Final

Removal Action Work Plan for Central Burn Pits (RVAAP-49)

Ravenna Army Ammunition Plant
Ravenna, Ohio

August 2007

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

Prepared for:

Prepared by:

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

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U.S. Army Corps of Engineers
Louisville, Kentucky

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ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
amsl	above mean sea level
AOC	Area of Concern
ARAR	Applicable and Relevant or Appropriate Requirements
BGS	below ground surface
BMP	best management practice
CBP	Central Burn Pits
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
COR	Contract Officer Representative
CQAP	Construction Quality Assurance Plan
DFFO	Director's Final Findings and Orders
DOT	Department of Transportation
EE/CA	Engineering Evaluation/Cost Analysis
FSA	Field Staging Area
GSA	U. S. General Services Administration
INRMP	Integrated Natural Resources Management Plan
IDW	investigation-derived waste
IRP	Installation Restoration Program
MEC	munitions and explosives of concern
MI	multi-increment
MMRP	Military Munitions Response Program
mph	miles per hour
MRS	Munitions Response Site
NCR	Non-Conformance Report
NGB	National Guard Bureau
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
PBC	Performance Based Contract
PID	Photoionization Detector
PPE	personal protective equipment
PVC	polyvinyl chloride
QAPP	Quality Assurance Protection Plan
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RmAO	Removal Action Objective

ACRONYMS AND ABBREVIATIONS (continued)

RmAWP	Removal Action Work Plan
RRSE	Relative Risk Site Evaluation
RTLS	Ravenna Training and Logistics Site
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
TCLP	toxicity characteristic leaching procedure
TSD	Treatment, storage, or disposal
USACE	U. S. Army Corps of Engineers
USACHPPM	U. S. Army Center for Health Promotion and Preventative Medicine
USEPA	U. S. Environmental Protection Agency
VOC	Volatile Organic Compound
WAC	waste acceptance criteria

1.0 INTRODUCTION

Science Applications International Corporation (SAIC) has been contracted by the U. S. Army Corps of Engineers (USACE), Louisville District, to provide environmental services in support of six (6) high priority areas of concern (AOCs) at the Ravenna Army Ammunition Plant (RVAAP) in Ravenna, Ohio. This Removal Action Work Plan (RmAWP) describes the implementation process for the selected remedy for the contaminated debris Piles M and N at the Central Burn Pits (CBP).

This work is being performed under a Performance Based Contract (PBC) in accordance with U. S. General Services Administration (GSA) Environmental Advisory Services Contract GS-10-F-0076J. In addition, planning and performance of all work elements is being conducted in accordance with the requirements of the Director's Final Findings and Orders (DFFO) dated June 10, 2004 [Ohio Environmental Protection Agency (Ohio EPA) 2004].

1.1 PURPOSE

The purpose of this RmAWP is to detail implementation of the selected removal action alternative specified in the *Final Engineering Evaluation/Cost Analysis (EE/CA) for Central Burn Pits* (USACE 2007a) and the *Action Memorandum for the Central Burn Pits* (USACE 2007b). Specific elements of the removal action are as follows:

- Remove and dispose impacted (contaminated by previous activities) soil at debris Piles M and N from CBP;
- Support appropriate transportation and disposal activities;
- Confirm impacted soil has been removed; and
- Restore excavated areas to neighboring contours and conditions.

1.2 SCOPE

The scope of this RmAWP is to excavate and dispose soil containing concentrations of lead and hexavalent chromium exceeding removal cleanup goals as specified in the *Final Engineering Evaluation/Cost Analysis for Central Burn Pits* (USACE 2007a). Approximately 183 cubic yards (293 tons) of soil will be removed.

Confirmation sampling will be conducted to ensure all contaminated material exceeding removal cleanup goals has been removed. Any additional soil found to have contaminants above cleanup goals will be excavated and confirmation sampling will be performed until cleanup goals are attained. Excavated areas will be backfilled and/or graded and restored according to this RmAWP.

Removal activities will be implemented by USACE/SAIC and its subcontractors. SAIC, under contract with the USACE, is responsible for the excavation, characterization, and disposal of impacted soil.

Implementation of these activities will meet the requirements of the *Facility-Wide Sampling and Analysis Plan (SAP)* (USACE 2001a), the *Facility-Wide Safety and Health Plan* (USACE 2001b), and this RmAWP.

1.3 FACILITY DESCRIPTION

When the RVAAP Installation Restoration Program (IRP) began in 1989, RVAAP was identified as a 21,419-acre installation. The property boundary was resurveyed by Ohio Army National Guard (OHARNG) over a 2-year period (2002 and 2003) and the total acreage of the property was found to be 21,683.289 acres. As of February 2006, a total of 20,403 acres of the former 21,683-acre RVAAP has 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 Ravenna Training and Logistics Site (RTLS). RTLS 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. RTLS/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 1-1 and 1-2). RTLS 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 RVAAP was operational, RTLS 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 and, therefore, references to RVAAP in this document are considered to be inclusive of the historical extent of RVAAP, which is inclusive of the combined acreages of the current RTLS and RVAAP, unless otherwise specifically stated.

1.4 CENTRAL BURN PITS

1.4.1 Description and History

CBP is currently licensed to the OHARNG and is part of the RTLS. CBP is located in the east-central area of the RVAAP/RTLS facility at the intersection of Paris-Windham Road and Lumber Yard Road, and covers approximately 20 acres (Figure 1-3). The AOC is bordered by old railroad beds to the north (Track 39) and south (Track 33), and Sand Creek to the west-northwest. The AOC was originally used as a lumber and building materials storage area. Later the AOC was used for open burning of non-explosive wastes, electrical components, wooden boxes, scrap, and the disposal of other non-hazardous waste material.

Operation of the burn pits is believed to have started soon after RVAAP began operations and continued into the mid-1970s, although actual dates are unknown. The burn pits are comprised of bare mounds of slag and debris, and there are approximately 15 pits located within the AOC. Three burn areas, characterized by debris, scrap materials, and distressed vegetation, were identified in the eastern portion of the AOC near Lumber Yard Road.

The topography across the majority of CBP is relatively flat due to historical grading and fill activities. Undisturbed topography is characterized by gently undulating contours. Sand Creek forms the western AOC boundary. Elevations vary from 292 to 298 meters (960 to 980 ft) above mean sea level (amsl). Structural features include former rail lines Track 33 and Track 39. Other features include debris piles and berms in the central area and burn areas in the eastern area. These debris piles and berms are placed materials, 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 of the piles and berms contain minor miscellaneous general construction debris (scrap metal, aluminum door frames, glass). Two piles (debris Piles M and N) contain primarily burning residues. It was noted miscellaneous materials (including glass, ceramics, and rail road ties) have been scattered within the AOC. There are no buildings at CBP.

Soils within CBP consist 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). Subsurface lithology at CBP consists mostly of clay to sand-rich silt tills with interbedded sands scattered throughout. These deposits are generally firm, moderately plastic, and tend to hold water where encountered.

A topographic high is located near the southwestern portion of the site, 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 on site. The drainage ditches generate flow mainly from surface water runoff and precipitation events following the topography of the AOC. Eventually, the majority of surface water drains to Sand Creek. The ditches tend to hold water for extended periods due to the low permeability of most soil at CBP.

Although bedrock was not encountered during the remedial investigation (RI) monitoring well installation, it is assumed the bedrock is Sharon Conglomerate bedrock based on available historical geologic and environmental surveys of the area.

1.4.2 Anticipated Future Land Use

OHARNG has prepared a comprehensive Environmental Assessment and an Integrated Natural Resources Management Plan (INRMP) to address future use of RTLS property (OHARNG 2001). OHARNG has established future land use for CBP as Dismounted Training, No Digging based on anticipated training, mission, and utilization of the RTLS. Future land use will also include the

development of small arms ranges. CBP is not included as a Military Munitions Response Program (MMRP) Munitions Response Site (MRS) at RVAAP based on available historical and operational information; therefore, no removal actions or land use controls are currently planned with respect munitions and explosives of concern (MEC).

1.5 PREVIOUS ACTIVITIES

This section presents a brief summary of previous activities implemented for CBP. Previous studies and reports at CBP include a Relative Risk Site Evaluation (RRSE), a Phase I RI, a supplemental Phase II RI, an EE/CA, and an Action Memorandum. No previous removal actions have been conducted at CBP.

1.5.1 Relative Risk Site Evaluation and Phase I Remedial Investigation

Previous investigations at CBP include the following:

- The "Relative Risk Evaluation for Newly Added Sites at the RVAAP, Ravenna, Ohio, Hazardous and Medical Waste Study No. 37-EF-5360-99, 19-23 October 1998," by the US Army Center for Health Promotion and Prevention Medicine (USACHPPM 1998) evaluated 13 new sites, resulting in CBP being classified as a high-priority AOC.

- The Phase I RI (USACE 2005a) sampled soil (0 to 3 ft below ground surface [BGS]), subsurface soil (3 to 30 ft BGS), sediment, surface water, and groundwater in order to characterize contamination at the AOC. (Calculated exposure point concentrations for manganese and arsenic from soil samples collected during the Phase I investigation exceeded the Facility-wide background values for the RVAAP).

1.5.2 Supplemental Phase II RI

Supplemental Phase II RI field activities were conducted to further define nature and extent of soil contamination at CBP and collect additional data from the debris piles and berms to assess potential disposition requirements and options. The sampling strategy was presented in the *Supplemental Phase II Remedial Investigation of Central Burn Pits, Fuze and Booster Quarry Landfill/Ponds, and Open Demolition Area #2 at Ravenna Army Ammunition Plant in Ravenna, Ohio* (USACE 2005b). The results from the Supplemental Phase II RI will be published in a future Phase II RI Report.

Soil samples of berm and pile materials at CBP were collected using multi-increment (MI) sampling techniques. The MI samples were composite samples collected from multiple, stratified random points within each of the designated MI sampling areas. The MI sample results from Piles M and N indicate they contain inorganic contaminants at much higher levels than surrounding soil. Process knowledge and visual characteristics indicate Piles M and N contain a substantial percentage of residues from previous burning activities and, on this basis, are considered waste material rather than conventional environmental media. The MI sample result from Pile M contained a total lead concentration of 8,560 mg/kg. The lead

concentration in the toxicity characteristic leaching procedure (TCLP) sample from Pile M was 15.4 mg/L. This TCLP result exceeds the maximum lead concentration (5.0 mg/L) for toxicity characteristics per 40 *Code of Federal Regulations* (*CFR*) 261.24. Therefore, debris pile M may be classified as a characteristically hazardous waste.

The MI sample result for Pile N had a detected value of 25 mg/kg of hexavalent chromium, which, although not characteristically hazardous, is highly elevated compared to the surrounding soil. All TCLP sample results from Pile N were below laboratory reporting limits.

Field measurements of the approximate dimensions of these piles and berms were collected during the Supplemental Phase II RI field activities. The dimensions and estimated volumes of Piles M and N have been updated from recent topographical surveying and engineering calculations and are summarized in Table 1-1.

Table 1-1. Estimated Dimensions of Piles M and N

Surface Features	Approximate Dimensions	Shape	Estimated Volume
Pile M	Height = 2 ft, Diameter = 47 ft	Pile	99 cu yards
Pile N	Height = 2.5 ft, Diameter = 40 ft	Pile	84 cu yards

1.5.3 Engineering Evaluation/Cost Analysis

The *Final Engineering Evaluation/Cost Analysis for Central Burn Pits* (USACE 2007a) was developed following guidelines of *Use of Non-Time Critical Removal Authority in Superfund Response Actions* (USEPA 2000). As stated in the guidelines, U. S. Environmental Protection Agency (USEPA) has urged Superfund decision makers to broadly use the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) removal authority to achieve quick, protective results at Superfund sites, consistent with legal requirements, including public participation. Although RVAAP is not a National Priorities List (NPL) listed site, the US Army and Ohio EPA have agreed to proceed with a Non-Time Critical Removal Action for Piles M and N due to likelihood of contaminant dispersal and migration from the piles to surrounding environmental media. The EE/CA developed Removal Acton Objectives (RmAOs) consistent with the intended future land use at CBP.

The EE/CA presented two removal action alternatives with costs to ensure adequate protection of human health and the environment, achieve RmAOs, meet Applicable and Relevant or Appropriate Requirements (ARARs), and permanently and significantly reduce the volume, toxicity, and/or mobility of contaminants. The EE/CA recommended Removal Action Alternative 2 for debris Piles M and N:

- Alternative 1: No Action; and
- Alternative 2: Excavation of Waste Piles with Off-site Treatment and Disposal.

1.5.4 Action Memorandum

The CBP Action Memorandum (USACE 2007b) documents the approval of the Non-Time Critical Removal Action recommended in the EE/CA. The Action Memorandum documents the evaluation of the CBP conditions, proposes the action to excavate Piles M and N with off-site treatment and disposal, and includes a Responsiveness Summary addressing public comments on the removal action.

1.6 REMOVAL ACTION WORK PLAN ORGANIZATION

This RmAWP is comprised of a work plan, design drawings, and specifications. The work plan is organized as follows:

- Section 2: presents the project organization and coordination
- Section 3: outlines the removal action objectives
- Section 4: discusses construction mobilization and site preparation
- Section 5: describes soil removal activities
- Section 6: presents the confirmation sampling procedure
- Section 7: summarizes site restoration activities
- Section 8: discusses waste characterization and disposal activities
- Section 9: presents the Construction Quality Assurance Plan (CQAP)
- Section 10: summarizes the reporting requirements and project schedule
- Section 11: lists the references used in the document
- Attachments:
  A. Site-Specific Health and Safety Plan
  B. Design Drawing

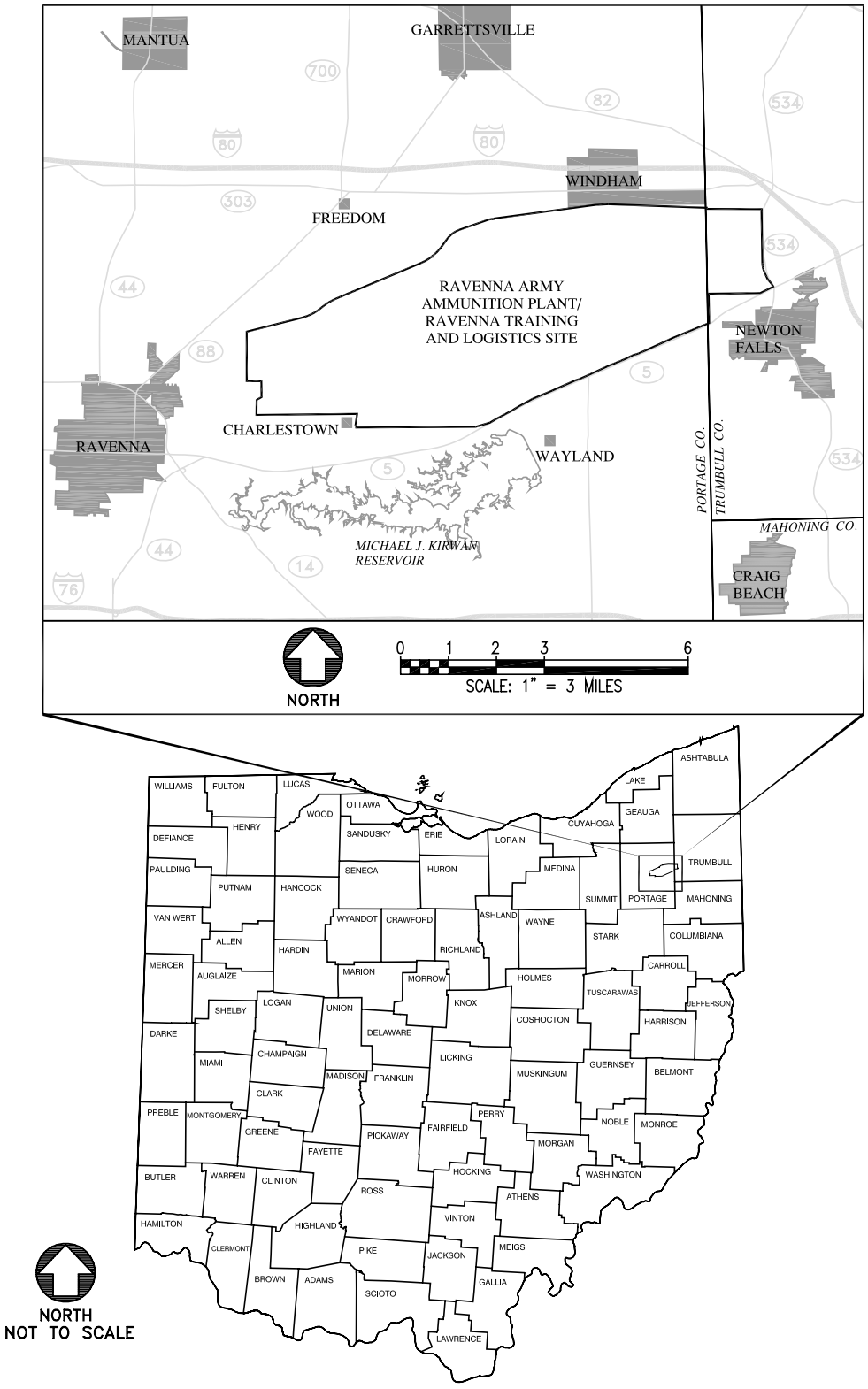

Figure 1-1. General Location and Orientation of RTLS/RVAAP

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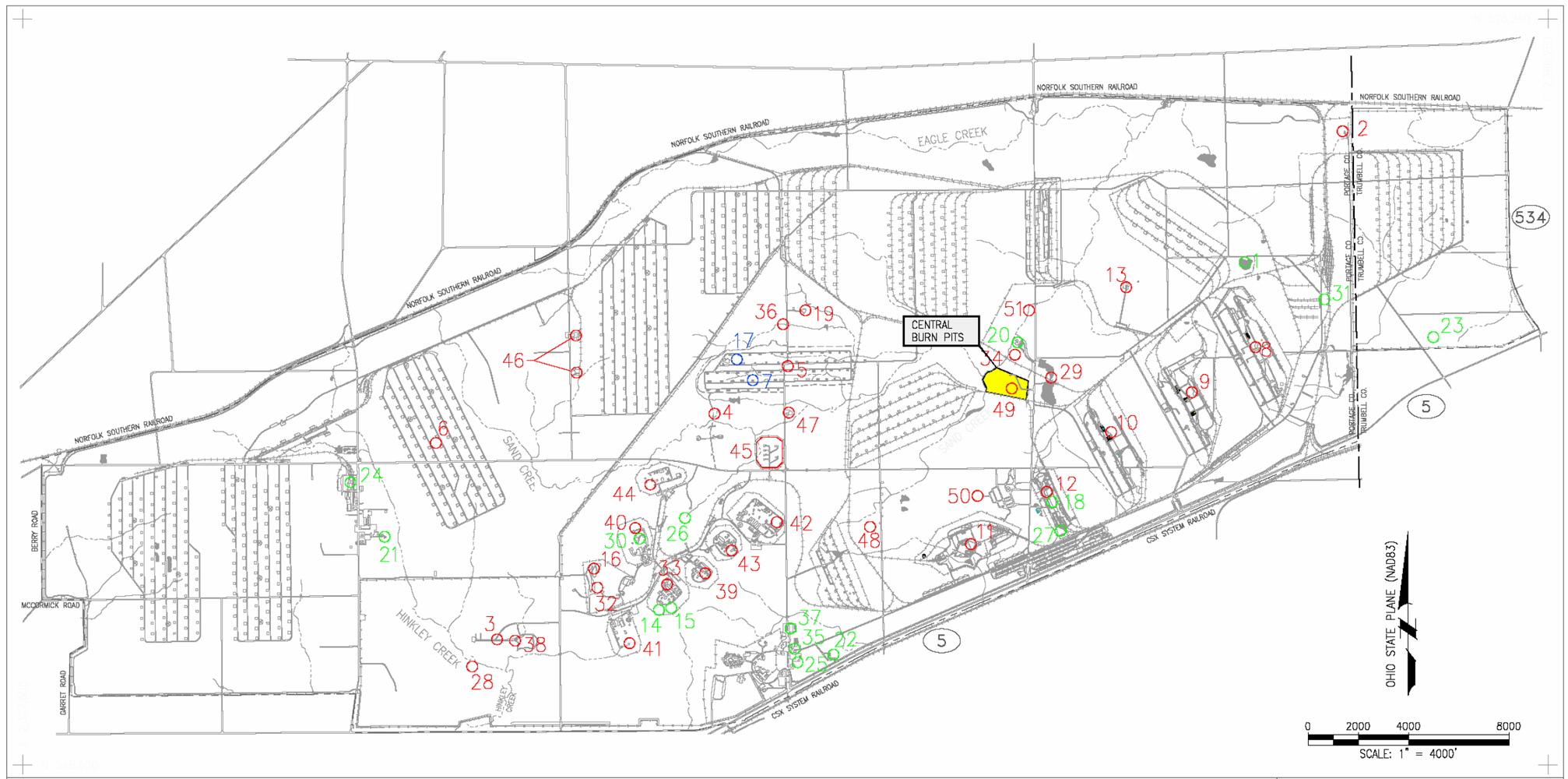

