Final
Sampling and Analysis Plan Addendum No.1
Supplemental Phase II Remedial Investigations
Open Demolition Area #2 (RVAAP-02), Fuze and Booster Quarry Landfill/Ponds (RVAAP-16), and Central Burn Pits (RVAAP-49)




Ravenna Army Ammunition Plant
Ravenna, Ohio

November 2005

US Army Corps of Engineers®
Louisville District

Contract No. GS-10F-0076J
Delivery Order No. W912QR-05-F-00

SAIC® From Science to Solutions™

Prepared for:
U.S. Army Corps of Engineers
Louisville, Kentucky

Prepared by:
Science Applications International Corporation
8866 Commons Boulevard, Suite 201
Twinsburg, Ohio 44087

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FINAL

Part I

Field Sampling Plan
Addendum No. 1
for the
Supplemental Remedial Investigations of
Open Demolition Area #2 (RVAAP-02)
Fuze and Booster Quarry Landfill/Ponds (RVAAP-16)
Central Burn Pits (RVAAP-49)
at the
Ravenna Army Ammunition Plant,
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ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
CBP	Central Burn Pits
CERCLA	Comprehensive Environmental Response, Compensation, and Liability
COC	chemical of concern
DOT	Department of Transportation
DQO	data quality objective
EBG	Erie Burning Grounds
EPA	Environmental Protection Agency
FBQ	Fuze and Booster Quarry Landfill/Ponds
FFS	Focused Feasibility Study
FSA	Field Staging Area
GSA	U.S. General Services Administration
IDW	Investigative Derived Waste
JMC	United States Army Joint Munitions Command
LL12	Load Line 12
MEC	Munitions and Explosives of Concern
ODA2	Open Demolition Area #2
OE	ordnance and explosives
Ohio EPA	Ohio Environmental Protection Agency
OVA	Organic Vapor Analyzer
PBC	Performance Based Contract
PCB	polychlorinated biphenyl
PMP	Project Management Plan
PPE	personal protective equipment
PRG	preliminary remediation goal
PWS	Performance Work Statement
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RGO	Remedial Goal Option
RI	Remedial Investigation
RQL	Ramsdell Quarry Landfill
RTLS	Ravenna Training and Logistics Site
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SVOC	semi-volatile organic compound
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventative Medicine
USCS	United Soil Classification System
VOC	volatile organic compound

1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

Science Applications International Corporation (SAIC) has been contracted by the United States Army Corps of Engineers (USACE) Louisville District to provide environmental services to achieve interim closure of six high priority areas of concern (AOCs) at the Ravenna Army Ammunition Plant (RVAAP) in Ravenna, Ohio:

- RVAAP-01 Ramsdell Quarry Landfill (RQL);
- RVAAP-02 Erie Burning Grounds (EBG);
- RVAAP-04 Open Demolition Area #2 (ODA2);
- RVAAP-12 Load Line 12 (LL12);
- RVAAP-16 Fuze and Booster Quarry Landfill/Ponds (FBQ); and
- RVAAP-49 Central Burn Pits (CBP).

This work is being performed under a firm fixed price basis in accordance with U.S. General Services Administration (GSA) Environmental Advisory Services Contract GS-10-F-0076J under a Performance Based Contract (PBC). The performance objectives to complete all necessary remedial actions for six high priority environmental AOCs by September 30, 2007 were specified in the Performance Work Statement (PWS) issued by the Army on February 10, 2005 (USACE 2005d). In addition, planning and performance of all elements of this PBC will be in accordance with the requirements of the Director's Findings and Orders dated June 10, 2004 (Ohio EPA 2004).

As part of this project, Supplemental Phase II Remedial Investigation (RI) soil sampling activities are to be performed at three locations: CBP, ODA2, and FBQ. This Phase II Sampling and Analysis Plan (SAP) Addendum presents the Supplemental Phase II RI sample locations to delineate areas identified during the Phase I/II RI and to support a feasibility study.

