOSAL ROAD LANDFILL           | 46..... BUILDINGS F-15 AND F-18           |
| 11..... LOAD LINE 4 AND DILUTION/SETTLING POND | 23..... UNIT TRAINING SITE WASTE OIL TANK            | 35..... BUILDING 1037 LAUNDRY WASTEWATER SUMP       | 47..... BUILDING T-5301 DECONTAMINATION   |
| 12..... LOAD LINE 12                           | 24..... RESERVE UNIT MAINTENANCE AREA WASTE OIL TANK | 36..... PISTOL RANGE                                | 48..... ANCHOR TEST AREA                  |
|  |  |   | 49..... <b>CENTRAL BURN PITS</b>          |
|  |  |   | 50..... ATLAS SCRAP YARD                  |
|  |  |   | 51..... DUMP ALONG PARIS-WINDHAM ROAD     |

**U.S. ARMY ENGINEER DISTRICT**  
**CORPS OF ENGINEERS**  
 Louisville, Kentucky

**RAVENNA ARMY AMMUNITION PLANT/CAMP RAVENNA**

DRAWN BY: P.H. / S.D.    REV. NO./DATE: REV. 2 / 07-27-04    CAD FILE: /00064/DWGS/R73SITE2

Figure 2. RVAAP/Camp Ravenna Installation Map



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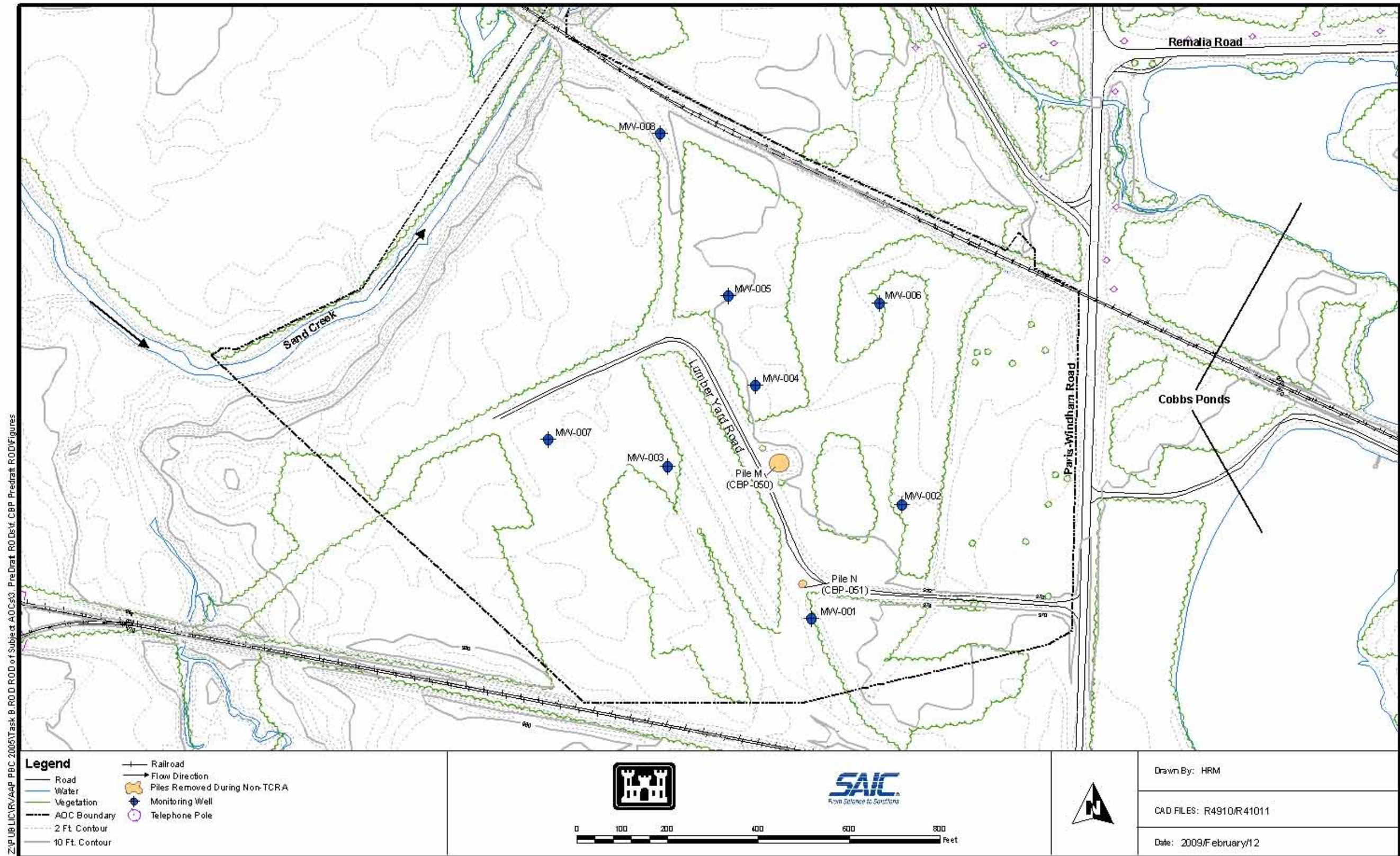