LEGEND:

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

CERCLA
RCRA
OTHER REGULATORY
RAILROAD TRACKS
FENCE LINE
PROPERTY BOUNDARY
STREAM OR CREEK

US Army Corps of Engineers Louisville District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

RVAAP/RTLS
RAVENNA, OHIO

DRAWN BY:	REV. NO./DATE:	CAD FILE:
P.H. / S.D.	REV. 2 / 07-27-04	/DD064/DWGS/R73SITE2

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Figure 1-2. RVAAP/RTLS Installation Map

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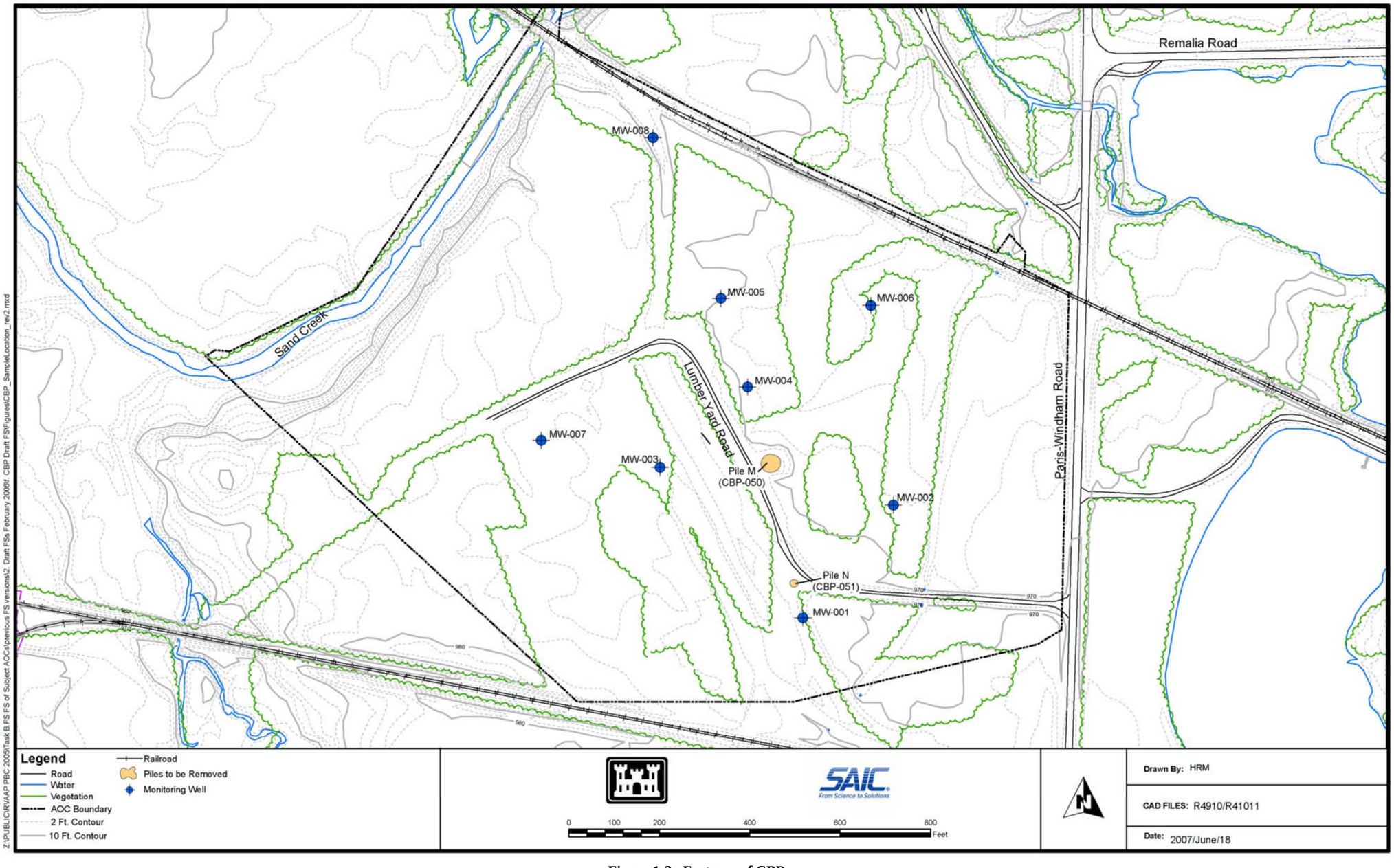

Figure 1-3. Features of CBP

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2.0 PROJECT ORGANIZATION AND COORDINATION

This section presents the project organization and describes how the project will be coordinated amongst the project team. This section describes the roles and responsibilities of personnel that will coordinate the implementation of this RmAWP. This section also describes SAIC's monthly reporting and participation in weekly contractor meetings at the RVAAP.

2.1 PROJECT ORGANIZATION

The US Army is the lead agency for this removal action and is responsible for its implementation. The USACE, Louisville District has implementation and technical oversight responsibility on behalf of the US Army. Ohio EPA is the regulatory authority governing work on this removal action. SAIC is the primary contractor responsible for implementing this RmAWP. SAIC will select and procure a qualified removal subcontractor to perform the work herein. An organizational chart for implementation of the RmAWP is presented in Figure 2-1. Below is a summary of key personnel responsibilities.

2.1.1 USACE Contract Officer Representative

The USACE Contract Officer Representative (COR) duties include overseeing SAIC to ensure work is completed in accordance with the RmAWP and coordinating responses for any unexpected materials encountered.

2.1.2 RVAAP Facility Manager

The RVAAP Facility Manager is responsible for signing waste profiles, manifests, and necessary permits. The RVAAP Facility Manager will also assist in the coordination between SAIC and the Operations and Maintenance Contractor (MKM Engineers, Inc.).

2.1.3 Ohio EPA Project Coordinator

The Ohio EPA Project Coordinator will oversee the Army and its implementation contractor (SAIC) to ensure work is completed in accordance with the Work Plan and that all activities meet regulatory requirements. The Ohio EPA Project Coordinator will be informed of project schedule and implementation deviations.

2.1.4 SAIC Project Manager

The SAIC Project Manager manages the overall performance to implement this RmAWP. The Project Manager provides oversight to ensure all contractual requirements are properly satisfied and provides final resolution of any conflict identified during project performance. The Project Manager is responsible for the overall management and quality of implementing the RmAWP. This individual ensures all project

goals and objectives are met in a high-quality and timely manner. The Project Manager is responsible for tracking project schedule and informing the USACE COR and Ohio EPA Project Coordinator of any deviations to the project schedule. The Project Manager provides the Ohio EPA Project Coordinator 1) notification of project implementation, and 2) information of any quality assurance and non-conformance issues for this removal action.

2.1.5 SAIC Technical Manager

The SAIC Technical Manager manages the technical performance and quality of implementing this RmAWP. The Technical Manager oversees the SAIC Construction Manager in meeting project goals and objectives in a high quality and timely manner and reports to the SAIC Project Manager. In coordination with the SAIC Construction Manager and the SAIC Quality Assurance/Quality Control (QA/QC) Officer, the SAIC Technical Manager addresses issues including identification of non-conformances and verification of removal action.

2.1.6 SAIC Quality Assurance/Quality Control Officer

The SAIC QA/QC Officer coordinates with the SAIC Construction Manager to ensure the requirements of the CBP RmAWP CQAP and Facility-Wide Quality Assurance Protection Plan (QAPP) are achieved and ensures inspections are performed in accordance with both plans.

The SAIC QA/QC Officer also provides quality control of sampling and sample handling (including sample custody, field testing, and coordinating QA/QC of the laboratory), and ensures the required submittals are on time and of high quality. The SAIC QA/QC Officer is responsible for reviewing and approving variances during field activities before work continues; approving, evaluating, and documenting the disposition of Non-Conformance Reports (NCR); and designing and supervising the implementation of audit/surveillance plans. The SAIC QA/QC Officer reports directly to the SAIC Project Manager and informs the SAIC Program Manager and SAIC Construction Manager of all information and decisions reported.

2.1.7 SAIC Health and Safety Manager

The SAIC Health and Safety Manager establishes health and safety policies and procedures supporting project and office activities, and verifies safe work practices and conditions. The SAIC Health and Safety Manager ensures these policies are, at a minimum, in accordance with the Facility-Wide Safety and Health Plan for Environmental Investigations at the RVAAP (USACE 2001b). The SAIC Health and Safety Manager reports directly to the SAIC Project Manager and will inform the SAIC Technical Manager and SAIC Construction Manager of all information and decisions reported.

2.1.8 SAIC Construction Manager

The SAIC Construction Manager is responsible for project control and implementation of removal activities in accordance with this CBP RmAWP. The SAIC Construction Manager is responsible for subcontractor oversight, adherence to QA/QC field procedures and the Site Safety and Health Plan (SSHP), coordination with RVAAP personnel and the USACE COR, management of any investigation derived wastes, field documentation, and preparation of field change orders, if required. The SAIC Construction Manager reports directly to the SAIC Technical Manager.

2.1.9 Subcontractor Construction Supervisor

The Subcontractor Construction Supervisor implements specific contracted components of this RmAWP. The Subcontractor Construction Supervisor is responsible for the proper performance of specified removal activities in accordance with this RmAWP, adherence to QA/QC field procedures and the CQAP, implementation of the SSHP, coordination of field personnel activities, and field documentation. The Subcontractor Construction Supervisor reports directly to the SAIC Construction Manager.

2.1.10 Subcontractor Site Safety and Health Officer

The Subcontractor Site Safety and Health Officer (SSHO) is responsible for implementing and confirming that health and safety procedures designed to protect personnel are strictly adhered to throughout the field activities (included soil sampling) conducted for the project. The SSHO has the authority to halt fieldwork if health and/or safety issues arise that are not immediately resolvable in accordance with the SSHP. The SSHO reports to the Subcontractor Construction Supervisor and the SAIC Construction Manager.

2.2 MONTHLY REPORTS

A summary of field activities for this removal action will be included in monthly reports issued per the *Project Management Plan for the Six High Priority Areas of Concern* (SAIC 2005). The monthly reports will include a status and summary of project activities.

2.3 WEEKLY CONTRACTOR MEETING

SAIC will participate in the RVAAP weekly coordination meetings from one week prior to and for the duration of removal activities. The Subcontractor may participate in these meetings on an as needed basis. These weekly coordination meetings are typically held on Mondays in RVAAP Building 1037.

2.4 BI-WEEKLY SCHEDULE CALLS

SAIC will participate in bi-weekly telecronferences with the Ohio EPA and the US Army. SAIC will communicate the progress of implementing this RmA WP at this meeting.

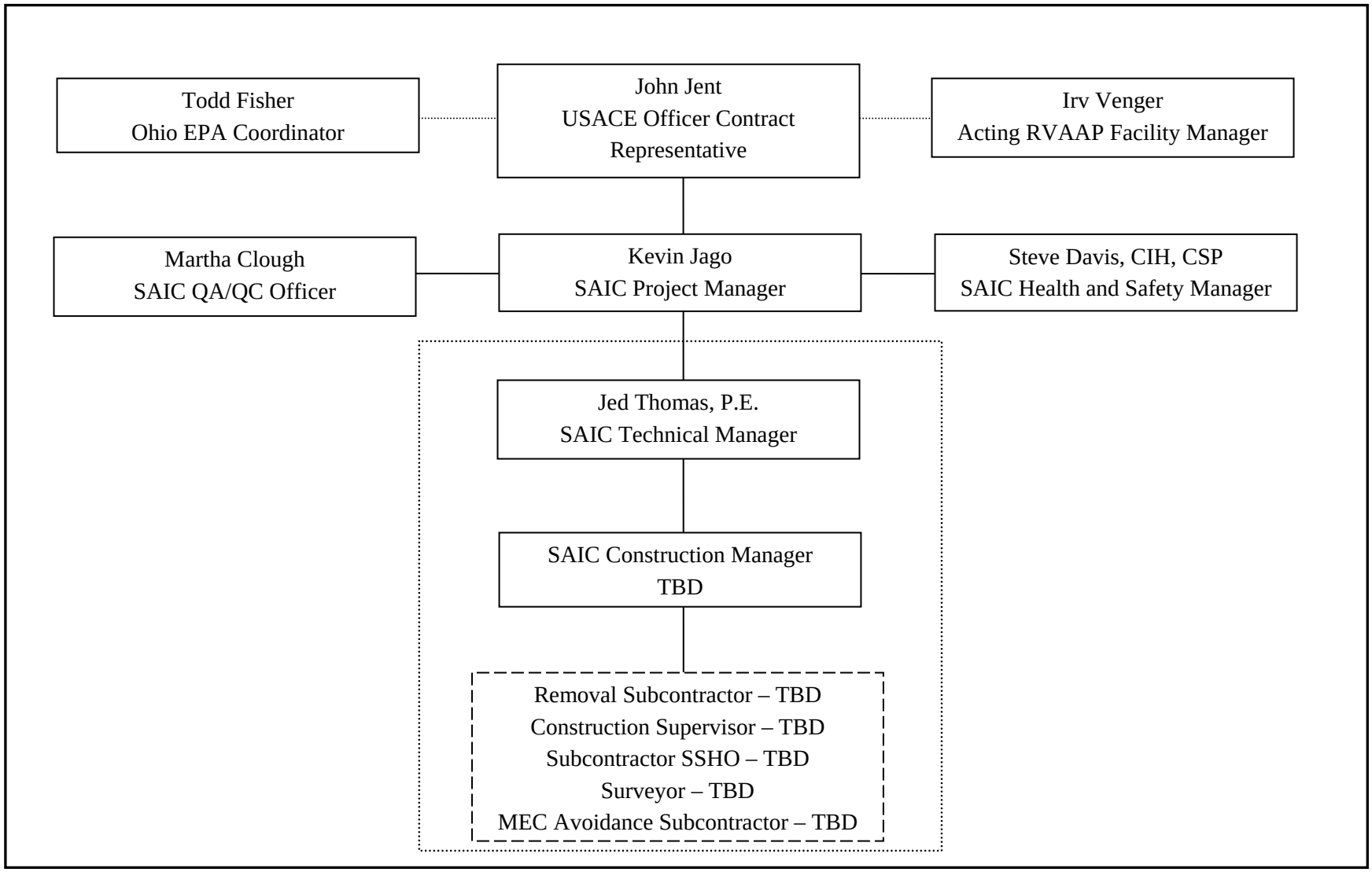

Figure 2-1. Organizational Chart for Implementation of the CBP Removal Action Work Plan

3.0 REMOVAL ACTION OBJECTIVES AND CLEANUP GOALS

This section describes the RmAO and cleanup goals. RmAO specifies the requirements the removal action must fulfill to protect human health and the environment. The removal cleanup goals are the contaminant concentrations required to achieve the RmAO.

3.1 REMOVAL ACTION OBJECTIVE

Debris Piles M and N at CBP contain residues and materials with elevated levels of lead (Pile M) and hexavalent chromium (Pile N) that have a high likelihood to disperse and migrate. Further, Pile M TCLP sample results exceeded TCLP criteria indicating the materials in the pile are characteristically hazardous. The piles are not considered viable exposure units. However, due to these elevated contaminant levels, a removal action is required to provide protection to human health and the environment and minimize the potential for contaminant dispersal from the materials (USACE 2007a).

The EE/CA developed RmAOs consistent with the intended future land use at CBP. The following RmAO for impacted piles at CBP was developed consistent with the intended future land use at CBP:

- Remove Piles M and N to prevent dispersal of contaminants and ensure underlying soil meets the lowest risk-based cleanup goals for the exposure scenarios evaluated in the RI.

3.2 REMOVAL CLEANUP GOALS

Cleanup goals for this removal action were selected based on the lowest cleanup number for the exposure scenarios evaluated in the RI. These cleanup goals are explained in the following text and presented in Table 3-1. As agreed to with Ohio EPA, these cleanup goals will be compared against the results from MI confirmation samples collected (per Section 6.1) to ensure the RmAO is attained.

The cleanup goal for Pile M is based upon the lowest risk-based cleanup goal for lead among the receptors evaluated, which is residential land use (400 mg/kg, USEPA residential play areas hazard level – 40 *CFR* 745). The cleanup goal for Pile N is based upon the lowest cleanup goal for hexavalent chromium among the receptors evaluated, which is for the National Guard Trainee (16 mg/kg). This cleanup goal is based on combined exposure through ingestion, inhalation of fugitive dust, and dermal contact with soil. The hexavalent chromium cleanup goal is consistent with the previously approved cleanup goal in the *Final Proposed Remedial Goal Options for Soils at Load Lines 1, 2, 3, and 4 at the Ravenna Army Ammunition Plant* (Shaw 2004).

Table 3.1. Removal Action Cleanup Goals

Location	Parameter	Supplemental Phase II RI Results[1] (mg/kg)	Removal Action Cleanup Goal (mg/kg)
Pile M	Lead, Total	8,560	400
Pile N	Chromium, hexavalent	25	16

[1] Results are for multi-increment samples collected. Table does not include RI discrete soil samples.

RI = remedial investigation.

4.0 CONSTRUCTION MOBILIZATION

This section describes construction mobilization and site preparation activities required to implement this CBP RmAWP. Design drawings (Attachment B) detailing removal action requirements are referenced as appropriate throughout this section.