This SAP Addendum has been developed to tier under and supplement the *Facility Wide Sampling and Analysis Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2001b). The Facility Wide SAP provides the base documentation, technical procedures, and investigative protocols for conducting RIs under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at RVAAP, whereas this SAP Addendum includes the sampling and analysis objectives, rationale, planned activities, and criteria specific to the Supplemental Phase II RI soil sampling activities at CBP, FBQ, and ODA2. Consequently, the Supplemental Phase II RI soil sampling activities cannot be implemented without the guidance provided in both documents. Where appropriate, the SAP Addendum contains references to the Facility Wide SAP for standard procedures and protocols.

Both the Facility Wide SAP and this SAP Addendum have been developed following the USACE guidance document, *Requirements for the Preparation of Sampling and Analysis Plans, EM200-1-3, September 1994* (USACE 1994a), to collectively meet the requirements established by the Ohio Environmental Protection Agency (Ohio EPA), Northeast District, and the U.S. Environmental Protection Agency (EPA), Region V, for conducting CERCLA investigations.

1.2 HISTORY AND CONTAMINANTS

RVAAP is a 1,481-acre portion of the 21,419-acre Ravenna Training and Logistics Site (RTLS) of the Ohio Army National Guard (OHARNG). A total of 19,938 acres of the former 21,419-acre RVAAP was transferred to the United State Property and Fiscal Officer (USP&FO) for Ohio in 1996 and 1999 for use by the OHARNG as a military training site. The current RVAAP consists of 1,481 acres in several distinct parcels scattered throughout the confines of the Ohio Army National Guard (OHARNG) Ravenna Training and Logistics Site (RTLS). The RVAAP and RTLS are co-located on contiguous parcels of property and the RTLS perimeter fence encloses both installations. Since the Installation Restoration Program (IRP) encompasses past activities over the entire 21,419 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) U.S. Army facility. Currently, the installation is jointly operated by the U.S. Army Rock Island BRAC Field Office and the OHARNG.

The RVAAP is located within the confines of the RTLS which is in northeastern Ohio within Portage and Trumbull counties, approximately 4.8 kilometers (3 miles) east northeast of the town of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the town of Newton Falls. The RVAAP portions of the installation are solely located within Portage County. The installation consists of a 17.7-kilometer (11-mile) long, 5.6-kilometer (3.5-mile)-wide tract bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garrett, McCormick and Berry roads on the west; State Route 534 to the east, and the Norfolk Southern Railroad on the north (Figures 1-1 and 1-2). The installation is surrounded by several communities: Windham on the north, Garrettsville 9.6 kilometers (6 miles) to the northwest, Newton Falls 1.6 kilometers (1 mile) to the east, Charlestown to the southwest, and Wayland 4.8 kilometers (3 miles) southeast.

Operations at the facility date to 1940 and include the storage, handling, and packing of military ammunition and explosives. A detailed history of process operations and waste disposal processes for each AOC at RVAAP (Figure 1-2) is presented in the *Preliminary Assessment for the Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 1996b). The following sections are a summary of the history and related contaminants for CBP, FBQ, and ODA2.

1.2.1 FBQ History and Contaminants

FBQ was used as an explosive contaminated sawdust burning area for Load Lines 6 and 11 from 1945-1949. In 1976, settling ponds were constructed, separated by earthen dams, with flow control gates for spent brine regenerant and sand filtration backwash from the Water Works 3 treatment plant, which treated groundwater from facility production wells (1976-1993). Before 1987, 11 ponds/depressions excavated within a low drainage area west of the quarry were used for settling purposes. Several of these ponds appear on aerial photographs predating construction of the facility. Historical operational information indicated fuze and booster assemblies, projectiles, residual ash, and sanitary waste were burned in the quarry prior to pond construction. In 1976, the existing debris was removed from the quarry bottom and transferred to RQL or one of the other burning grounds. In 1998, this AOC was expanded to include the quarry vicinity, the 11 former settling ponds/depressions and drainage conveyance, and a debris pile north of the quarry.