Figure 3. Central Burn Pits Area of Concern Map

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**DRAFT RECORD OF DECISION FOR SOIL AND DRY SEDIMENT AT THE RVAAP-49 CENTRAL BURN PITS AT THE  
RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO  
COMMENT RESPONSE TABLE  
APRIL 16, 2009**

| Comment Number              | Page or Sheet                      | New Page or Sheet  | Comment   | Recommendation  | Response   |
|-----------------------------|------------------------------------|--------------------|---|---|--|
| <i>Ohio EPA (T. Fisher)</i> |                                    |                    |   |   |  |
| O-1                         | Part II,<br>page 6,<br>lines 28-29 | Part II,<br>Page 6 | The text states that “responses to the verbal and written comments received are included in the Responsiveness Summary, which is Part II of this ROD.” This is incorrect.   | Please change “Part II of this ROD” to “Part III of this ROD”   | Agree. Text revised as follows:<br>“Responses to the verbal and written comments received are included in the Responsiveness Summary, which is Part <b>III</b> of this ROD.”   |
| O-2                         | Part II,<br>page 7,<br>lines 1-3   | Part II,<br>Page 7 | The text states that “following the removal of debris piles M and N as outlined in the EE/CA and Action Memorandum, the contamination present in soil and dry sediment at CBP does not pose a potential risk to human health or the environment.” | Change to something like: “following the removal of debris piles M and N as outlined in the EE/CA and Action Memorandum, no contamination remains above site cleanup levels.” | Clarification. Some discrete soil sample locations have concentrations exceeding cleanup goals. However, the calculated EPC for these chemicals does not exceed the CUGs. The following text revision is recommended:<br>“Following the removal of debris piles M and N as outlined in the EE/CA and Action Memorandum, the <b>exposure point concentrations (EPCs)</b> for contamination present in soil and dry sediment at CBP <del>does are</del> <b>below risk-based cleanup goals; therefore, the residual contaminants do</b> not pose a potential risk to human health or the environment. Therefore no principal threat has been identified for these media.” |

**DRAFT RECORD OF DECISION FOR SOIL AND DRY SEDIMENT AT THE RVAAP-49 CENTRAL BURN PITS AT THE  
RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO  
COMMENT RESPONSE TABLE  
APRIL 16, 2009**

| Comment Number                       | Page or Sheet | New Page or Sheet | Comment   | Recommendation  | Response                                   |
|--------------------------------------|---------------|-------------------|---|---|--|
| <i>RTLS-Environmental (K. Elgin)</i> |               |                   |   |   |  |
| R-1                                  | Pg 9, Line 31 | Part II, Page 9   | <p>“Receptors other than the National Guard Trainee are not anticipated at CBP due to intended future land use by the OHARNG.” This statement is not necessarily true as other National Guard receptors may access the site (such as the security guard/maintenance worker). Recommend revising this statement.</p> | <p>Change to: “Receptors, other than those associated with the National Guard future land use, are not anticipated.”</p>  | <p>Agree. Text revised as recommended.</p> |
| R-2                                  | Pg 8, Line 8  | Part II, Page 9   | <p>“Both land and water plants and animals are found at CBP. There are a few state-threatened species and state-listed species of concern at RVAAP, but none have been documented at CBP.” There are more than a few identified state-listed species. Recommend revising this statement.</p>                        | <p>Change to: “A diversity of wildlife and plants has been observed at CBP. State-endangered, State-threatened, State species of concern, and State special interest species have been identified at the RVAAP. CBP has not been previously surveyed for State-listed species; therefore, none have been documented at CBP. No federally listed species have been identified at RVAAP.”</p> | <p>Agree. Text revised as recommended.</p> |