The selected removal Subcontractor responsible for implementing construction activities will prepare an addendum to the SSHP (Attachment A) in accordance with USACE and Occupational Safety and Health Administration (OSHA) guidelines. SAIC will review and approve the SSHP Addendum to start of removal activities. The final SSHP Addendum will be distributed to the US Army, Ohio EPA, and OHARNG.

4.1 PERMIT AND NOTIFICATION REQUIREMENTS

Based on review of applicable requirements, the following permits and notifications are required for the removal action. All signatory documentation (e.g., permits and manifests) will be obtained through RVAAP or RTLS representatives.

4.1.1 Endangered Species Protection

Section (h) *Endangered species protection* of 40 *CFR* 6.302 prohibits federal agencies from jeopardizing threatened or endangered species or adversely modifying habitats essential to their survival. A Letter of Determination will be sent to the U. S. Fish and Wildlife Service office in Reynoldsburg, Ohio prior to removal activities. The letter is to express that implementation of this RmAWP will have no impact on federally endangered or threatened species. Copies of this Letter of Determination and correspondence from the U. S. Fish and Wildlife Service will be submitted to USACE and OHARNG.

A site-wide Indiana bat survey was conducted at RTLS in January 2005 and was documented in the *Training Site-Wide Survey for the Indiana Bat (Myotis sodalis) at the Ravenna Training and Logistics Site (RTLS) Portage and Trumbull Counties, Ohio, Final Report* (ESI 2005). The site-wide survey included CBP. The survey identified six species of bats but did not identify any Indiana bats at the project site.

OHARNG has also completed extensive surveys of the bald eagle (federally threatened), Mitchell satyr butterfly (federally endangered), northern monkshood (federally threatened), and eastern massasauga (federal candidate). These species have not been found at RTLS.

4.1.2 Ohio EPA Requirements

The total area of construction within the CBP is estimated to be 0.5 acres, which is below the 1 acre threshold requiring coverage under the National Pollutant Discharge Elimination System (NPDES)

Construction Storm Water Permit No. OHC000002. However, best management practices (BMPs), such as silt fence and construction entrance/exit, will be employed during implementation of this RmAWP.

USACE/SAIC will notify Ohio EPA of the following:

- Initiation of construction activities (minimum 14 days prior);
- Selected disposal facility (minimum 5 days prior to shipping material off-site);
- Disposal options for collected storm water; and
- Initiation of confirmation samples (minimum 14 days prior).

4.2 SITE PREPARATION

This section describes the site preparation activities that must be performed by the Subcontractor prior to beginning construction activities at the site. Site preparation activities consist of several elements designed to maximize access to the site and prevent migration of soil during construction, including:

- Utility survey and clearance;
- Establishing site controls and site access;
- MEC Clearance;
- Setting up construction support facilities;
- Clearing and grubbing; and
- Installing erosion and sediment controls.

4.2.1 Utility Clearance

The Subcontractor will notify SAIC and the RVAAP Facility Manager a minimum of 28 days prior to initiating removal action so a utility survey may be conducted by appropriate RVAAP personnel. Any identified utilities (underground and aboveground) will be maintained as determined by RVAAP Facility Manager.

In the event unmarked utilities are discovered during removal activities, construction activities will stop immediately and removal activities will be reassessed. The RVAAP Facility Manager, USACE COR, and SAIC Project Manager will be notified immediately. RVAAP personnel will determine the disposition of the discovered utility. RVAAP personnel and SAIC will collaborate on any necessary actions in order to continue removal activities. If the discovery of unmarked utilities results in a change to this RmAWP's scope, objectives, or schedule, SAIC will notify the USACE COR and Ohio EPA Project Coordinator for concurrence on proposed revisions and/or corrective actions.

4.2.2 Site Control and Access

The Subcontractor and SAIC Construction Manager will provide site controls and site access. The project site will be controlled at ingress and egress. Site controls will include:

- Controlling access to the project site;
- Erecting signs at location indicated on Drawing C-5 to expedite deliveries, maintain traffic flow, promote safety, and prevent interference with other RVAAP/RTLS operations; and
- Adherence to RVAAP traffic rules.

Ohio and RVAAP traffic rules will be strictly adhered to. Speed limits of 35 miles per hour (mph) during daylight hours and 25 mph at night in the RVAAP main roads will be maintained. A speed limit of 10 mph on the access road will be maintained. Main roads will not be blocked. RVAAP traffic will be maintained on at least half of the roadway width at all times. Approval will be obtained from the RTLS, RVAAP Facility Manager, and SAIC Construction Manager prior to starting any activity that will obstruct traffic. All haul trucks will be weighed upon arrival and prior to departure from the site at the site truck scale (Drawing C-5).

The use of two-way radios and cell phones is permitted at the RVAAP. The SAIC Construction Manager will coordinate with RVAAP security to ensure that contact with Post 1 is maintained at all times.

4.2.2.1 Facility Access Protocol

All personnel and vehicles must enter the facility through the main entrance (8454 State Route 5, Ravenna, OH 44266) and are subject to search and inspection. Weapons, lighters (or similar fire starters), and alcohol (with the exception of sample preservatives, decontamination fluid, etc.) are prohibited while at the project site; prohibited items may be left with security while onsite. Security personnel will confiscate any prohibited items discovered during inspections.

SAIC will submit a roster of all personnel and subcontractors who will be working at the RVAAP to the RVAAP Operations and Maintenance Contractor at least one week in advance of the field work. This roster will be maintained and submitted to the RVAAP Operations and Maintenance Contractor on a weekly basis. All personnel approved to enter the RVAAP must provide government issued identification (e.g., driver's license, passport) in order to enter. Visitors and contractors are required to sign a roster with times of arrival and departure from the RVAAP and specify the area where work will be performed.

4.2.2.2 Site Access Protocol

All supervisors, workers, and site visitors entering the construction area must provide training records specified in Table 4-1 of the SSHP prior to entry of the construction area and/or exclusion zones. Site visitors arriving throughout the day must: 1) sign in on a visitors log; 2) undergo a briefing by the SAIC Construction Manager; and 3) provide necessary training records and documentation prior to approaching or entering the exclusion zone. All site visitors must be approved by the SAIC Construction Manager to enter the construction area and/or exclusion zones.

4.2.3 Construction Support Facilities

Construction support facilities for this RmAWP will include:

- Sanitary facilities;
- Water storage tank;
- Equipment staging area; and
- Turnaround area.

4.2.4 Vegetation Clearing

Minimal clearing and grubbing will be required to facilitate equipment access and soil removal (Drawing C-3). Clearing and grubbing will primarily involve felling and removing trees located on and around the excavation areas. Tree stumps and associated roots within the limits of excavation will be removed and disposed with the impacted soil. Trees outside the limits of excavation will be removed at the discretion of the Subcontractor with approval from the SAIC Construction Manager, RVAAP Facility Manager, and the RTLS Forestry point of contact.

4.2.5 Truck Turnaround Area

The truck turnaround area will be completed as indicated in Drawing C-3. Stone (American Association of State Highway and Transportation Officials [AASHTO] No. 2) will be placed to facilitate the ingress/egress and loading of on-road haul trucks. The Subcontractor will be responsible to maintain the truck turnaround area throughout the project (i.e. kept free of mud).

4.2.6 Access Road

CBP may be accessed from unimproved road located off of Paris-Windham Road (Drawing C-3). The Subcontractor will maintain the haul road to allow equipment to traverse safely and efficiently. If visible dust is being generated by equipment, then dust suppression measures (e.g., wetting) will be employed. Additional stone may be required to further improve the access road.

4.3 STORM WATER POLLUTION PREVENTION

The Subcontractor will install storm water run-on and run-off controls prior to initiating removal activities in accordance with this section of the RmAWP and as detailed on Drawing C-3. BMPs will be employed to protect the excavation area from storm water run-on and run-off. Erosion and sedimentation controls will include both non-structural BMPs and structural BMPs. Non-structural BMPs to be employed at the project site include:

- Minimizing disturbance;
- Phasing of construction operations; and

- Maintaining good housekeeping practices.

Structural BMPs to be employed at the site include:

- Construction entrance/exit;
- Silt fence; and
- Temporary stabilization measures.

To further minimize the potential for erosion and sediment run-off, no work will be performed during periods of inclement weather, as determined by the SAIC Construction Manager. The excavation areas will be opened and covered as quickly as possible during construction activities. Any water that accumulates in an excavation and comes into contact with impacted soil will be classified as "Excavation Water." Excavation water will be pumped to a temporary water storage tank located near the excavation. The Subcontractor will be responsible to containerize, sample, characterize, and dispose of the excavation water and sediments. Erosion/sedimentation control features will remain in place until completion of site restoration activities as determined by the SAIC Construction Manager. Inspection of storm water controls will be performed by the Subcontractor on a daily basis. After site restoration has been completed, inspection of storm water controls will be performed on a weekly basis until 70 percent cover has been achieved and erosion controls can be removed as specified in Section 7.5. The Subcontractor also will inspect the storm water controls within 24 hours after any rain event greater than 0.5 inches of rain per 24 hour period. These inspections will be performed in accordance with the CQAP in Section 9 of this RmAWP.

4.4 DUST AND WIND CONTROLS

All excavations, access roads, and all other work areas within the project boundaries will be maintained free from soil that could cause a hazard or nuisance. Dust generation activities may occur during excavation, material handling, and truck transportation. Dust control will be maintained by keeping traffic on improved roads, maintaining the posted speed limit, and applying water as required. Dust generation will be monitored visually by the Subcontractor SSHO. The Subcontractor will employ water spraying/misting for dust control if airborne dust is observed. Water used for dust control will be clean (i.e., obtained from RVAAP sources with approval of the RVAAP Facility Manager or potable water obtained from an off-site source). The use of additives will not be permitted.

During instances of high winds resulting in excessive dust, additional dust control measures or work stoppage may be required. The Subcontractor SSHO will be responsible for visual dust monitoring. The Subcontractor SSHO will perform visual inspections daily, at a minimum, for visible fugitive dust emissions during normal representative operating conditions.

4.5 GOOD HOUSEKEEPING

Good housekeeping practices are designed to maintain a clean and orderly work environment. Good

housekeeping measures will include at a minimum:

- Regular pickup and disposal of garbage and waste material;
- Routinely inspect for equipment leaks or conditions that could lead to discharges of petroleum or chemicals or contact of storm water with raw materials, intermediate materials, waste materials, or products;
- Perform preventative maintenance on equipment to ensure it is in proper operation and to detect potential leaks before they occur; and
- Ensure that spill cleanup procedures are understood by employees, contractors, and/or subcontractors, and establish storage areas away from direct traffic routes to prevent accidental spills.

5.0 SOIL REMOVAL ACTIVITIES

This section describes the soil removal activities to be performed in support of this RmAWP:

- Land survey;
- MEC Avoidance;
- Excavation of impacted soil;
- Storm water controls; and
- Equipment decontamination.

Design Drawings (Attachment B) detailing removal action requirements for the performance of soil removal and associated activities are referenced as appropriate throughout this section.

If any unsafe or unexpected site conditions or materials (e.g., MEC) are encountered during any phase of the removal activities, construction activities will stop immediately to be reassessed. The SAIC Project Manager, USACE COR, and the RVAAP Facility Manager will be notified immediately. The conditions will be assessed and a joint determination will be made regarding continuation of removal activities. Work will not resume until approval has been granted by the USACE COR. If the discovery results in a change to the scope, objectives, or schedule of this RmAWP, USACE will notify the Ohio EPA Project Coordinator for concurrence on proposed revisions and/or corrective actions.

If archeological artifacts (e.g., Early American) are found, excavation will stop, the USACE COR, SAIC Project Manager, RTLS, and the RVAAP Facility Manager will be notified. Excavation will not resume until a Cultural Resource Specialist with concurrence of the State of Ohio Historic Preservation Officer releases the area.

5.1 LAND SURVEY

Prior to the start of excavation activities, SAIC will establish the horizontal limits of excavation by land survey. The excavation limits will be demarcated in accordance with Drawing C-4. A land survey will be conducted to verify vertical excavation limits have been achieved. The horizontal tolerance will be ±0.1 ft and the vertical tolerance will be ±0.1 ft.

5.2 MEC AVOIDANCE

The MEC Avoidance Subcontractor will provide personnel specifically trained in MEC identification, explosive items, and/or ordnance. During excavation activities, the on-site MEC Avoidance Subcontractor will be responsible for inspecting excavation soils and removal areas for the presence of MEC, identifying items suspected of being MEC, and contacting the SAIC Construction Manager of the discovery of MEC. The SAIC Construction Manager will contact the SAIC Project Manager, the USACE COR, and the RVAAP Facility Manager. In the event that MEC is identified in the area, activities will

cease until the RVAAP Facility Manager and USACE COR take active measures for removing the MEC. Soil removal activities will resume only when the MEC is removed and SAIC receives approval from the RVAAP Facility Manager and USACE COR to continue the soil removal effort.

5.3 EXCAVATION

This section describes the excavation activities for the removal of soil within the limits of excavation. The limits of excavation are presented in Drawing C-4. The limits of excavation are based on visual observations of the extent of the debris piles and a topographic survey conducted of the area. The initial excavation will extend approximately 1 ft horizontally beyond the modeled extents of each pile. The vertical extent of the initial excavation will be one foot into native soil below the base of the pile as determined by visual observation. The current estimated in situ volume of soil in both Piles M and N is approximately 183 cubic yards.

5.3.1 General Sequence of Excavation

The general sequence of excavation is as follows:

1. Land survey;

2. Excavation will occur to horizontal and vertical extents as presented on Drawing C-4;

3. On-road haul trucks will be positioned on plastic sheeting extending on either side of the truck and will be positioned adjacent to the excavation;

4. On-road haul trucks will be "live-loaded" directly;

5. A land survey will be conducted to verify extents have been achieved;

6. Confirmation samples will be collected upon completion of excavation activities (Section 6.0);

7. Grading and backfill will occur upon approval from the SAIC Construction Site Manager; and

8. The site will be restored in accordance with Drawing C-6.

5.3.2 Excavation Activities

Excavation activities will be performed to minimize the handling of materials. Excavation activities will include:

- Excavation of impacted soil within the defined extent;

- Excavation shoring and/or sloping are not anticipated to be necessary since removal action is associated with excavating an aboveground debris pile and excavation cave-ins are not likely;
- Establishment of excavation depth controls to ensure soil is removed to the required depth;
- Verification of the excavation grade via land survey; and,
- Loading of soil directly into haul trucks for transfer to the disposal facility.

The excavation area will be opened and covered at the end of the work day. Impermeable covers will be used by the Subcontractor to cover exposed soil at the end of a work day. The impermeable covers will be secured with sand bags or equivalent at the end of each work day and during periods of inclement weather.

Equipment and personnel will be staged or operated from non-contaminated areas only. The Subcontractor will ensure heavy equipment does not enter the excavation area. It is anticipated only the excavator bucket will require decontamination. Decontamination of the bucket will be conducted in accordance with Section 5.4 of this RmAWP. If it is determined that excavation equipment will need to enter the open excavation, the excavation equipment will be decontaminated in accordance with Section 5.4 of this RmAWP.

During the loading process, care will be taken to not overfill the trucks or to drop soil on the sides of the trucks. The haul trucks will be positioned over plastic sheeting to contain any soil spilled during loadout. Trucks will be inspected for soil on the exterior of the truck bed. Soil will be brushed off and captured prior to the truck pulling out of the loading area. All trucks will be covered while en route to the disposal facility. On-road haul trucks transporting hazardous waste shall be lined as required by the disposal facility along with any other specific requirements (placarding, etc.).

Confirmation samples will be collected prior to backfilling the open excavation (Section 6). If necessary, the excavation area will be backfilled and compacted to grade upon approval from the SAIC Construction Manager.

No suspect or unexpected materials, such as drums or cylinders, are anticipated during excavation activities. If unexpected site conditions or materials are encountered during any phase of the removal activities, construction activities will stop immediately to be reassessed in accordance with procedures outlined in the SSHP (Attachment A).

5.4 DECONTAMINATION

Contact with impacted soils will be actively minimized. The Subcontractor will implement measures to prevent the tracking of material from the excavation. Equipment used to excavate impacted soils will be decontaminated prior to contact with other materials and/or prior to demobilization off-site. Equipment that comes into direct contact with impacted soils will be decontaminated as follows:

- The excavator bucket will be placed over the haul truck and washed with a pressure washer. Limited amounts of liquids (i.e. less than 30 gallons) will be used for decontamination activities performed over haul trucks. The subcontractor will ensure free water is not present in the haul truck nor are any liquids escaping the truck bed. Decontamination liquids will not change the chemical profile of the waste (i.e. addition of solvents or pH);

- Other excavation equipment used during the excavation activities will be placed within a portable polyvinyl chloride (PVC) container (e.g., molded portable swimming pool) or bermed area lined with plastic sheeting as described below.

- All loose soil will be removed using a stiff-bristle brush or other device to dislodge visible soil.

- Steam clean equipment using potable water.

- Allow equipment to air dry as long as possible.

- Place equipment on clean plastic if immediate use is anticipated, or wrap in plastic to prevent contamination if longer-term storage is required.

- Loose soils and wash water will be mixed with soils and placed into a haul truck for disposal (decontamination liquids will consist of less than 30 gallons per truck and will not change the chemical profile of the waste).

At the end of each day the excavator bucket will be placed and maintained in an excavation area. Alternatively, the bucket may be wrapped with minimum 6-mil low density polyethylene sheeting and bound using duct tape and/or wire in sufficient manner to prevent exposure to weather elements during overnight/weekend weather conditions.

Prior to release of construction equipment from the site, the SSHO, or designee, will visually inspect construction equipment with specific attention to:

- Tires and wheels or tracks (as applicable);
- Undercarriage (frame, axles, etc.);
- Exterior surfaces (including steps, running boards);
- Engine compartment; and
- Operator compartment.

6.0 CONFIRMATION SAMPLING

This section describes the process to verify that the excavation and removal activities meet the established removal cleanup goals. The purpose of the confirmation sampling is to provide data to confirm that the removal action discussed in the previous sections attained the cleanup goals. The confirmation sampling is comprised of two components: 1) sample collection and analyses, and 2) verification of the cleanup goal.

6.1 CONFIRMATION SOIL SAMPLE COLLECTION

6.1.1 Confirmation Soil Sample Collection

At the completion of the excavation activities described in Section 5.3, one MI confirmation sample will be collected from each excavation footprint using MI sampling techniques. An MI sample is a composite sample of multiple aliquots collected from random points within a designated MI sampling area. The sample aliquots are collected at random from the surface of the remaining excavation footprint. Any point on the surface within the boundary of the excavated area is a possible sample location, and each point has an equal chance of being selected.

Approximately equal sample volume aliquots are collected using a stainless steel spoon or scoop. A sufficient number of aliquots are collected to provide statistical confidence that the average concentration of a particular constituent within a designated area is represented by the composite sample. No less than 30 aliquots for each MI sample will be collected to provide the requisite statistical confidence (95%).