1.2.2 ODA2 History and Contaminants

ODA2, which consists of approximately 25 acres, was used from 1948-1992 to detonate large caliber munitions and off-spec bulk explosives that could not be deactivated or demilitarized by any other means due to their condition. Past operations at this AOC may have included the burial of munitions and ordnance components. More recent burning and detonation activities related to facility operations

occurred until 1994 in a 2.5-acre area covered under a Resource Conservation and Recovery Act (RCRA) permit application. Since 1994, this area has been used for a small number of non-routine and emergency detonations. Munitions and Explosives of Concern (MEC) clearance to a depth of 4 ft (excavating and sifting) was performed in the RCRA permitted area from 1999-2000. MEC and MEC scrap is ubiquitous within the AOC, along portions of the Sand Creek embankment (which bisects the AOC), and as kickout fragments in adjacent areas. "Rocket Ridge" and adjacent riparian areas of Sand Creek have not been cleared of MEC. "Rocket Ridge" is not included in the current scope of this PBC.

1.2.3 Central Burn Pits History and Contaminants

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 debris piles and berms located in the central portion of the site and near the western edge of the AOC.

1.3 SUMMARY OF EXISTING DATA

1.3.1 FBQ Landfill/Ponds

Phase I/Phase II field activities were conducted in October, November, and December 2003, and July 2004 at FBQ. These activities and subsequent findings and data are presented in the *Fuze and Booster Quarry Landfill/Pond Phase I & II Remedial Investigation Report* (USACE 2005a).

Inorganics, explosive/propellant compounds, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and pesticides were detected in some or all of the soil samples collected during the Phase I/Phase II RIs. All detections except antimony, arsenic, manganese, iron, and lead were below EPA Region IX Preliminary Remediation Goals (PRGs) (residential). Antimony, lead, and manganese only exceeded the Region IX PRG (residential) once.

Explosives/propellants, perchlorate and SVOCs were detected in surface water at FBQ. Perchlorate was detected in surface water samples collected in 2003; however, perchlorate was not detected at these same sample locations in 2004. No pesticides or polychlorinated biphenyls (PCBs) were detected in the surface water. Explosives/propellants were detected in five of the six monitoring wells. SVOCs, inorganics (copper, lead, cobalt, manganese, aluminum, nickel, silver, and cadmium) also were detected in groundwater. No pesticides or PCBs were detected in either surface water or groundwater.

1.3.2 ODA2

As stated in the Phase II Remedial Investigation Report (USACE 2005b), previous investigations of the 2.5-acre RCRA unit within ODA2 included surface and subsurface soil, surface water, sediment, surface runoff, and aquatic organism sampling. Six investigations conducted prior to the Supplemental Phase II RI at ODA2 included:

- Hazardous Waste Management Study No. 37-26-0442-84 (USAEHA 1984), Geohydrologic Study No. 38-26-KF95-92 (USAEHA 1992);
- Preliminary Assessment for the Ravenna Army Ammunition Plant (USACE 1996);
- Phase I Remedial Investigation of High Priority Areas of Concern at the Ravenna Army Ammunition Plant (USACE 1998);

- RCRA Closure Field Investigation Report for the Deactivation Furnace Area, Open Detonation Area, Building 1601, and Pesticides Building, Ravenna Army Ammunition Plant, Ravenna, Ohio (USACE 1998); and

- Report of Analytical Results Open Demolition Area #2 CERCLA Sites (USIOC 2000).

The Supplemental Phase II Remedial Investigation confirmed findings in the previous studies. Contamination of surface and subsurface soil by explosive compounds and inorganic analytes was identified.

1.3.3 CBP

A Phase I RI field investigation for CBP was conducted in 2001. The field investigation consisted of sampling shallow soils, subsurface soils, surface water, groundwater, and sediment. Data collected were used to support the development of the *Central Burn Pits Remedial Investigation RI* (USACE 2005c).

In surface soil samples, minimal amount of samples had detections of PCBs, explosives, propellants and pesticides. Inorganics were detected at the site with arsenic, manganese, and iron exceeding background and USEPA Region IX PRGs (residential) values. In sediment, inorganics, two VOCs, and SVOCs were detected at concentrations above background and/or PRG values. Calcium, magnesium, and arsenic were detected above background and/or PRG values. Only inorganics and acetone were detected in groundwater.

1.4 SPECIFIC SAMPLING AND ANALYSIS PROBLEMS

Ordnance and explosives (OE) is present at FBQ and ODA2. OE avoidance will be performed prior to and during the sampling effort at all three sites (see Appendix A).