These aliquots will be selected on a random basis over the surface of the excavation walls and floor. This assures coverage over the entire sample area and the randomness provides repeatability and accuracy. The aliquot locations will be selected by sample personnel walking over the entire sample area and randomly placing sampling location stakes. These aliquots will be collected at the surface of the removal area to provide representativeness of the remaining footprint. All aliquots collected from each sample area will be placed in a container, such as a large plastic bag or bowl for transport back to the sample processing location.

In the event that the initial confirmation sample at Pile M does not meet the removal action cleanup goal, the existing excavation will be characterized prior to additional soil removal to determine waste disposal requirements. A portion of the initial MI confirmation sample will be retained and used for analysis of TLCP metals, PCBs, pesticides, and SVOCs. To complete waste disposition characterization, a discrete soil sample will be collected from the middle of the Pile M footprint for the TCLP Volatile Organic Compounds (VOC). This sample will have a unique Sample Identification Number. A Photoionization Detector (PID) or similar instrument will be used to identify an area of the footprint that may have elevated levels of VOCs. The discrete soil sample will be collected from that location. If there are no areas that are identified as having high concentrations of VOCs, the middle of the footprint will be

sampled. The discrete sample will be collected to minimize volatilization during the sample collection process. The sampling and packaging of this sample will be done in accordance with the *RVAAP Facility-Wide Sampling and Analysis Plan* (USACE 2001a). This sample will not undergo the drying, sieving, and grounding that were specified for non-volatile constituent analyses.

6.1.2 Confirmation Sampling Procedures

All the soil collected during the MI sampling for each pile is composited into a single sample and sent to an approved off-site laboratory. The sample will be dried, sieved, and ground finely for specified non-volatile constituent analyses. Sample grinding and analyses will be conducted at the fixed-base laboratory. The discrete soil sampling procedure will be conducted in accordance with the *RVAAP Facility-Wide Sampling and Analysis Plan* (USACE 2001a).

Specific sample identifying information that will be used to implement the sampling scheme is presented in Figure 6-1. The confirmation samples collected will be considered surface soil samples. Samples will be identified sequentially using the identification number system consistent with the remedial investigations. If a sample is not collected or is reassigned to a different location, a specific reason and notation will be noted in the project field books.

Sample Station Location Identification: XXXmm-NNN(n)-####-tt

CBP = Area Designator

mm = Sample Location Type
so = Soil Boring/Subsurface Soil Sample Location
ss = Surface Soil Sample Location

NNN = Sequential Sample Location Number
Unique, sequential number for each sample location beginning with Phase I RI stations and extending into any subsequent investigative phases (i.e., 001 – 999)

(n) = Special Identifier
Optional use (as needed) to identify special sample matrices or sample location characteristics
M = Multi-increment Sample

= Sequential Sample Identification Number
Unique, sequential number for each sample beginning with Phase I RI locations and extending into any subsequent investigative phases (i.e., 0001 – 9999)

tt = Sample Type
SO = Soil Sample
TB = Trip Blank
FB = Field Blank
ER = Equipment Rinsate

Figure 6-1. Supplemental Phase II RI Sample Identification System

Table 6-1 presents the baseline sample identification listing. The concentration of total lead at Pile M and the hexavalent chromium analyses at Pile N will be used to compare against the cleanup goals. The TCLP sample at Pile M will provide disposal guidance if further excavation is required.

Table 6-1. Sample Identification for the CBP Confirmation Sampling

Location	Station	Sample ID	Lead, Total	TCLP[1a]	TCLP[1b]	Chromium, hexavalent
Pile M	CBP-050	CBPss-050-0125M-SO	1	1	0	0
Pile M	CBP-050	CBPss-050-0126-SO	0	0	1	0
Pile N	CBP-051	CBPss-051-0127M-SO	0	0		1

[1]TCLP sample will be collected at Pile M. Sample will be analyzed only if total lead result does not meet the cleanup goal for Pile M.
[a]TCLP sample will be analyzed for metals, PCBs, pesticides, and SVOCs
[b]TCLP sample will be analyzed for VOCs
PCB = polychlorinated biphenyl
SVOC = semivolatile organic compound
TCLP = toxicity characteristic leaching procedure
VOC = volatile organic compound

The sampling and analysis requirement are summarized in Table 6-2. This table presents the anticipated sample numbers, QA sample frequencies, and field QC frequencies.

Table 6-2. Sampling and Analytical Requirements

Parameter	Methods	Field Samples[a]	Field Duplicate Samples	Site Source Water[b]	Sampler Rinsates	Trip Blanks	Total A-E Samples	USACE QA Split Samples[c]	USACE Trip Blanks
Lead, Total	SW-846 6010B/7471	1	1	1	0	0	3	0	0
Chromium, Hexavalent	SW-846 3060/7196	1	1	1	0	0	3	0	0
TCLP[d] (Metals, PCBs, Pesticides, SVOCs)	SW-846 1311/6010B	1	1	1	0	0	3	0	0
TCLP[d] (VOCs)	SW-846 1311/6010B	1	1	1	0	0	3	0	0

[a]Matrix spike/matrix spike duplicate samples will be collected at a rate of 10% of total samples.
[b]Source waters = one potable water source and one American Society for Testing and Materials water supply lot for the project.
[c]USACE QA Split Samples will be collected as one for the entire Removal Action effort.
[d]TCLP sample will be collected at Pile M. Sample will be analyzed only if total lead result does not meet the cleanup goal for Pile M.
Project Quantitation Levels will be in accordance with the Facility-wide Sampling and Analysis Plan (USACE 2001a)
A-E = Architect-Engineer
PCB = polychlorinated biphenyl

QA = Quality Assurance
SVOC = semivolatile organic compound
TCLP = toxicity characteristic leaching procedure
USACE = U.S. Army Corps of Engineers
VOC = volatile organic compound

6.2 VERIFICATION OF CLEANUP GOAL

The cleanup goal for Pile M is a total lead concentration of 400 mg/kg. The cleanup goal for Pile N is a hexavalent chromium concentration of 16 mg/kg. The results of the confirmation samples will be compared to the cleanup goals. If the confirmation sample results exceed the cleanup goal, the following steps will take place:

1) The excavation of the footprint will be expanded 1 ft horizontally;
2) The excavation of the footprint will be expanded 1 ft vertically;
3) Confirmation sample(s) will be collected. It will be at the discretion of the SAIC Construction Supervisor to determine if multiple confirmation samples will be collected from the footprint to minimize areas that may need re-excavation. The SAIC Construction Supervisor will create a grid-like pattern and document which areas are represented by specific MI samples.

As areas are confirmed to be below cleanup goals, site restoration activities can begin as feasible.

7.0 SITE RESTORATION

Site restoration will begin after the analytical results of the confirmation samples confirm removal action cleanup goals have been achieved. The Subcontractor will restore the site to the required conditions set forth in Drawing C-6. At a minimum, this will include:

- Backfilling and grading to final grades;
- Removal of stone at truck turn-around area;
- Re-vegetation (excavation and construction support areas); and
- Removal of erosion controls.

7.1 BACKFILL

It is anticipated that excavations will not require backfill and that the area may be re-graded. Where necessary, ruts and depressions at the truck turn-around area will be re-graded. If backfill is required, the Subcontractor will use approved backfill material and vegetative cover for site restoration activities. A minimum of 4 inches of vegetative cover will be placed to support vegetative growth in all areas requiring re-vegetation. For the shallow excavations, the use of only vegetative cover may be necessary.

The Subcontractor will identify a source of backfill and vegetative cover. Per Ohio EPA guidance, one MI sample will be collected for every 4,000 cubic yards of backfill or vegetative cover used. This quantity of backfill or vegetative cover must come from the same source or an additional sample must be collected. The samples will be analyzed for the parameters identified in Table 7-1. The backfill and vegetative cover must be approved by Ohio EPA and, at a minimum, be at or below the Facility-wide background values shown in Table 7-2.

Table 7-1. Borrow Source Sampling Analytical Requirements (Vegetative Cover and Backfill)

Parameter	Methods
VOCs, TCL	SW-846 5030/8260B
SVOCs, TCL	SW-846 3540/8270C
Pesticides, TCL	SW-846 3540/8081A
PCBs	SW-846 3540/8082
Explosives	SW-846 3540/8330
Nitro-glycerine	SW-846 3540/8330
Nitro-guanadine	SW-846 3540/8330 Modified
Nitrocellulose	MCAWW353.2 Modified
Metals, TAL	SW-846 6010B/6010A/7471
pH	SW-846 9040/9045

Project Quantitation Levels will be in accordance with the Facility-Wide SAP (USACE 2001a)
PCB = polychlorinated biphenyl
SAP = sampling and analysis plan
SVOC = semivolatile organic compound
TAL = target analyte list
TCL = target compound list
USACE = U. S. Army Corps of Engineers
VOC = volatile organic compound

Table 7.2. RVAAP Facility-wide Background Criteria for Surface Soils

Parameter	Background Criteria (mg/kg)	Parameter	Background Criteria (mg/kg)	Parameter	Background Criteria (mg/kg)
Cyanide	0	Chromium	17.4	Nickel	21.1
Aluminum	17,700	Cobalt	10.4	Potassium	927
Antimony	0.96	Copper	17.7	Selenium	104
Arsenic	15.4	Iron	23,100	Silver	0
Barium	88.4	Lead	26.1	Sodium	123
Beryllium	0.88	Magnesium	3,030	Thallium	0
Cadmium	0	Manganese	1,450	Vanadium	31.1
Calcium	15,800	Mercury	0.036	Zinc	61.8

7.2 REMOVAL OF TRUCK TURNAROUND AREA

Any stone placed on the access road through CBP will not require removal. However, the Subcontractor will remove stone at the established truck turnaround area. The stone will not require disposal, as it will be spread onto the access road going through CBP. The Subcontractor will grade and seed the truck turnaround as necessary.

7.3 FINAL GRADING

Final grading will be performed to match surrounding elevations and prevent ponding (Drawing C-6). The final grade of the excavation area will be approved by the SAIC Construction Manager.

7.4 RE-VEGETATION

All disturbed areas must be seeded within 7 days of the completion of verification of cleanup goals and area grading. The Subcontractor will use a RTLS-approved seed mixture for permanent cover. It is anticipated that the 'open area' seed mixture will be used (see below). Fertilizer and lime are not needed for seeding with native seed mixes. Mulching of all seeded areas will occur using a minimum of 3 bales of straw per 1,000 square feet. Other effective mulch/protective material (besides straw) may be used. Specialized seeding products/technologies, such as seed impregnated fiber matting, may be used as appropriate. Seeding of this area will follow the seeding requirements below.

A. Open Areas

23.5%	Nodding Wild Rye (*Elymus Canadensis*)
25%	Virginia wild rye (*Elymus virginicus*)
22%	Little Bluestem (*Schizachyrium scoparium*)
18.75%	Partridge Pea (*Chamaecrista fasciculate*)
7.75%	Thin-leaved Coneflower (*Rudbeckia triloba*)
1.5%	Brown fox sedge (*Carex vulpinoidea*)
1.5%	Black-eyed Susan (*Rudbeckia hirta*)

Broadcast @ 18 lbs/acre, drilled at 12 lbs/acre
Mulch with a minimum of 3 bales of straw per 1,000 square feet.

7.5 REMOVAL OF EROSION CONTROLS

Existing erosion control measures should remain in place until the grass is established with a density of at least 70 percent cover in all disturbed construction areas, in accordance with Ohio Rainwater and Land Development guidance. Once it is confirmed that at least 70 percent cover has been achieved, the Subcontractor is responsible for removing and disposing of erosion controls.

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8.0 WASTE CHARACTERIZATION AND DISPOSAL

This section describes waste characterization, transportation, and disposal activities that will be performed in support of implementing this CBP RmAWP. All investigation-derived waste (IDW) will be properly handled, labeled, characterized, and managed in accordance with Section 7.0 of the *Facility-Wide SAP*, federal and state of Ohio large-quantity generator requirements, and RVAAP's Installation Hazardous Waste Management Plan. All IDW will be appropriately accounted for as soon as possible and prior to conclusion of the project. Any shipment of IDW solid waste off-site will comply with all appropriate federal and state laws.

8.1 WASTE STREAM IDENTIFICATION

Waste generated during removal activities will be managed to prevent the potential release of contamination. The following types of waste may be generated:

- Vegetation;
- Excavated soils (metals impacted-soils);
- Decontamination fluids from sampling activities;
- Sanitary waste;
- Personal protection equipment (PPE) and contact waste (e.g., plastic tarps, ground cloths);
- Excavation water –storm water in direct contact with exposed impacted soils; and
- Decontamination fluids generated during the decontamination of excavation equipment.

No soil IDW is anticipated during implementation of field activities. The entire volume of soil collected for these samples will be shipped to the laboratory. The laboratory will be responsible for the ultimate disposition of remaining soil.

In general, proper waste minimization procedures will be employed to limit the volume of waste generated. These procedures will include:

- Re-use of materials that do not require decontamination;
- Minimization of the volume of decontamination fluids;
- Minimization of contact with potentially contaminated materials;
- Minimization of foot and vehicle traffic through potentially contaminated areas, and
- Utilization of good housekeeping practices.

8.2 WASTE STREAM MANAGEMENT

This section discusses the identified waste streams. Characteristics discussed for each waste stream include: the point of generation, on-site staging and processing, characterization requirements, and method of final disposition.

8.2.1 Vegetation

Trees and shrubs growing on and around the piles will be cut within 3 inches of the ground surface. Roots and root balls will be excavated and disposed of with the respective excavated debris piles. Efforts will be made to leave root and root balls intact; however, they may require breaking apart to facilitate removal.

8.2.1.1 Point of Generation

Vegetation waste will be generated as a result of the removal of surface vegetation from each debris pile. The piles will be cut of all vegetation to a height of not greater than 3 inches above the ground surface. Efforts will be made to eliminate or minimize the amount of contact cut trees will have with the excavation area.

8.2.1.2 On-Site Staging and Processing

Vegetation may be cut to sizes that can be handled and hauled with soil in haul trucks. Once cut, the vegetation will be piled such that it does not interfere with soil removal activities. Care will be taken to minimize dust control during clearing and cutting of the vegetation.

8.2.1.3 Characterization Requirements

Vegetation samples will not be collected.

8.2.1.4 Disposition

The vegetation will be ultimately placed in the haul trucks and removed for disposal as solid waste.

8.2.2 Excavated Soils

Soil requiring disposal will be generated as a result of the removal action. Pile M is considered characteristically hazardous. Pile N is not considered characteristically hazardous. Soils will be disposed accordingly.

Additional characterization of excavated soils will be required if the initial excavation effort does not achieve the cleanup goals. The confirmation sample of the excavation at Pile M will undergo TCLP analysis to determine if the remaining soils are considered characteristically hazardous.

As Pile N is not considered characteristically hazardous, TCLP analysis will not be required from the confirmation sample. The soil adjacent and beneath Pile N are assumed to have the same nonhazardous properties as the Pile N debris material.

Disposal facilities will be selected in accordance with regulatory requirements.

8.2.2.1 Point of Generation

These soils will be generated during the excavation and removal activities at debris Piles M and N.

8.2.2.2 On-Site Staging and Processing

Impacted debris piles will be excavated directly into on-road haul trucks for transport to a licensed waste disposal facility. Truck beds will be lined as required by state or federal Department of Transportation (DOT) requirements or disposal facility requirements.

8.2.2.3 Characterization Requirements

The excavated soil was characterized during the S*upplemental Phase II Remedial Investigation* (USACE 2005b). The soil must meet the waste acceptance criteria (WAC) of the target disposal facility. If the disposal target facility requires more analyses than what was collected during the Supplemental Phase II RI, additional characterization samples may be collected.

8.2.2.4 Disposition

Soil excavated from Piles M and N will be segregated from one another and disposed separately. Pile M is considered hazardous waste and will be transported and disposed accordingly. Pile N is considered nonhazardous solid waste and will be transported and disposed accordingly. The debris piles will ultimately be disposed in a target disposal facility permitted to accept these soils.

8.2.3 Decontamination Fluids from Sampling Activities

Decontamination fluids are those derived from decontamination of sampling equipment.

8.2.3.1 Point of Generation

This decontamination fluid will be generated during the decontamination of soil sampling equipment during confirmation sampling activities at both Piles M and N.

8.2.3.2 On-Site Staging and Processing

All liquid non-indigenous (decontamination rinse water) IDW will be combined due to the small volume anticipated and contained in labeled DOT approved containers. It is anticipated that a maximum of one 55-gal closed-top drum will be needed for containerization of the decontamination fluids.

8.2.3.3 Characterization Requirements

A representative sample of the decontamination fluid will be collected in accordance with Section 7.4.2 of the *Facility-Wide SAP* (USACE 2001a). The sample(s) will be characterized in accordance with Section 7.4 of the *Facility-Wide SAP*.

8.2.3.4 Disposition

The decontamination fluid will be removed from the site and disposed by a licensed waste disposal contractor in accordance with Section 7.5 of the *Facility-Wide SAP* and all applicable state and federal rules, laws, and regulations.

8.2.4 Sanitary Waste

Sanitary waste consists of solid materials that have no contact with contaminated soil. Examples of sanitary waste include garbage, paper, silt fence, and other non-indigenous solids generated during the removal action.

8.2.4.1 Point of Generation

Sanitary waste may be generated at any time during the removal action.

8.2.4.2 On-Site Staging and Processing

Sanitary waste will be collected and moved to a designated area as specified in Section 7.3 of the *Facility-Wide SAP*.

8.2.4.3 Characterization Requirements

Sanitary waste is not expected to be contaminated and will not be analytically characterized. The characterization will be based on process knowledge that the waste has not been contaminated with a hazardous waste.

8.2.4.4 Disposition

Sanitary waste will be disposed in a licensed solid waste disposal facility in accordance with local, state, and federal regulations.

8.2.5 Personal Protective Equipment and Contact Waste

PPE waste will consist of used gloves, boot covers, Tyvek clothing (if necessary), and other equipment required for worker safety in the SSHP. Contact waste would consist of material that came into contact

with contaminated soils (e.g., plastic from a decontamination pad). PPE that contacts hazardous soils at Pile M will be segregated from the rest of the PPE.

8.2.5.1 Point of Generation

PPE waste will be generated by the site workers on a daily basis throughout the removal action. At this point, it is not anticipated that a decontamination pad will be constructed.

8.2.5.2 On-Site Staging and Processing

PPE or contact waste that contacts the hazardous soils at Pile M will either be disposed with the trucks transporting the hazardous material or stored in a 55-gallon drum for overnight storage. Ultimately, this requires disposal at a permitted hazardous waste facility.

The PPE or contact waste that does not come in contact with the hazardous soils at Pile M will be collected in trash bags during each work day. At the end of each work day, this waste will be placed in either an RVAAP dumpster or a project-specific dumpster.

8.2.5.3 Characterization Requirements

PPE and contact waste will be characterized in accordance with Section 7.4 of the *Facility-Wide SAP*. Generally, the PPE and contact waste will be characterized for disposal based on the soil it was in contact with.

8.2.5.4 Disposition

PPE and contact waste will be disposed in accordance Section 7.5 of the *Facility-Wide SAP*. It will be disposed as either sanitary waste or as a permitted hazardous waste facility.

8.2.6 Excavation Water

Excavation/accumulated water will include water that is collected in excavation areas due to a rain event.

8.2.6.1 Point of Generation

Excavation/accumulated water is generated from rainfall collecting in the excavation areas. The Subcontractor will be prepared to remove and store this water in the event there is accumulation.

8.2.6.2 On-Site Staging and Processing

Excavation/accumulated water will be placed in a baker style tank (or equivalent). Minimal quantities are expected to be collected, as the footprint and excavation depths are nominal and the excavation footprint will be covered during inactivity if there is a threat of precipitation.

8.2.6.3 Characterization Requirements

At the conclusion of removal activities or due to capacity limitations, the water storage tank will be sampled in accordance with the Portage County Water & Sewer pre-treatment standards.

8.2.6.4 Disposition

If the liquid meets the Portage County Water & Sewer pre-treatment standards, the containerized liquid will be discharged to the sanitary sewer with concurrence from RVAAP, SAIC, and the Ohio EPA. If Portage County Water & Sewer does not accept the liquid, the Subcontractor will arrange for the disposition of the liquid at a suitable waste disposal facility with prior approval from RVAAP/SAIC.

8.2.7 Decontamination Water from Excavation Equipment

Decontamination fluids are those derived from decontamination of sampling equipment.

8.2.7.1 Point of Generation

This decontamination fluid will be generated during the decontamination of excavation equipment (specifically the excavator bucket) during and after the excavation removal activities.

8.2.7.2 On-Site Staging and Processing

The decontamination of the excavation equipment will be done upon completion of the final haul excavation activities. The amount of water to be used will be minimized such that water accumulation in the haul truck will not exceed requirements of the disposal facility or leak during transport. If a decontamination pad is required to be built, water will be collected and stored with the excavation water.

8.2.7.3 Characterization Requirements

There are no characterization requirements for this decontamination water, as it is planned to be disposed in the haul trucks. The water will be assumed to have contamination consistent with the debris piles being removed. If this decontamination water is required to be containerized with the excavation water, it will be characterized the same.

8.2.7.4 Disposition

The decontamination water will be disposed with the excavated soil in the haul truck or disposed with the excavation water.

8.3 INVESTIGATION-DERIVED WASTE FIELD STAGING

A Field Staging Area (FSA) will be designated at the beginning of field activities and approved by the RVAAP Facility Manager. A centralized FSA will be established for the staging of all drums of IDW. The FSA will be managed according to the requirements of Section 7.3 of the *Facility-Wide SAP* (USACE 2001a). Any excavation water will be containerized in a storage tank staged proximate to the removal areas in the event water collects in the excavated area.

Final inventories of IDW will be taken and provided to the RVAAP Facility Manager by the designated IDW coordinator. All liquid waste not transported off of the facility within 30 days following project completion will require secondary containment. Any waste identified as hazardous through process knowledge or characterization must be staged in the designated RVAAP 90-day hazardous waste storage area and managed in accordance with facility requirements.

8.4 WASTE CONTAINERIZATION AND LABELING

All waste storage containers will be of suitable size, leak proof, and constructed of materials compatible with the materials to be contained. Waste storage containers will be properly labeled prior to placement of material. Hazardous waste will be managed according to relevant Resource Conservation and Recovery Act (RCRA) requirements including, but not limited to, proper marking and labeling, approved containers, storage requirements (the RVAAP designated 90-day storage area), and documented inspections.

The Subcontractor will be responsible for providing new DOT-approved containers for the liquid IDW. The Subcontractor will be responsible for the waste characterization, container labeling, transportation and final disposal and approved treatment, storage, or disposal (TSD) facility of all decontamination liquids. The RVAAP Facility Manager will sign all waste profiles and waste manifests for the disposal of project IDW to approved disposal facility.

All IDW containers will be labeled prior to placing IDW in them. All IDW containers (drums) will be labeled in accordance with Section 7.2 of the *Facility-Wide SAP*. Each IDW container (with the exception of sanitary waste) will be labeled to ensure easy identification and proper management. Prior to placing IDW into a container, a "Pending Analysis" label containing the following information will be affixed to the outside of the container:

- Project name;
- Contents;

- Date waste was first placed into the container;
- Source location(s); and
- Emergency contact name and telephone number.

Drums will be labeled as hazardous material only if known or suspected hazardous waste is encountered during field activities, or when analytical data from sampling activities are received and evaluated. All IDW containers will be closed and stored in the equipment storage area. Liquid IDW containers will be filled to a maximum of 66% container volume and will be placed on spill containment pallets. All IDW containers and pallets will be covered with a weather-proof tarp. All IDW containers will be inspected to ensure no leaks or releases occur during use. An orange construction fence will be installed around the IDW storage area.

8.5 TRANSPORTATION, STORAGE, AND DISPOSAL

The management, transportation, and disposal of all waste streams will be coordinated with the RVAAP. All transportation paperwork (manifests or shipping papers) and on-road haul truck placards will be prepared by the Subcontractor Construction Supervisor in accordance with federal, state, and local regulatory requirements, and disposal facility requirements. A draft of the transportation paperwork containing "base" information will be submitted to RVAAP/SAIC for review and approval a minimum of one week prior to shipment of any material. The approved transportation paperwork will then be completed as appropriate by SAIC Construction Manager in the field during excavation activities. The RVAAP Facility Manager will be responsible for custody of manifest copies and submittal to Ohio EPA and USEPA as part of the annual reporting for RVAAP hazardous waste generation and management.

Impacted soils loaded into on-road haul trucks will be transported by licensed waste haulers to RVAAP and SAIC approved licensed off-site hazardous waste disposal facilities. All transportation requirements, including proper labeling and placarding, and weight limits will be followed. All manifests, shipping documents, and disposal facility approval letters will be provided to SAIC and incorporated into the Construction Report.

All on-road haul trucks will be weighed both empty and loaded at the on-site truck scales. The weight information will be recorded on the transportation paperwork. The Subcontractor will comply with RVAAP/SAIC site access protocols and will allow for minor delays accordingly (Drawings C-5).

All other waste types (i.e., IDW, other materials, and excavation water) will be managed by the Subcontractor in compliance with all federal, state and local laws. The RVAAP Facility Manager will sign all waste profiles and waste manifests for the disposal of project wastes for disposal at an approved facility. All manifests, shipping documents, and disposal facility approval letters will be provided to SAIC and for incorporation into the Construction Report.

9.0 CONSTRUCTION QUALITY ASSURANCE PLAN

This section presents the CQAP. The CQAP describes the inspection procedures and documentation required to ensure excavation, disposal, and restoration activities occur according to the requirements of this RmAWP.

Protocols for reporting test results, certifying compliance with construction requirements, correcting construction deficiencies, and documenting such corrections are provided. This section also addresses the review and documentation requirements necessary to comply with the site restoration details contained herein.

9.1 RESPONSIBILITY AND AUTHORITY

9.1.1 Responsibility

The organizational chart presented in Figure 2-1 outlines the management structure that will be used to implement the removal and disposal activities in accordance with this RmAWP. Functional responsibilities of key personnel were described in Section 2.1. The assignment of personnel to each position was based on the following:

- Qualifications;
- Experience; and
- Training.

The QA/QC Officer and SAIC Construction Manager, in coordination with the USACE COR, will ensure the completed removal action conforms to the work plan, design drawings, specifications, and any necessary permit conditions. The SAIC Project Manager will verify completion of these activities.

The SAIC Construction Manager will monitor excavation, removal, and site restoration activities. The SAIC Construction Manager or designee will be on-site during work activities to ensure that all components of this RmAWP are fulfilled.

9.1.2 Administration and Operation

The QA/QC organization is administered by the QA/QC Officer in concert with the SAIC Construction Manager. The SAIC Construction Manager will be supported by the Subcontractor Construction Supervisor and technical staff (engineers, scientists, and technicians) as necessary.

All vendors supplying materials used for site restoration will supply materials from manufacturing facilities with established QC programs. Results of the manufacturer QC procedures will be submitted to the QA/QC Officer for review, evaluation, and documentation prior to beginning field activities.

9.2 PERSONNEL QUALIFICATIONS

All QA/QC personnel will be properly trained for their job function. The SAIC Construction Manager is key to the inspection and certification program. The SAIC Construction Manager will have demonstrated knowledge of specific construction practices relating to earthwork, regulations and specifications, observation and testing procedures, and documentation procedures. The SAIC Construction Manager will also be experienced in performing similar duties on previous jobs in which comparable construction activities took place.

9.3 DAILY PLANNING BRIEFINGS

In addition to daily tailgate briefings conducted in accordance with the SSHP, the Subcontractor will participate in daily planning briefings to determine the plan of action for the particular work day. This briefing will include at a minimum the following:

- A discussion of the planned activities for the work day;
- Planned area of excavation;
- Weather considerations;
- Deliveries;
- Transportation schedule;
- Schedule forecast; and
- Any issues which would result in an impact to the project.

This briefing will be recorded by the SAIC Construction Manager with concurrence by the Subcontractor.

9.4 INSPECTION ACTIVITIES

Inspections will be completed to verify acceptability of materials, prevent spills, and assess effectiveness of storm water and dust generation controls. The scope and frequency of each type of inspection is described below.

9.4.1 Spill Control

The SAIC Construction Manager will conduct daily inspections to verify spill equipment is maintained and no spills have occurred. During excavation, if any visually or olfactory indicators suggest the presence of potentially impacted soils, the employee will report to the SAIC Construction Manager. The Subcontractor will provide all necessary on-site spill equipment (e.g., granulated clay, absorbent blankets, PPE, shovels, containers). All on-site workers will maintain good housekeeping practices (as discussed in Section 4.5).

9.4.2 Storm Water Control

Prior to construction activities, the Subcontractor will inspect all storm water controls (including the collection system for any excavation water encountered) and document proper placement in accordance with the requirements of this RmAWP and associated drawings and specifications. Any water in contact with an open excavation will be collected, containerized, sampled, characterized, and managed by the Subcontractor.

All employees will practice due diligence to prevent any damage to the storm water control measures. The Subcontractor will conduct routine walkovers during normal operations to evaluate the integrity of the storm water controls. Any deficiencies will be immediately corrected and documented in the daily report. Inspection of storm water controls will be performed by the Subcontractor on a daily basis. Storm water controls also will be inspected within 24 hours of a storm event (0.5 inches or greater).

9.4.3 Dust Control

Dust generation activities may occur during excavation, material handling, and truck transportation on paved and unpaved roads. Dust control will be maintained by keeping all traffic on improved roads, maintaining a 10 mph speed limit on the CBP access road, and application of water for dust suppression purposes as required. Water used for dust control will be clean (i.e., obtained from sources with approval of the SAIC Construction Manager or potable water obtained from an off-site source). The use of additives will not be permitted. Engineering controls will be implemented to minimize the potential for dust generation. The Subcontractor SSHO will conduct daily inspections for fugitive dust emissions during representative, normal operating conditions, as described in Section 4.4 and the SSHP.

9.4.4 Survey

Upon completion of soil excavation and removal activities, the floor and walls of excavations will be surveyed to document actual limits and elevations (i.e., horizontal and vertical extent). The vertical excavation limits will be ±0.1 ft. SAIC's Ohio licensed surveyor will conduct a survey of excavation extent to be included as as-built drawings in the Construction Report. The horizontal and vertical survey tolerance will be ±0.1 ft.

9.4.5 Site Restoration

Once excavation activities have been completed and approved by the SAIC Construction Manager, in conjunction with the USACE and Ohio EPA, excavations will be graded and a minimum of 4-inches of vegetative cover will be placed at the site. Regrading will be performed to match surrounding elevations and prevent ponding as indicated in Section 7 and on Drawing C-6. Backfill material may be required based on the need for additional excavation (i.e. due to failed confirmation sample results). The Subcontractor will submit data for materials to be brought on site (i.e. topsoil, etc.) a minimum of 21 days prior to placing materials. USACE/SAIC will review material certifications for the backfill material,

vegetative cover, and seed in accordance with Section 7 and Drawing C-6. The Subcontractor will obtain and apply the seeding plan as prescribed within Section 7.4.

9.5 VERIFICATION REQUIREMENTS

9.5.1 Confirmation Sampling

Confirmation sampling will be performed in accordance with Section 6 of this RmAWP and the RVAAP *Facility-Wide SAP* (USACE 2001a) to demonstrate achievement of the removal cleanup goals. Confirmation samples will be analyzed for total lead concentrations at Pile M and total hexavalent chromium concentrations at Pile N by an offsite analytical laboratory.

9.5.2 Verification of Achievement of Performance Criteria

Analytical laboratory analysis will be expedited and provided to the SAIC Construction Manager upon receipt. The SAIC Construction Manager will verify the results meet the removal cleanup goals. The USACE COR and Ohio EPA Project Coordinator will be notified of the evaluations and results. If any samples do not meet removal cleanup goals, the evaluation will include a description of the additional excavation based on the approach described in Section 6.2. Confirmation sampling results will be included in the Construction Report.

9.6 DOCUMENTATION

9.6.1 Field Documentation

This project will include daily inspection and quality summary reports, which will be signed and dated by the SAIC Construction Manager. These reports will be submitted to the SAIC Project Manager.

The daily reports may include:

- Summary of activities performed at the project site;
- Weather information;
- Departures from the approved RmAWP;,
- Problems encountered during field activities;
- Subcontractor submittals; and/or
- Subcontractor certifications (e.g. health and safety records).

9.6.2 Construction Report

Upon completion of removal activities, a Construction Report will be prepared by SAIC. The Construction Report will document:

- The project was performed in accordance with this RmAWP (i.e., complied with requirements, technical specifications, construction drawings, and other relevant contract documents), and all applicable regulations, including surface water and air regulations.

- Corrective actions and achievement of removal goals.

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10.0 PROJECT SCHEDULE

Figure 10-1 presents the anticipated project schedule.

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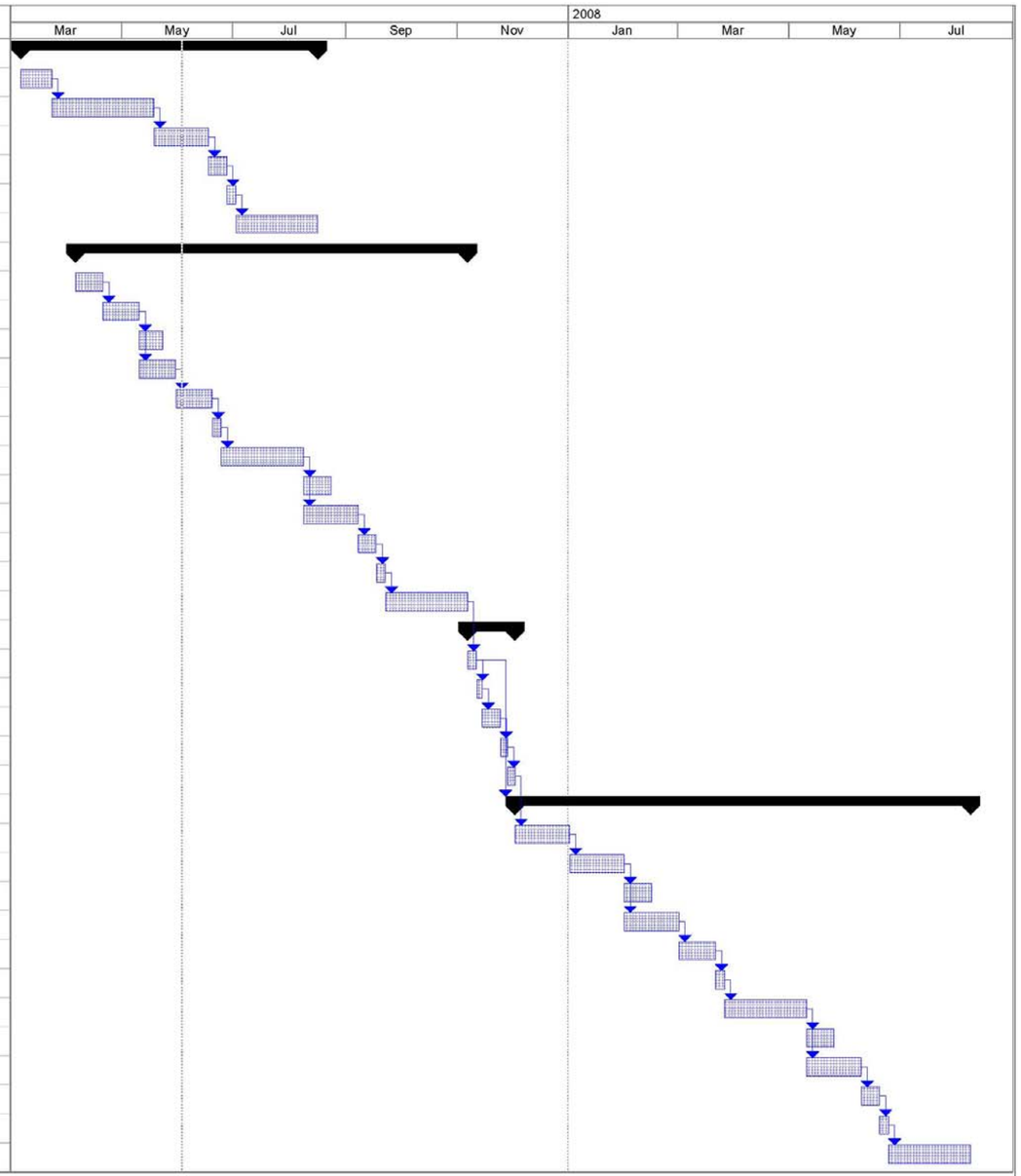
ID	Task Name	Duration	Start	Finish	Predecessors
1	**Action Memorandum**	**163 days**	**Wed 3/7/07**	**Thu 8/16/07**	
2	Prepare and Submit Draft Action Memo	17 days	Wed 3/7/07	Fri 3/23/07	
3	Army and OH EPA Review	56 days	Sat 3/24/07	Fri 5/18/07	2
4	Comment Resolution Meeting/Submit Final Action Memo	30 days	Sat 5/19/07	Sun 6/17/07	3
5	USACE Preliminary Review of Final	10 days	Mon 6/18/07	Wed 6/27/07	4
6	Prepare and Submit Final to Army and Ohio EPA	5 days	Thu 6/28/07	Mon 7/2/07	5
7	Army and OH EPA Review and Approval	45 days	Tue 7/3/07	Thu 8/16/07	6
8	**Removal Action Work Plan**	**215 days**	**Fri 4/6/07**	**Tue 11/6/07**	
9	Prepare and Submit Draft	15 days	Fri 4/6/07	Fri 4/20/07	
10	USACE Preliminary Review of Draft	20 days	Sat 4/21/07	Thu 5/10/07	9
11	Comment Resolution Meeting	13 days	Fri 5/11/07	Wed 5/23/07	10
12	Re-submit Draft to USACE	20 days	Fri 5/11/07	Wed 5/30/07	10
13	USACE Review of Draft	20 days	Thu 5/31/07	Tue 6/19/07	12
14	Prepare and Submit Draft to Army and Ohio EPA	5 days	Wed 6/20/07	Sun 6/24/07	13
15	Army and Ohio EPA Review	45 days	Mon 6/25/07	Wed 8/8/07	14
16	Comment Resolution Meeting	15 days	Thu 8/9/07	Thu 8/23/07	15
17	Prepare and Submit Final to USACE	30 days	Thu 8/9/07	Fri 9/7/07	15
18	USACE Preliminary Review of Final	10 days	Sat 9/8/07	Mon 9/17/07	17
19	Prepare and Submit Final to Army and Ohio EPA	5 days	Tue 9/18/07	Sat 9/22/07	18
20	Army and OH EPA Review and Approval	45 days	Sun 9/23/07	Tue 11/6/07	19
21	**Implement Removal Action**	**26 days**	**Wed 11/7/07**	**Sun 12/2/07**	
22	Mobilization and Site Preparation	5 days	Wed 11/7/07	Sun 11/11/07	20
23	Excavation, Transportation, and Disposal of Debris Piles	3 days	Mon 11/12/07	Wed 11/14/07	22
24	Collect Confirmation Samples/Laboratory Analysis	10 days	Thu 11/15/07	Sat 11/24/07	23
25	Ohio EPA Review of Confirmation Samples	4 days	Sun 11/25/07	Wed 11/28/07	24
26	Site Restoration	4 days	Thu 11/29/07	Sun 12/2/07	25
27	**Final Close Out Report**	**250 days**	**Mon 12/3/07**	**Fri 8/8/08**	**22**
28	Prepare and Submit PreDraft to USACE	30 days	Mon 12/3/07	Tue 1/1/08	26
29	USACE Review	30 days	Wed 1/2/08	Thu 1/31/08	28
30	Comment Resolution Meeting	15 days	Fri 2/1/08	Fri 2/15/08	29
31	Prepare and Submit Draft to USACE	30 days	Fri 2/1/08	Sat 3/1/08	29
32	USACE Preliminary Review of Draft	20 days	Sun 3/2/08	Fri 3/21/08	31
33	Prepare and Submit Draft to Army and Ohio EPA	5 days	Sat 3/22/08	Wed 3/26/08	32
34	Army and Ohio EPA Review of Draft	45 days	Thu 3/27/08	Sat 5/10/08	33
35	Comment Resolution Meeting	15 days	Sun 5/11/08	Sun 5/25/08	34
36	Prepare and Submit Final to USACE	30 days	Sun 5/11/08	Mon 6/9/08	34
37	USACE Preliminary Review of Final	10 days	Tue 6/10/08	Thu 6/19/08	36
38	Prepare and Submit Final to Army and Ohio EPA	5 days	Fri 6/20/08	Tue 6/24/08	37
39	Army and Ohio EPA Review and Approval	45 days	Wed 6/25/08	Fri 8/8/08	38