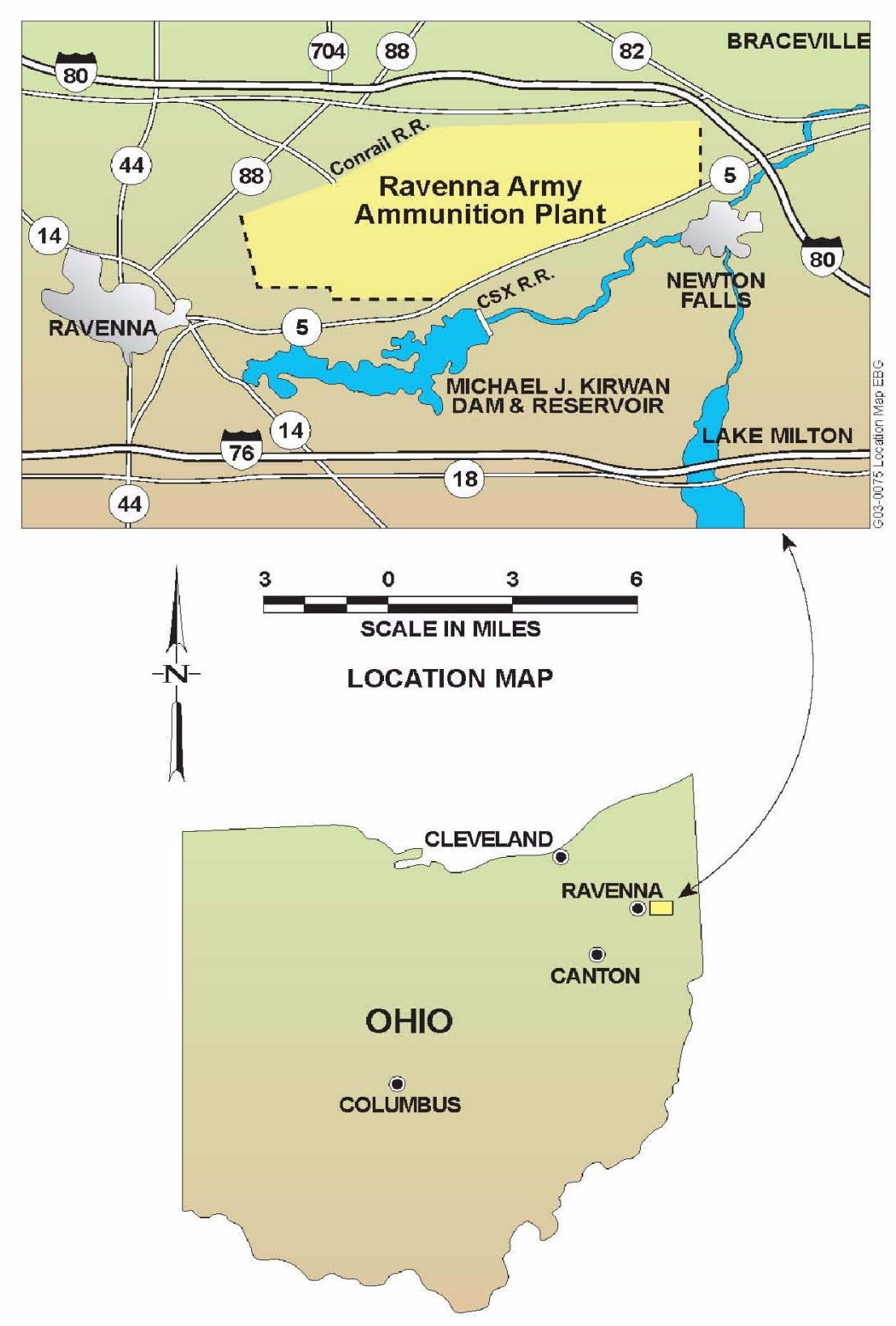

Figure 1-1. General Location and Orientation of RTLS/RVAAP

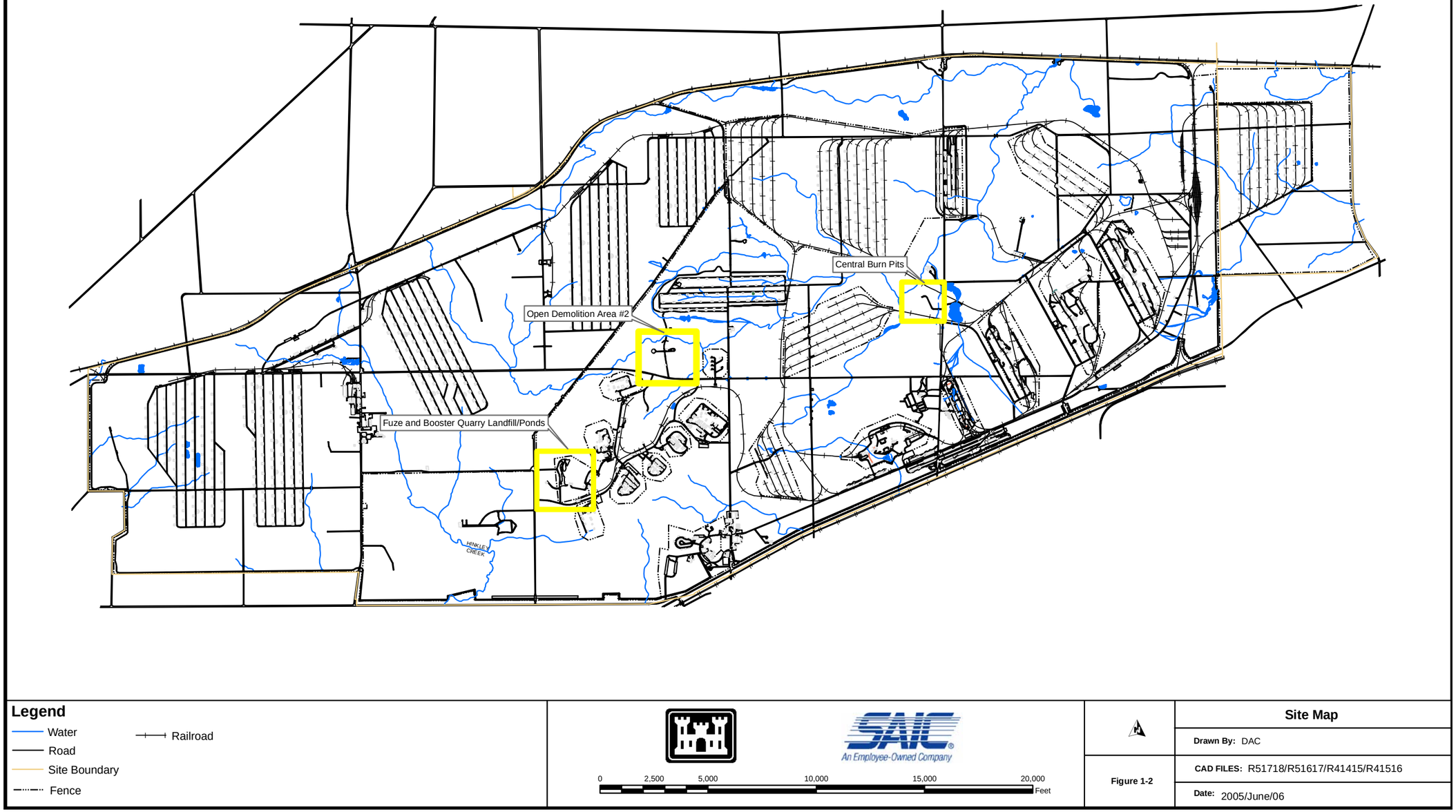

Figure 1-2. RTLS/RVAAP Site Map

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The overall project organization and responsibilities for the PBC for Six High Priority Environmental AOCs at RVAAP are presented in the Project Management Plan (PMP) (SAIC 2005). Key personnel and subcontractors implementing this SAP Addendum are listed in Table 2-1. The functional responsibilities of these key personnel are described in Section 2.0 of the Facility Wide SAP.