Sun 6/3/07

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Figure 10-1. Project Schedule

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11.0 REFERENCES

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FINAL

Site Safety and Health Plan
for the
Central Burn Pits (RVAAP-49) Removal Action Work Plan
at the
Ravenna Army Ammunition Plant,
Ravenna, Ohio

August 2007

Prepared for

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APPROVALS

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August 2007

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ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
BRAC	Base Realignment and Closure
CBP	Central Burn Pits
CPR	cardiopulmonary resuscitation
EPA	U. S. Environmental Protection Agency
FSHP	Facility Wide Safety and Health Plan
GOCO	government-owned, contractor-operated
HAZWOPER	Hazardous Waste Operations
HTRW	Health Requirements for Radioactive Waste
IDW	investigation-derived waste
IRP	Installation Restoration Program
MEC	munitions and explosives of concern
MSDS	Material Safety Data Sheet
NGB	National Guard Bureau
OE	ordnance and explosives
OEW	ordnance and explosive waste
OHARNG	Ohio Army National Guard
PID	photoionization detector
PPE	personal protective equipment
PRG	preliminary remediation goal
RmAWP	Removal Action Work Plan
RI	Remedial Investigation
RRSE	Relative Risk Site Evaluation
RTLS	Ravenna Training and Logistic Site
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
TBD	to be determined
TCLP	toxicity characteristic leaching procedure
USACE	U. S. Army Corps of Engineers
UXO	unexploded ordnance

INTRODUCTION

Science Applications International Corporation's (SAIC's) formal policy, stated in the Environmental Compliance and Health and Safety Program manual, is to take every reasonable precaution to protect the health and safety of our employees, the public, and the environment. To this end, the Ravenna Army Ammunition Plant (RVAAP) *Facility-Wide Safety and Health Plan* (FSHP) (USACE 2001a) and this Site Safety and Health Plan (SSHP) Addendum collectively set forth the specific procedures required to protect SAIC and SAIC subcontractor personnel involved in the field activities. These plans are driven by requirements contained in the most current revisions of the U.S. Army Corps of Engineers (USACE) *Safety and Occupational Health Requirements for Radioactive Waste (HTRW)* and *Ordnance and Explosive Waste (OEW) Activities, ER-385-1-92,* and the USACE *Safety and Health Manual, EM-385-1-1-1*, which are available online via the USACE web site. SAIC activities are also subject to the requirements of the SAIC Corporate Environmental Compliance and Health and Safety Program and associated procedures. All field personnel are required to comply with the requirements of these programs and plans. In addition, subcontractors are responsible for providing their employees with a safe work place and nothing in these plans relieves such subcontractors of this responsibility. If the requirements of these plans are not sufficient to protect the employees of a subcontractor, that subcontractor is required to supplement this information with work practices and procedures that will ensure the safety of its personnel.

The FSHP addresses program issues and hazards and hazard controls common to the entire installation. This SSHP Addendum to the FSHP serves as the lower tier document addressing the hazards and controls specific to the Removal Action (RA) at the following location:

- RVAAP-49 Central Burn Pits (CBP).

This location was designated as a high priority Area of Concern (AOC). Copies of the FSHP and this SSHP Addendum will be present at the work site during all fieldwork.

The CBP is an approximately 20-acre site used early in RVAAP history as a construction yard by Cleveland Builders Supply. Multiple areas within the site were later used to burn non-explosive combustible scrap and to dump construction/industrial waste. Sand Creek forms the west boundary. There are several (approximately 15) debris piles located in the central portion of the site and another near the western edge of the AOC.

Previous investigations at CBP include a Relative Risk Site Evaluation (RRSE); a Phase I Remedial Investigation (RI), which involved comprehensive sampling of soil, sediment, groundwater, and surface water within the site; and a Supplemental Phase II RI to define the nature and extent of soil contamination at CBP. Ordnance and explosives (OE) avoidance surveys were conducted. No previous removal actions have been conducted at CBP.

Planned site activities consist of excavation, environmental sampling, site restoration, and support tasks. These tasks include equipment decontamination and management of investigation-derived wastes (soil and decontamination fluids).

Potential hazards posed by the planned tasks include injury from ordnance and explosives; lifting, and strain hazards associated with operating soil sampling equipment; heavy equipment; noise; excavation; fuel or decontamination solvent fires; chemical exposure; temperature extremes; stinging/biting insects; poisonous plants; and snakes.

The potential for chemical overexposure appears to be very low, based on the nature of planned tasks and review of available data. There is some potential for chemical exposures via the inhalation pathway during sampling activities and dermal contact with contaminated soil. Airborne exposures will be monitored during sampling activities. Sampling crews will use protective gloves to handle potentially contaminated materials, and, if necessary, the Site Safety and Health Officer (SSHO) will upgrade the required personal protective equipment (PPE) to prevent inhalation and/or dermal contact with potentially contaminated materials. The SSHO will observe all site tasks during daily safety inspections and will use professional judgment and appropriate monitoring results to determine if upgrading PPE is required. A detailed analysis of these hazards and specific appropriate controls is presented in Table 2-2.

This removal action will be performed in Level D PPE, plus chemical-resistant gloves when handling potentially contaminated materials. If one of several action levels is exceeded or the potential for increased risk becomes apparent during the investigation, protective procedures, including protective clothing, will be upgraded as necessary by the SSHO.

1.0 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

1.1 SITE DESCRIPTION

When the RVAAP Installation Restoration Program (IRP) began in 1989, the Ravenna Training and Logistics Site (RTLS) of the Ohio Army National Guard (OHARNG) was identified as a 21,419-acre installation. The property boundary was resurveyed by 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 RTLS. Since the IRP encompasses past activities over the entire 21,683 acres of the former RVAAP, the site description of the RVAAP includes the combined RTLS and RVAAP properties. The RVAAP was previously operated as a government-owned, contractor-operated (GOCO) US Army facility. Currently, the installation is jointly operated by the U.S. Army Rock Island Base Realignment and Closure (BRAC) Field Office and the OHARNG.

The RTLS 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. The RTLS/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 1-1 and 1-2). The RTLS 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.

The installation was active from 1941 to 1992. Activities included loading, assembling, storing, and packing military ammunition; demilitarization of munitions; production of ammonium nitrate fertilizer; and disposal of "off-spec" munitions. Various munitions were handled on the installation including artillery rounds of 90 mm or more and bombs up to 2,000 lbs.

In addition to production and demilitarization activities at the load lines, other AOCs at RVAAP were used for the burning, demolition, and testing of munitions. These burning and demolition grounds consist of large parcels of open space or abandoned quarries. Potential contaminants at these AOCs include explosives, propellants, metals, waste oils, and sanitary waste. Other types of AOCs present at RVAAP include landfills, an aircraft fuel tank testing facility, and various general industrial support and maintenance facilities.

1.1.1 CBP

CBP is located in the east-central area at the intersection of Paris-Windham Road and Lumber Yard Road, and covers approximately 20 acres. The topography across the majority of CBP is relatively flat due to historical grading and fill activities. The AOC is bordered by old railroad beds to the north (Track 39) and south (Track 33), and Sand Creek to the west-northwest. The AOC was originally used as a lumber and building materials storage area, and later used for open burning of non-explosive wastes, electrical components, wooden boxes, and scrap and the disposal of other non-hazardous waste material. Operation of the burn pits is believed to have started shortly after RVAAP began operations and continued into the mid-1970s, although actual dates are unknown. The burn pits are comprised of bare mounds of slag and debris, and there are approximately 15 located within the AOC. Three burn areas, characterized by debris, scrap materials, and distressed vegetation, were identified in the eastern portion of the AOC near Lumber Yard Road.

Calculated exposure point concentrations for manganese and arsenic from soil samples collected during the Phase I investigation exceeded the Facility-wide background values for the RVAAP. Supplemental Phase II sampling indicated debris pile M had a hazardous lead concentration and toxicity (TCLP) and pile N had a highly elevated hexavalent chromium concentration.

1.2 CONTAMINANTS

Table 1-1 lists contaminants that occurred in soil samples (discrete and multi-increment) during the CBP remedial investigations. Inclusion in this table indicates the potential to encounter a contaminant during the removal action activities, but it does not necessarily indicate that the contaminant is present in sufficient quantity to pose a health risk to workers. Results of the Supplemental Phase II sampling of debris piles and berms are shown in Table 1-2. Inclusion in this table indicates the potential to encounter a contaminant during removal action activities that is present in sufficient quantity to pose a health risk to workers.

Table 1-1. Maximum Concentrations of Constituents of Potential Concern

Analyte	Units	CBP Maximum Detect
Miscellaneous		
Chromium, hexavalent	mg/kg	25
Metals		
Aluminum	mg/kg	32600
Antimony	mg/kg	39.3
Arsenic	mg/kg	40.1
Barium	mg/kg	1560
Beryllium	mg/kg	4.2
Cadmium	mg/kg	14.1
Chromium	mg/kg	105
Cobalt	mg/kg	22.3
Copper	mg/kg	1260
Cyanide, total	mg/kg	99
Lead	mg/kg	8560
Manganese	mg/kg	6150
Mercury	mg/kg	28
Nickel	mg/kg	33.7
Selenium	mg/kg	3.9
Silver	mg/kg	98.2
Thallium	mg/kg	4.1
Vanadium	mg/kg	37
Zinc	mg/kg	8780
Organics-Explosives		
1,3,5-Trinitrobenzene	mg/kg	--
2,4,6-Trinitrotoluene	mg/kg	0.18
2,4-Dinitrotoluene	mg/kg	--
2,6-Dinitrotoluene	mg/kg	--
2-Amino-4,6-dinitrotoluene	mg/kg	--
4-Amino-2,6-dinitrotoluene	mg/kg	--
Nitrobenzene	mg/kg	--
Nitrocellulose	mg/kg	1.8
RDX	mg/kg	--
HMX	mg/kg	--
Nitroglycerine	mg/kg	--
Nitroguanidine	mg/kg	--
Tetryl	mg/kg	--

Data is from *Remedial Investigation Report for the Central Burn Pits (RVAAP-49).* Ravenna Army Ammunition Plant, Ravenna, Ohio. Delivery Order W912QR-05-F-0033, September 2005, and *Final Engineering Evaluation/Cost Analysis for Central Burn Pits at Ravenna Army Ammunition Plant in Ravenna, Ohio.* January 2007

Table 1-2. Inorganics Detected in Multi-Increment Samples of Debris Piles and Berms at CBP

Analyte (mg/kg)	Pile or Berm												
	Back-ground	**Berm A**	**Pile B**	**Pile C**	**Berm D**	**Pile E**	**Berm H**	**Pile I**	**Berm K**	**Pile L**	**Pile M**	**Pile N**	**Pile P**
Chromium, hexavalent	--	0.42 U	0.47 U	0.4 U	0.48 U	0.43 U	0.53 U	0.42 U	0.49 U	1.2 =	0.42 U	25 =	0.49 U
Aluminum	17700	14500 =	15900 =	6960 =	18100 =#	12400 =	16900 =	12500 =	32600 =#	22300 =#	12700 =	10200 =	6190 =
Antimony	0.96	0.47 J	0.88 J	0.93 J	0.4 UJ	0.96 J	0.69 J	0.34 U	0.37 UJ	0.51 J	39.3 =#	6.5 =#	0.46 J
Arsenic	15.4	10 =	14.6 =	21.3/=#	8.8 =	15.6 =#	9.9 =	11.3 =	5.4 =	10.8 =	12 =	40.1 =#	15 =
Barium	88.4	121 J#	135 J#	87 J	329 J#	132 J#	222 J#	76.8 =	465 J#	264 =#	1560 =#	317 =#	73.1 J
Beryllium	0.88	1.1 =#	1.3 =#	0.67=	2.4 =#	1.2 =#	2.1 =#	0.6 =	3.6 =#	2.2 =#	1.6 U	1.1 =#	0.37 =
Cadmium	0	0.35 =#	0.68 =#	0.92 =#	0.69 =#	0.27 =#	0.79 =#	0.36 =#	0.38 =#	0.27 =#	14.1 =#	6.2 =#	0.43 =#
Chromium	17.4	51.6 J#	27.9 J#	19.2 J#	28.9 =#	28.3 =#	20.5 J#	18.8 =#	40.8 J#	27.8 =#	23.1 =#	105 =#	13.8 J
Copper	17.7	13.9 =	28.5 =#	113 =#	13.2 =	38.7 J#	16.4 =	15.7 =	14.8 =	18 =#	12800 =#	380 =#	9.9 =
Lead	26.1	20.7 =	75.1 =#	62.1 =#	57.9 =#	85.3 =#	56.1 =#	37.3 =#	15.4 =	21.6 =	8560 =#	348 =#	29.8 =#
Manganese	1450	1540 =#	1320 =	1050 =	2790 =#	3130 =#	1880 =#	733 =	5290 =#	2630 =#	668 =	745 =	690 =
Mercury	0.036	0.04 =#	0.05 =#	0.06 =#	0.04 =#	0.04 =#	0.06 =#	0.06 =#	0.04 =#	0.13 =#	0.04 =#	28 =#	0.06 =#
Nickel	21.1	24.6 =#	20.6 =	19.5=	17.1 =	24.9 =#	18.1 =	16.5 =	9 =	13.9 =	26.3 =#	30.7 =#	15.4 =
Selenium	1.4	1.8 J#	1.6 =#	1.4 J	1.6 J#	0.5 J	1 J	0.73 =	3.6 J#	2.3 J#	3.9 =#	2.7 =#	0.91 =
Silver	0	0.21 U	0.08 U	0.11 J#	0.24/U	0.04 U	0.22 U	0.04 U	0.9 J#	0.2 U	0.73 =#	98.2 =#	0.05 U
Thallium	0	1.4 U	0.54 U	0.57 U	1.6 U	2.4 U	1.5 U	0.27 U	2.9 U	1.3 U	0.84 J#	0.41 J#	0.3 U
Zinc	61.8	58.1 =	131 =#	151 =#	65.5 =#	151 =#	75.1 =#	127 =#	34.3 =	72.9 =#	8780 =#	490 =#	67.2 =#

J - estimated value less than reporting limits.

U - Not detected

= - analyte present and concentration accurate

- value above Facility-Wide background

Data is from *Remedial Investigation Report for the Central Burn Pits (RVAAP-49).* Ravenna Army Ammunition Plant, Ravenna, Ohio. Delivery Order W912QR-05-F-0033, September 2005, and *Final Engineering Evaluation/Cost Analysis for Central Burn Pits at Ravenna Army Ammunition Plant in Ravenna, Ohio.* January 2007

2.0 HAZARD/RISK ANALYSIS

The purpose of the task hazard/risk analysis is to identify and assess potential hazards that may be encountered by personnel and to prescribe required controls. Table 2-1, a general checklist of hazards that may be posed by this project, indicates whether a particular major type of hazard is present. If additional tasks or significant hazards are identified during the work, this document will be modified by addendum or field change order to include the additional information.

Table 2-1. Hazards Inventory

Yes	No	Hazard
	X	Confined space entry
X		Excavation entry (excavations will not be entered)
X		Heavy equipment (drill rigs, backhoe)
X		Fire and explosion (fuels)
X		Electrical shock (utilities and tools)
X		Exposure to chemicals (contaminants and chemical tools)
X		Temperature extremes
X		Biological hazards (poison ivy, Lyme disease, West Nile disease)
	X	Radiation or radioactive contamination
X		Noise (excavation equipment, powered auger, drill rig)
	X	Drowning
X		OE (potential to encounter unexploded ordnance)

OE = ordnance and explosives.

Specific tasks are as follows:

- Debris pile excavation using heavy equipment performed by the subcontractor;
- Soil sampling with hand augers, or scoops performed by SAIC;
- Vegetations clearing with chainsaws, machetes, and sling blades, as required performed by the subcontractor;
- Surveying performed by the subcontractor;
- Investigation-derived waste handling and disposition performed by the subcontractor; and
- Sampling equipment decontamination performed by both SAIC and the subcontractor.

2.1 TASK-SPECIFIC HAZARD ANALYSIS

Table 2-2 presents task-specific hazards, relevant hazard controls, and required monitoring, if appropriate, for all of the planned tasks.

2.2 POTENTIAL EXPOSURES

Prior sampling results indicate that the primary contaminants of concern at CBP are metals and explosives. Table 2-3 contains information on the potential contaminants, as well as the reagents and chemicals that will be used for the project. It is important to note that the contaminants listed in Table 2-3 have been detected in a number of locations at RVAAP and might be expected to occur at any former operations area. Exposure to chemical tools, such as corrosive sample preservatives, field laboratory reagents, or flammable fuels, is a possibility and will be controlled through standard safe handling practices.

Table 2-2. Hazards Analysis

Safety and Health Hazards	Controls	Monitoring Requirements
Civil Surveys and Visual Surveys in Potentially Contaminated Areas		
General safety hazards (moving equipment, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety glasses, safety shoes or boots, and hard hats if overhead hazards are present (see Section 5.0 of the FSHP). Site-specific training, buddy system, proper housekeeping	Daily safety inspections
Contact with OE	Pre-entry screening survey and continuous escort by OE specialist support. On-site training in ordnance recognition for all field personnel. Withdrawal of all SAIC and subcontractor personnel from immediate area and field marking of suspect area if ordnance or suspected ordnance is discovered	Visual and instrument surveys for ordnance conducted by OE expert personnel
Exposure to chemicals	Nitrile or similar gloves for contact with potentially contaminated material. Gloves will be disposed after single use. Wash face and hands and any other exposed areas prior to taking anything by mouth. Hazardous waste site operations training and medical clearance Site training must include hazards and controls for exposure to site contaminants and chemicals used on-site. MSDSs on-site. All chemical containers labeled to indicate contents and hazard	None
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellant on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Inspect for ticks during the day and at the end of each workday (see Section 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Section 9.0 of FSHP)	Visual survey
Vehicle accidents	Compliance with E&I EC&HS Procedure 110 “Vehicle Operation” to include verification of current drivers licenses, use of seat belts when vehicle is in motion, daily (undocumented) vehicle safety inspection, compliance with applicable laws and regulations, and defensive driving.	Verification of valid drivers licenses by FM
Temperature extremes	Administrative controls (see Section 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Section 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Soil Sampling Using Hand Augers or Scoops		
General safety hazards (manual lifting, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety boots, safety glasses, and work gloves for manual work (see Section 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping	Daily site safety inspections
Contact with OE	On-site training in ordnance recognition for all field personnel. Clearance of sites by OE personnel for intrusive work. Continuous escort by OE personnel when in areas with potential to encounter OE. Withdrawal of all non-OE personnel if ordnance or suspected ordnance is discovered. Sampling of stations having known or suspected (i.e., red soil or raw product) explosives >10% (100,000 mg/kg) to be performed by OE technicians following applicable OE safety requirements	Visual and instrument surveys by OE technicians
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Stay upwind of any dust-generating activities. Dust suppression techniques (such as wetting area) as required. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for site contaminants and all chemicals used on-site. MSDSs for chemical tools on-site. Chemical containers labeled to indicate contents and hazard	PID or other sampling, as appropriate
Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season, October and November)	Fieldwork will not be conducted on hunt days. Office work, sample management, and analytical work may be conducted in the SAIC staging building (Building 1036) if approved by the RVAAP environmental coordinator	None
Temperature extremes	Administrative controls (see Section 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Section 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing
Vehicle accidents	Compliance with E&I EC&HS Procedure 110 “Vehicle Operation” to include verification of current drivers licenses, use of seat belts when vehicle is in motion, daily (undocumented) vehicle safety inspection, compliance with applicable laws and regulations, and defensive driving.	Verification of valid drivers licenses by FM
Lifting injuries	Compliance with E&I EC&HS Procedure 150 “Manual Lifting” to limiting individual lifts by SAIC personnel to 50 pounds.	Verification/observation of lifting by SAIC personnel by FM.

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellant on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Snake chaps if working in overgrown areas. Inspect for ticks during the day and at the end of each workday (see Section 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Section 9.0 of FSHP)	Visual survey
Vegetation Clearing with Chainsaws, Machetes, and Sling Blades		
General safety hazards (contact with sharp edges, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety boots, safety glasses, plus heavy-duty work gloves and hard hat (see Section 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping. Only experienced operators. Personnel operating brush-clearing tools must maintain separation of at least 15 ft. Machetes equipped with lanyard and lanyard looped around wrist. Tools must be inspected daily and taken out of service if damaged. Exclusion zone if there is a potential for entry of unauthorized personnel	Daily site safety inspections
Chainsaw kickback and related hazards	Chainsaw chaps and face shield as additional PPE. Saws must have automatic chain brake or kickback device. Idle speed adjusted so chain does not move when idling. Only experienced operators may use chainsaw. Saws must not be used to cut above shoulder height. Saws must be held with both hands when operating. Additional requirements at 385-1-1 Section 31	Daily inspection
Noise (chainsaw)	Hearing protection $\geq$ NRR 25 within 7.6 m (25 ft) of operating chainsaw unless specific monitoring indicates noise exposure of less than 85 dBA	Daily safety inspections
Fire (fuels)	Fuels stored in safety cans with flame arrestors. Bonding (metal to metal) and grounding during fuel transfers. Fuel storage areas marked with no smoking or open flames signs. Fire extinguishers in all fuel use areas. Gasoline-powered equipment turned off and allowed to cool for at least 5 min prior to fueling	Daily safety inspection
Contact with OE	On-site training in ordnance recognition for all field personnel. Clearance of sites by OE personnel for intrusive work. Escort by OE personnel when in areas with potential to encounter OE. Withdrawal of all non-OE personnel if ordnance or suspected ordnance is discovered	Visual and instrument surveys by OE technicians

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Hazardous waste site operations training and medical clearance. Site training must include the hazards and appropriate controls for site contaminants and chemicals to be used or stored on-site. Chemical containers labeled to indicate contents and hazard. Medical clearance for hazardous waste work	Daily safety inspection
Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season, October and November)	Fieldwork will not be conducted on hunt days. Office work, sample management, and analytical work may be conducted in the SAIC staging building (Building 1036) if approved by the RVAAP environmental coordinator	None
Temperature extremes	Administrative controls (see Section 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Section 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice per day. Pulse rates at the start of each break if wearing impermeable clothing
Vehicle accidents	Compliance with E&I EC&HS Procedure 110 "Vehicle Operation" to include verification of current drivers licenses, use of seat belts when vehicle is in motion, daily (undocumented) vehicle safety inspection, compliance with applicable laws and regulations, and defensive driving.	Verification of valid drivers licenses by FM
Lifting injuries	Compliance with E&I EC&HS Procedure 150 "Manual Lifting" to limiting individual lifts by SAIC personnel to 50 pounds.	Verification/observation of lifting by SAIC personnel by FM.
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellant on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize potential for tick entry. Snake chaps if working in overgrown areas. Inspect for ticks during the day and at the end of each workday (see Section 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Section 9.0 of FSHP)	Visual survey

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Investigation-Derived Waste Handling		
General hazards (lifting equipment, manual lifting, slips)	Level D PPE: long pants, shirts with sleeves, safety glasses, safety shoes or boots, heavy-duty gloves for materials handling, and hard hat if overhead hazards are present (see Section 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping. Unnecessary personnel will stay well clear of operating equipment. Functional back-up alarm on fork trucks, Bobcats, trucks, etc. Ravenna O&M contractor personnel will provide any required fork truck services in the IDW staging area (Building 1036). IDW movement from field sites to Building 1036 will be conducted by the drilling subcontractor using a backhoe equipped with forks and drum dollys. No personnel allowed under lifted loads. Lifts of greater than 50 lbs will be made with two or more personnel or with lifting equipment. Hazardous waste safety training. Compliance with EM 385-1-1 Sections 14 and 16	Daily safety inspections of operations. Daily inspection of equipment to verify brakes and operating systems are in proper working condition
Contact with OE	On-site training in ordnance recognition for all field personnel. Clearance of sites by OE personnel for intrusive work. Continuous escort by OE personnel if working in areas with potential for OE. Withdrawal of all non-OE personnel if ordnance or suspected ordnance is discovered	Visual and instrument surveys by OE technicians
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for exposure to site contaminants and chemicals used on-site	Daily safety inspections
Vehicle accidents	Compliance with E&I EC&HS Procedure 110 “Vehicle Operation” to include verification of current drivers licenses, use of seat belts when vehicle is in motion, daily (undocumented) vehicle safety inspection, compliance with applicable laws and regulations, and defensive driving.	Verification of valid drivers licenses by FM
Lifting injuries	Compliance with E&I EC&HS Procedure 150 “Manual Lifting” to limiting individual lifts by SAIC personnel to 50 pounds.	Verification/observation of lifting by SAIC personnel by FM.
Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season, October and November)	Fieldwork will not be conducted on hunt days. Office work, sample management, and analytical work may be conducted in the SAIC staging building (Building 1036) if approved by the RVAAP environmental coordinator	None

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Fire (vehicle fuels and flammable contaminants)	Fuels stored in safety cans with flame arrestors. Bonding (metal to metal) and grounding during fuel transfers. Fuel storage areas marked with no smoking or open flames signs. Gasoline-powered equipment will be shut down and allowed to cool for 5 min before fueling. Fire extinguishers in all fuel use areas	Daily safety inspection
Noise	Hearing protection within 7.6 m (25 ft) of any noisy drum moving equipment unless equipment-specific monitoring indicates exposures less than 85 dBA	Daily safety inspections
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellant on pants, boots, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Snake chaps if working in overgrown areas. Inspect for ticks during the day and at the end of each workday (see Section 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Section 9.0 of FSHP)	Visual survey
Electric shock	Identification and clearance of overhead utilities. GFCI for all electrical hand tools	Visual survey of all work areas
Temperature extremes	Administrative controls (see Section 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Section 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing
Equipment Decontamination (Hot Water Washing, Soap and Water Washing, HCl, and Methanol Rinse)		
General equipment decontamination hazards (hot water, slips, falls, equipment handling)	Level D PPE plus nitrile or PVC gloves (see Section 5.0 of FSHP). Face shield and Saranax or rain suit when operating steam washer. Site-specific training. Proper housekeeping	Daily safety inspections
Noise (spray washer)	Hearing protection when washer is operating unless equipment-specific monitoring indicates that exposure is less than 85 dBA	None
Fire (decontamination solvents and gasoline)	Flammable material stored in original containers or in safety cans with flame arrestors. Fire extinguisher kept near decontamination area	Daily safety inspection
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Minimal contact. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for exposure to site contaminants and chemicals used on-site. MSDSs on-site. All chemical containers labeled to indicate contents and hazard	None
Electric shock	Portable electrical hand tools and equipment must be connected through functional GFCIs.	Verification by FM

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Vehicle accidents	Compliance with E&I EC&HS Procedure 110 "Vehicle Operation" to include verification of current drivers licenses, use of seat belts when vehicle is in motion, daily (undocumented) vehicle safety inspection, compliance with applicable laws and regulations, and defensive driving.	Verification of valid drivers licenses by FM
Lifting injuries	Compliance with E&I EC&HS Procedure 150 "Manual Lifting" to limiting individual lifts by SAIC personnel to 50 pounds.	Verification/observation of lifting by SAIC personnel by FM.
Temperature extremes	Administrative controls (see Section 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Section 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice a day. Pulse rates at the start of each break if wearing impermeable clothing
Excavation using Heavy Equipment		
Safety hazards associated with excavation equipment	Excavation subcontractor must have and operate to their own safety programs, procedures, and practices. Compliance with E&I EC&HS Procedure 160 "Excavation Safety" to include subcontractor competent person, documented review of 160 by SAIC FM, daily inspection of excavation, no personnel in trenches deeper than 5 feet without additional controls per procedure. Level D PPE including hardhat (see Section 5.0). Unnecessary personnel will stay well clear of operating equipment. Functional back-up alarm. Exclusion zone around excavation areas. Only experienced operators will be allowed to operate equipment. Hazardous waste safety training.	Daily safety inspections of operations. Initial and at least weekly inspections of excavation equipment.
Contact with unexploded ordnance	Continuous escort by OE personnel during removal activities. On-site training in ordnance recognition for all field personnel. Clearance of sites by UXO subcontractor for intrusive work. Withdrawal of all non-UXO personnel if ordnance or suspected ordnance is discovered.	Visual surveys for ordnance. Instrument surveys by EOD technicians in munitions disposal areas.
Gunfire (deer hunting with shotguns loaded with slugs allowed on Friday and Saturday during season)	No contractors permitted on site on hunt days.	None.

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Fire (vehicle fuels and flammable contaminants)	Fuels stored in safety cans with flame arrestors. Bonding and grounding during fuel transfers. Fuel storage areas marked with no smoking or open flames signs. Fire extinguishers in all fuel use areas.	Daily safety inspection. Combustible gas indicator if buried organic material or other source of flammable gas suspected.
Noise	Hearing protection within 7.6 meters (25 feet) of backhoe or similar equipment unless equipment-specific monitoring indicates exposures less than 90 decibels.	Daily safety inspections.
Exposure to chemicals	PPE (Level D) plus nitrile or equivalent gloves for contact with contaminated material. Washing face and hands prior to taking anything by mouth. Staying upwind of any dust-generating activities. Minimal contact. Hazard communication training. MSDS for chemical tools on site. Chemical containers labeled to indicate contents and hazard. Medical clearance for hazardous waste work Decontamination of potentially contaminated equipment prior to servicing.	Photoionization detector or other sampling as appropriate.
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes)	PPE (boots, work clothes). Insect repellant, as necessary. Pant legs tucked into boots or otherwise closed to minimize tick entry. Inspect for ticks during the day and at the end of each work day (See Section 9.0). Avoidance of accumulations of bird or bat droppings (See Section 9.0).	Visual survey.
Electric shock	Identification and clearance of overhead and underground utilities per E&I EC&HS Procedure 130.	Visual of all work areas.
Temperature extremes	Administrative controls (see Section 8.0). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (See Section 8.0) Chilled drinks if temperature exceeds 70°F.	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing.

E&I EC&HS = Engineering & Infrastructure Environmental Compliance & Health and Safety
FM = Field Manager
FSHP = Facility Wide Safety and Health Plan
GFCI = ground-fault circuit interrupter
IDW = investigation-derived waste
MSDS = Material Safety Data Sheet
NRR= Noise Reduction Rating
OE = ordinance and explosives
O&M = operations and maintenance
PID = photoionization detector
PPE = personal protective equipment
EOD = explosive ordinance disposal
PVC = polyvinyl chloride
RVAAP = Ravenna Army Ammunition Plant
SAIC = Science Applications International Corporation
UXO = unexploded ordnance

Table 2-3. Potential Exposures

Chemical[a]	TLV/PEL/STEL/IDLH[b]	Health Effects/ Potential Hazards[c]	Chemical and Physical Properties[c]	Exposure Route(s)[c]
Chromium	TLV/TWA: 0.5 mg/m^3, A4 IDLH: 25 mg/m^3	Eye irritation, sensitization	Solid; properties vary depending upon specific compound	Inhalation Ingestion Contact
DNT (dinitrotoluene)	TLV/TWA: 0.2 mg/m^3, A2 IDLH: Ca [50 mg/m^3]	Suspected human carcinogen, anorexia, cyanosis, reproductive effects	Orange-yellow solid, VP: 1 mm; FP: 404°F	Inhalation Absorption Ingestion Contact
Gasoline (used for fuel)	TLV/TWA: 300 ppm IDLH: Ca	Potential carcinogen per NIOSH, dizziness, eye irritation, dermatitis	Liquid with aromatic odor; FP: -45°F; VP: 38-300 mm	Inhalation Ingestion Absorption Contact
Hydrochloric acid (potentially used to preserve water samples or for equipment decontamination)	TLV: 5 ppm ceiling IDLH: 50 ppm	Irritation of eyes, skin, respiratory system	Liquid; VP: fuming; IP: 12.74 eV; FP: none	Inhalation Ingestion Contact
Lead	TLV/TWA: 0.05 mg/m^3, A3 PEL/TWA: 0.05 mg/m^3 IDLH: 100 mg/m^3	Weakness, anorexia, abdominal pain, anemia	Solid metal; VP: 0 mm; FP: NA; IP: NA	Inhalation Ingestion Contact
Liquinox (used for decontamination)	TLV/TWA: None	Inhalation may cause local irritation to mucus membranes	Yellow odorless liquid (biodegradable cleaner); FP: NA	Inhalation Ingestion
Methanol (potentially used for equipment decontamination)	TLV/TWA: 200 ppm Skin notation IDLH: 6000 ppm	Irritation of eyes, skin, respiratory system; headache; optic nerve damage	Liquid; VP: 96 mm; IP: 10.84 eV; FP: 52°F	Inhalation Absorption Ingestion Contact

Table 2-3. Potential Exposures (continued)

Chemical[a]	TLV/PEL/STEL/IDLH[b]	Health Effects/ Potential Hazards[c]	Chemical and Physical Properties[c]	Exposure Route(s)[c]
HMX (octogen)	TLV/TWA: None established; toxicity assumed to be similar to RDX as compounds are very similar	Explosive; assumed irritation of eyes and skin, dizziness, weakness	Assumed similar to RDX- FP: explodes; VP: 0.0004 mm at 230°F	Assumed: Inhalation Absorption Ingestion Contact
RDX (cyclonite)	TLV/TWA: 0.5 mg/m^3, A4 Skin notation IDLH: none established	Explosive; irritation of eyes and skin, dizziness, weakness	White powder; FP: explodes; VP: 0.0004 mm at 230°F	Inhalation Absorption Ingestion Contact
TNT (2,4,6-trinitrotoluene)	TLV/TWA: 0.5 mg/m^3 Skin notation IDLH: 500 mg/m^3	Cluster headache; irritation of skin and mucus membranes, liver damage, kidney damage	Pale solid; FP: explodes; VP: 0.0002 mm	Inhalation Absorption Ingestion Contact

[a]The potential chemicals were obtained from the *Ravenna Army Ammunition Plant Phase I Remedial Investigation Report* (USACE 1998).
[b]From 2003 Threshold Limit Values, *American Conference of Governmental Industrial Hygienists*.
[c]From *NIOSH Guide to Chemical Hazards* web site.

A2 = suspected human carcinogen
A3 = confirmed animal carcinogen with unknown relevance to humans
A4 = not classifiable as a human carcinogen
DNT = dinitrotoluene.
FP = flash point
HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
IDLH = immediately dangerous to life and health
IP = ionization potential
NIOSH = National Institute for Occupational Safety and Health
PEL = permissible exposure limit
ppm = parts per million
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine
STEL = short-term exposure limit
TLV = threshold limit value
TNT = trinitrotoluene
TWA = time-weighted average
VP = vapor pressure

3.0 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

This Section presents the personnel (and their associated telephone numbers) responsible for site safety and health and emergency response. Table 3-1 identifies the Science Applications International Corporation (SAIC) and subcontractor staff who will fill key roles. See the Facility Wide Safety and Health Plan (FSHP) for information on the roles and responsibilities of key positions.

Table 3-1. Staff Organization

Position	Name	Phone
SAIC Health and Safety Manager	Steve Davis CIH, CSP	865-481-4755
SAIC Project Manager	Kevin Jago	865-481-4614
SAIC Construction Manager	TBD	
Subcontractor Construction Supervisor	TBD	
Subcontractor Site Safety and Health Officer[1]	TBD	
MEC Avoidance Subcontractor	TBD	

[1] Subcontractor Site Safety and Health Officer will be SSHO for all removal activities.

CIH= Certified Industrial Hygienist

CSP = Certified Safety Professional

MEC = munitions and explosives of concern

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4.0 TRAINING

Training requirements, from Section 4.0 of the FSHP, are summarized in Table 4-1 and in Table 2-2. All field personnel working within the AOC shall be first aid/cardiopulmonary resuscitation (CPR) trained.