Table 2-1. Project Organization for the Supplemental Phase II Remedial Investigations

Position	Personnel
SAIC Project Manager	Laura Obloy, PE
SAIC Safety & Health Officer	Steve Davis, CIH, CSP
SAIC QA/QC Officer	Glen Cowart
SAIC CQC Field Operations Manager	Martha Clough
SAIC CQC Field Representative	Martha Clough
SAIC Site Safety & Health Officer	Martha Clough
SAIC Field Task Leader	Kelly Milner
SAIC Sample Manager	Kelly Milner
SAIC Samplers	Jennifer Loerch Jed Thomas
SAIC Laboratory Coordinator	Nile Luedtke
Analytical Laboratory Services	TBD
OE Avoidance/Survey Services	USA Environmental Manok Synakorn
Waste Disposal Services	TBD

3.0 SCOPE AND OBJECTIVES

3.1 SUPPLEMENTAL PHASE II REMEDIAL INVESTIGATION SCOPE AND OBJECTIVES

The primary objectives of the Supplemental Phase II RI of CBP, FBQ, and ODA2 are:

1. To conduct surface and subsurface soil sampling to define nature and extent of contamination at each site and finalize the RI.

2. To conduct surface and subsurface soil sampling to delineate potential source areas identified during the Phase I RI at CBP.

3. To collect data to support the Feasibility Study.

Investigation-specific objectives have been developed using the data quality objective (DQO) approach presented in the Facility Wide SAP. Sampling objectives are presented in Section 4.0 of this SAP Addendum.

3.2 SUPPLEMENTAL PHASE II REMEDIAL INVESTIGATION DQO

The project DQO is to provide sufficient high-quality data to address the primary project objectives identified in Section 3.1.

3.2.1 Defining Nature and Extent

Previous Phase I and/or Phase II sampling activities were performed to provide an understanding of the nature and extent of contamination at CBP, FBQ, and ODA2. These previous sampling activities did not completely define the nature and extent of contamination; therefore, additional sampling will be performed to delineate the nature and extent of contamination at these three sites. Section 4 details the numbers, types, and locations of samples to be collected to accomplish this objective.

3.2.1.1 Nature and Extent at FBQ

The objective of this Supplemental Phase II sampling at FBQ is to define the nature and extent of explosive and inorganic compounds detected during the previous Phase I/Phase II RI in the upper northeast corner and southern portion of FBQ. The detections of explosives that have not been bounded reside in the upper northeast corner or southern end of FBQ. In addition, one location exceeds background for manganese (1,450 mg/kg) that is only partially bounded, for which an additional sample will be collected to define the extent in that area.

The objective of this Supplemental Phase II sampling at FBQ is to define the nature and extent of explosive and inorganic compounds detected during the previous Phase I/Phase II RI in the upper northeast corner and southern portion of FBQ. The detections of explosives that have not been bounded reside in the upper northeast corner or southern end of FBQ. Two locations exceed background manganese (1,450 mg/kg). One of the locations is not bounded, for which an additional sample will be collected to define the extent in that area.

Arsenic and iron were detected above Region IX PRGs (residential) in samples along the perimeter. Detected concentrations of arsenic at FBQ are similar to naturally occurring concentrations of arsenic. The average concentration of arsenic (11.2 mg/kg) is below background (15.4 mg/kg) at FBQ. The

maximum detections of iron occur in samples -044 and -045 located in the piles and are bounded. Additional samples will not be collected to define the extent of these inorganics.

3.2.1.2 Nature and Extent at ODA2

The objective of this Supplemental Phase II sampling at ODA2 is to define the nature and extent of explosive compounds detected at ODA2. Explosives detected in the northwestern portion of the site require delineation. Sample locations will be placed where explosives have been detected and have not been bounded.

Inorganics detected at ODA2 were compared to Region IX PRGs (residential). Only aluminum, iron, arsenic, and manganese exceeded these PRGs. Detected concentrations of aluminum, iron, arsenic, and manganese at ODA2 are similar to naturally occurring concentrations. Average results for aluminum, arsenic, and manganese are at or below background (Table 3-1). No further samples will be collected to delineate the extent of these four inorganics.