Table 4-1. Training Requirements

Training	Worker	Supervisor	Site Visitor (exclusion zone)
HAZWOPER (40-hr, 3-day OJT)	√	√	√
HAZWOPER Annual Refresher (8 hr)	√	√	√
HAZWOPER Supervisors Training (8 hr)		√	
American Red Cross Standard First Aid (5.5 hr) and CPR	√	√	
General Hazard Communication Training	√	√	√
Respiratory Protection Training (required only if respirators are worn)	√	√	√
Hearing Conservation Training (for workers in hearing conservation program)	√	√	√
Pre-entry Briefing	√	√	√
Site-Specific Hazard Communication (contained in pre-entry briefing)	√	√	√
Safety Briefing (daily and whenever conditions or tasks change)	√	√	√
American Red Cross CPR for the Professional Rescuer		√	

√ = required.
HAZWOPER = Hazardous Waste Site Operations.
OJT = on-the-job training.
CPR = Cardio Pulmonary Resuscitation

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5.0 PERSONAL PROTECTIVE EQUIPMENT

General guidelines for selection and use of personal protective equipment (PPE) are presented in the FSHP. Specific PPE requirements for this work are presented in the hazard/risk analysis section (Section 2.0).

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6.0 MEDICAL SURVEILLANCE

Medical surveillance requirements, as presented in Section 6.0 of the FSHP, are summarized in Table 6-1 and in Table 2-2.

Table 6-1. Medical Surveillance Requirements[a]

Baseline	Routine	Overexposure	Termination
Prior to work assessment	Every 12 months, unless greater frequency is deemed appropriate by attending physician. Not to exceed 2-year interval	Upon developing symptoms or where exposure limits have been exceeded or suspected to have been exceeded	Upon termination or re-assignment

[a]All medical exams shall include (see Section 6.2 of the Facility Wide Safety and Health Plan):

- medical/work history;
- physical exam by physician;
- audiometry;
- blood screening and blood count;
- chest x-ray, as specified by physician;
- electrocardiogram, as specified by physician;
- spirometry; and
- urinalysis.

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7.0 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

Assessment of airborne chemical concentrations will be performed, as appropriate, to ensure that exposures do not exceed acceptable levels. Action levels, with appropriate responses, have been established for this monitoring. In addition to the specified monitoring, the Site Safety and Health Officer (SSHO) may perform or require additional monitoring, such as organic vapor monitoring, in the field laboratory or equipment decontamination area or personnel exposure monitoring for specific chemicals. The deployment of monitoring equipment will depend on the activities being conducted and the potential exposures. All personal exposure monitoring records will be maintained in accordance with 29 *Code of Federal Regulations* 1910.20. The minimum monitoring requirements and action levels are presented in Table 7-1.

Most of the Removal Action field activities are not expected to pose airborne exposure hazards for the following reasons:

- With the exception of sampling equipment decontamination, which will be performed in a well-ventilated building, work will be performed in open areas with natural ventilation.
- Prior site sampling indicated that contaminant concentrations are unlikely to pose an airborne hazard.
- The most probable contaminants (metals and explosives) are materials with relatively low vapor pressures and exposure can be controlled through dust suppression techniques.

Air monitoring of the breathing zone using a photoionization detector or equivalent is planned during excavation and soil sampling. The SSHO will examine site conditions and will contact the Health and Safety Manager and initiate additional monitoring if there is any indication of potential airborne exposure.

Table 7-1. Monitoring Requirements and Action Limits

Hazard or Measured Parameter	Area	Interval	Limit	Action	Tasks
Airborne organics with PID or equivalent	Breathing zone [0.9 m (3 ft) from source or 0.36 m (14 in.)] in front of employee's shoulder	From 1 to 3 ft below ground surface and if site conditions, such as discolored soil or chemical smells, indicate that monitoring is necessary	<5 ppm >5 ppm	Level D Withdraw and evaluate • evaluate need for PPE upgrade • identify contaminants • notify project manager and H&S manager	Excavation with heavy equipment, hand auguring, power augering, and other intrusive work
Noise	All	Any area where there is some doubt about noise levels	85 dBA and any area perceived as noisy	Require the use of hearing protection	Hearing protection will be worn within the exclusion zone, around power augers, or other motorized equipment
Visible airborne dust potentially containing SRCs	All	Continuously	Visible dust generation	Stop work; use dust suppression techniques such as wetting surface	All

H&S = health and safety
PID = photoionization detector
PPE = personal protective equipment
ppm = parts per million
SRC = site-related contaminant

8.0 HEAT/COLD STRESS MONITORING

General requirements for heat/cold stress monitoring are contained in the FSHP.

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9.0 STANDARD OPERATING SAFETY PROCEDURES

Standard operating safety procedures are described in the FSHP.

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10.0 SITE CONTROL MEASURES

Site control measures are described in the FSHP. No formal site control is expected to be necessary for this work, as the work areas are somewhat remote and bystanders are not anticipated. The RVAAP installation is not open to the public, and only authorized personnel are allowed in the AOCs. If the SSHO determines that a potential exists for unauthorized personnel to approach within 25 ft of a work zone or otherwise be at risk due to proximity, then exclusion zones will be established as described in the FSHP.

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11.0 PERSONNEL HYGIENE AND DECONTAMINATION

Personal hygiene and decontamination requirements are described in the FSHP and in Section 2.0 of this addendum.

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12.0 EMERGENCY PROCEDURES AND EQUIPMENT

Emergency contacts, telephone numbers, directions to the nearest medical facility, and general procedures can be found in the FSHP. All emergencies onsite will be coordinated first through **Guard Post 1 [(330) 358-2017]** who will coordinate the response. The SAIC field operations manager will remain in charge of all SAIC and subcontractor personnel during emergency activities. The SAIC field office will serve as the assembly point if it becomes necessary to evacuate one or more sampling locations. During mobilization, the SSHO will verify that the emergency information in the FSHP is correct.

Each field team shall have a cellular phone and/or a 2-way radio capable of contacting Guard Post 1 for communications purposes.

During field operations all on-site personnel shall have CPR/first aid training.

Emergency Phone Numbers

Position	Phone
RVAAP Guard Post 1 (Police, Fire, Emergency Medical)	(330)358-2017
Hospital (Robinson Memorial, Ravenna)	(330) 297-2449/0811
RVAAP Acting Facility Manager Irv Venger	(330) 358-7311
RVAAP Operation and Maintenance Contractor Jim McGee, MKM Engineers	 (330) 358-3005
RTLS Base Operations Supervisor, MAJ Meade	(614) 336-6560
USACE John Jent Angela Schmidt	 (502) 315-6343 (502) 315-6313
Ohio EPA, Todd Fisher	(330) 963-1148
SAIC Project Manager, Kevin Jago Jed Thomas	 (865) 481-4616 Office: (330) 405-5802 Cell: (216) 214-2599
SAIC Health and Safety Personnel, Steve Davis CIH, CSP Martha Clough	 (865) 481-4755 (330) 405-5804

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13.0 LOGS, REPORTS, AND RECORD KEEPING

Logs, reports, and record keeping requirements are described in the FSHP.

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14.0 REFERENCES

American Conference of Governmental Hygienists (ACGIH) 2003. Threshold Limit Values.

NIOSH (National Institute for Occupational Safety and Health). *NIOSH Pocket Guide to Chemical Hazards, the Condensed Chemical Dictionary,* 10th Edition.

USACE (U.S. Army Corps of Engineers). *Safety and Occupational Health Requirements for Radioactive Waste (HTRW) and Ordnance and Explosive Waste (OEW) Activities,* ER-385-1-92.

USACE. *Safety and Health Manual,* EM-385-1-1-13.

USACE 2001a. *Facility Wide Safety and Health Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio,* DACA62-00-D-0001, D.O. CY02, March.

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APPENDIX A

SITE MAP

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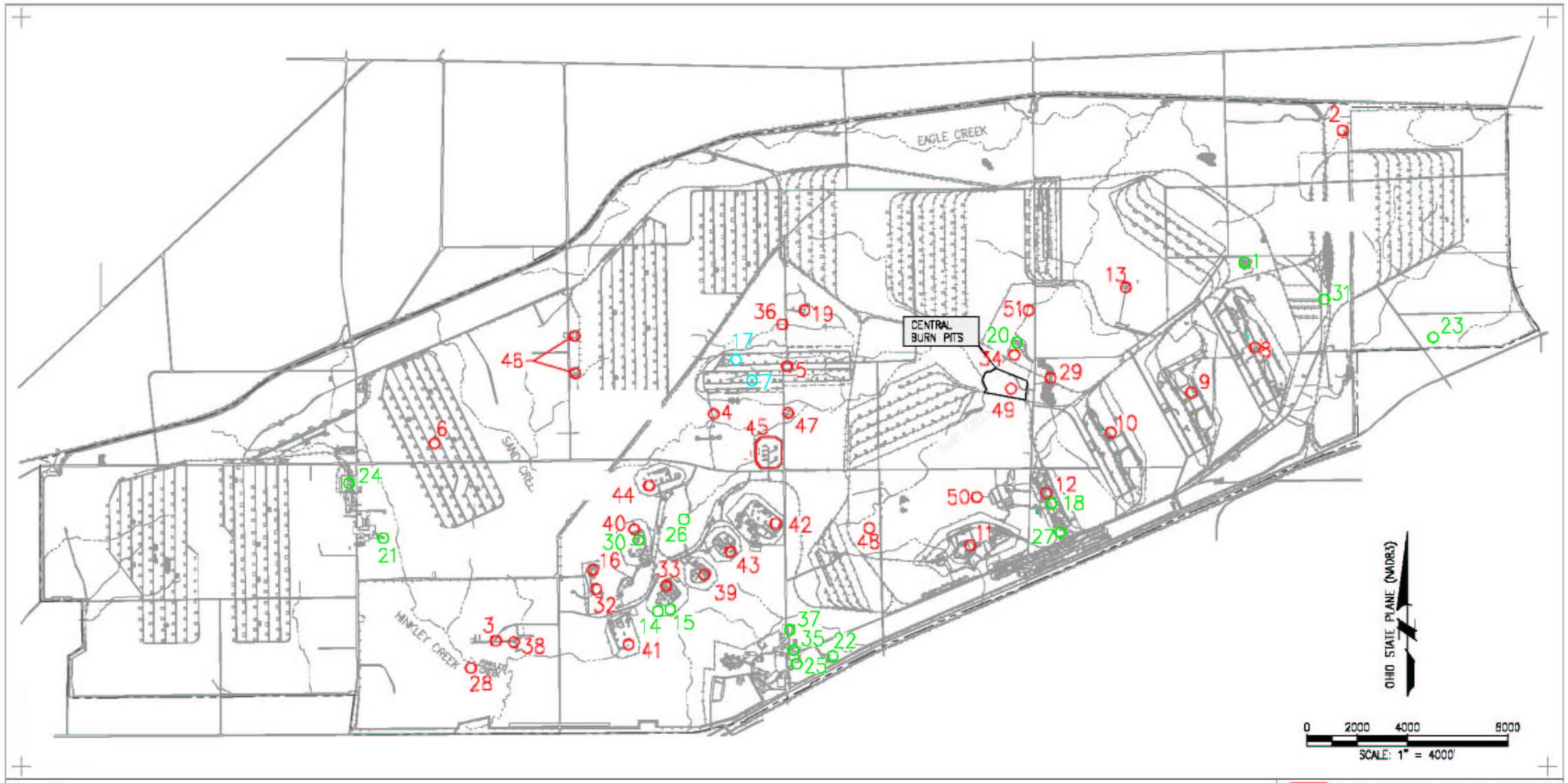

LEGEND:

1 ..... RAMSDELL QUARRY LANDFILL
2 ..... ERIE BURNING GROUNDS
3 ..... DEMOLITIONS AREA #1
4 ..... OPEN DEMOLITIONS AREA #2
5 ..... WINKLEPECK BURNING GROUNDS
6 ..... C BLOCK QUARRY
7 ..... BUILDING 1601 HAZARDOUS WASTE STORAGE
8 ..... LOAD LINE 1 AND DILUTION/SETTLING POND
9 .. LOAD LINE 2 AND DILUTION/SETTLING POND
10 . LOAD LINE 3 AND DILUTION/SETTLING POND
11 . LOAD LINE 4 AND DILUTION/SETTLING POND
12 ..... LOAD LINE 12
13 ..... BUILDING 1200 AND DILUTION/SETTLING POND
14 ..... LOAD LINE 6, EVAPORATION UNIT
15 ..... LOAD LINE 6, TREATMENT PLANT
16 ..... FUZE AND BOOSTER QUARRY LANDFILL/PONDS
17 ..... DEACTIVATION FURNACE
18 ..... LOAD LINE 12 PINK WASTEWATER TREATMENT
19 .. LANDFILL NORTH OF WINKLEPECK BURNING GROUND
20 ..... SAND CREEK SEWAGE TREATMENT PLANT
21 ..... DEPOT SEWAGE TREATMENT PLANT
22 ..... GEORGE ROAD SEWAGE TREATMENT PLANT
23 ..... UNIT TRAINING SITE WASTE OIL TANK
24 ... RESERVE UNIT MAINTENANCE AREA WASTE OIL TANK
25 .... BUILDING 1034 MOTOR POOL WASTE OIL TANK
26 ..... FUZE BOOSTER AREA SETTLING TANKS
27 ..... BUILDING 654 PCB STORAGE
28 ..... MUSTARD AGENT BURIAL SITE
29 ..... UPPER AND LOWER COBB'S POND COMPLEX
30 ... LOAD LINE 7 PINK WASTEWATER TREATMENT PLANT
31 ..... ORE PILE RETENTION POND
32 ..... 40- AND 60-MM FIRING RANGE
33 ..... FIRESTONE TEST FACILITY
34 ..... SAND CREEK DISPOSAL ROAD LANDFILL
35 ..... BUILDING 1037 LAUNDRY WASTEWATER SUMP
36 ..... PISTOL RANGE
37 ..... PESTICIDE STORAGE BUILDING T-4452
38 ..... NACA TEST AREA
39 ..... LOAD LINE 5/FUZE LINE 1
40 ..... LOAD LINE 7/BOOSTER LINE 1
41 ..... LOAD LINE 8/BOOSTER LINE 2
42 ..... LOAD LINE 9/DETONATOR LINE
43 ..... LOAD LINE 10/PERCUSSION ELEMENT
44 ..... LOAD LINE 11/ARTILLERY PRIMER
45 ..... WET STORAGE AREA
47 ..... BUILDING T-5301 DECONTAMINATION
48 ..... ANCHOR TEST AREA
49 ..... CENTRAL BURN PITS
50 ..... ATLAS SCRAP YARD
51 ..... DUMP ALONG PARIS-WINDHAM ROAD
..... CERCLA
..... RCRA
..... OTHER REGULATORY
..... RAILROAD TRACKS
..... FENCE LINE
..... PROPERTY BOUNDARY
..... STREAM OR CREEK

US Army Corps of Engineers Louisville District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

RVAAP/RTLS
RAVENNA, OHIO

DRAWN BY:	REV. NO./DATE:	CAD FILE:
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APPENDIX B

ROUTE MAP TO PRE-NOTIFIED FACILITY

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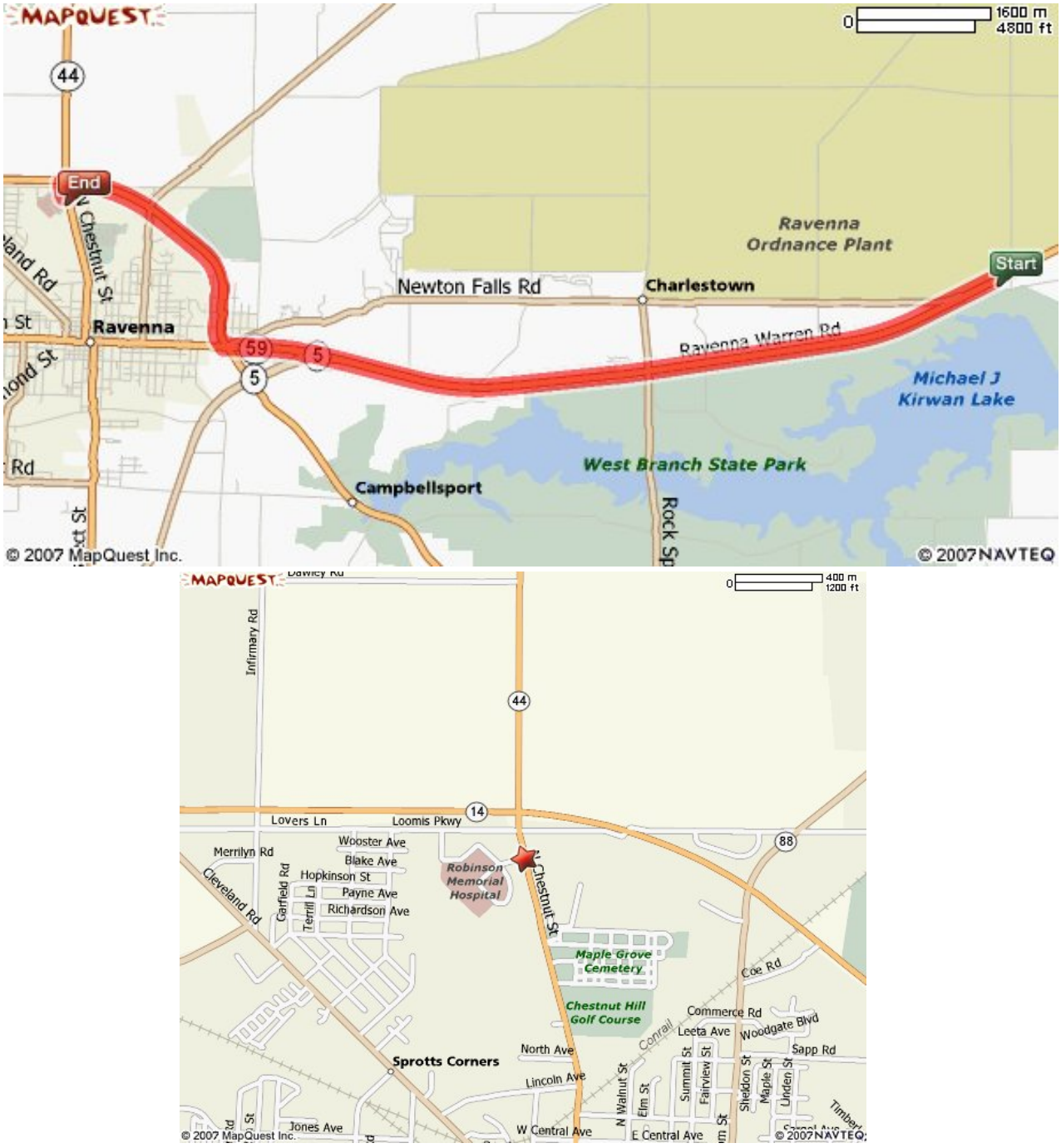

Figure B-1. Route Map to Pre-Notified Medical Facility

Robinson Memorial Hospital
6847 N. Chestnut Street
Ravenna, Ohio
(330) 297-0811

Directions: West on State Route 5. Stay straight onto OH-59 West. Turn Right onto OH-14/OH-44. Turn Left onto North Chestnut St.

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