Table 3-1. ODA2 Surface Soil Summary Statistics

Analyte	Units	Frequency of Detection	Minimum Detect	Average Result	Maximum Detect	Site Background Criteria
Aluminum	mg/kg	63/ 63	4,020	11,100	23,400	17,700
Arsenic	mg/kg	63/ 63	3.5	13.1	19.9	15.4
Iron	mg/kg	63/ 63	10,200	23,900	39,300	23,100
Manganese	mg/kg	63/ 63	115	518	2,140	1,450E

3.2.1.3 Nature and Extent at CBP

Arsenic, manganese, iron, lead, and chromium were detected above background and their respective Region IX PRGs (residential) at CBP. However, the average concentrations of all but lead were below background (Table 3-2). The exceedances of lead, manganese, and chromium are bounded. The Central Burn Pit RI established manganese, chromium, and arsenic as chemicals of concern as well as preliminary Remedial Goal Options (RGOs) for these constituents. Detections exceeding these RGOs are proximate to areas associated with previous burn activities. Soil samples will be collected to delineate the extent of these three COCs. In addition, hexavalent chromium samples will be collected from previously sampled locations to speciate chromium at CBP. Previous locations selected include the highest detection of chromium (SS-004) in an area associated with burn activities, the third highest detection of chromium (SS-018) in an area associated with burn activities, and a location on the boundary of the limit of assessment where chromium was not detected above background (SS-033).

Piles and berms identified at CBP were not characterized during the RI. To determine if these berms/piles have been impacted by previous burning activities, multi-increment sample will be collected from each of the piles/berms. Multi-increment samples collected from the piles/berms at Central Burn Pits will be used to evaluate disposition options/requirements for the FS.

Table 3-2. Central Burn Pits Surface Soil Summary Statistics

Analyte	Units	Frequency of Detection	Minimum Detect	Average Result	Maximum Detect	Site Background Criteria
Arsenic	mg/kg	42/ 43	1.7	11.7	32.8	15.4
Chromium	mg/kg	43/ 43	4.4	15.7	48.8	17.4
Iron	mg/kg	43/ 43	1420	22021	107000	23100
Lead	mg/kg	43/ 43	3.8	59.3	493	26.1
Manganese	mg/kg	43/ 43	107	1084	6150	1450

3.2.2 Remedial Action Objectives

See Section 3.2.3 of the Facility Wide SAP.

3.2.3 Identify Decisions

See Section 3.2.4 of the Facility Wide SAP.

3.2.4 Identify Decision Rules

See Section 3.2.6 of the Facility Wide SAP.

3.2.5 Identify Inputs to the Decision

See Section 3.2.7 of the Facility Wide SAP.

3.2.6 Specify Limits on Decision Error

See Section 3.2.8 of the Facility Wide SAP.

3.2.7 Sample Design

The sample design for the Supplemental Phase II RI of CBP, FBQ, and ODA2 are described in detail in Section 4.0 of this SAP Addendum. The sampling design will attempt to define the extent of contamination identified during Phase I and Phase II, and shall aim at providing sufficient information to address the primary objectives detailed in Section 3.1.

4.0 FIELD ACTIVITIES

4.1 SURFACE AND SUBSURFACE SOILS

4.1.1 Rationale

Surface soil samples from 0.0 to 0.3 m (0 to 1 ft) and subsurface soil samples from 0.3 to 0.9 m (1 to 3 ft) will be collected during the Supplemental Phase II RI to (1) define contaminant nature and extent of surface soil contamination; and (2) refine volume calculation in the feasibility study. A total of 17 discrete surface and subsurface soil locations, three discrete samples for hexavalent chromium at previous sample locations at CBP, and 12 multi-increment locations have been established for this supplemental Phase II investigation.

Discrete samples for explosives analysis will be collected at each sample location in a triangular pattern as detailed in the Facility Wide SAP. The preference will be to homogenize discrete samples using the MI processing technique (i.e., sieving, drying, and grinding) as performed by MKM during implementation of the 14 AOC sample activities (Section 4.1.2.2). If MKM is not available to assist with homogenization techniques, discrete samples will be collected and homogenized in accordance with the Facility Wide SAP.

Soil sample analytical suites are provided in Section 5.0.

4.1.1.1 FBQ Surface and Subsurface Soil Sample Locations

Six discrete surface and subsurface soil samples will be collected at FBQ (Figure 4-1). The final sample locations will be marked in the field based on site conditions, access considerations, visual survey of the area, and OE considerations. The six discrete surface and subsurface soil locations are as follows:

- Three surface and subsurface soil samples will be collected along the northeastern edge of FBQ. These samples will encompass the explosive detections at Supplemental Phase II sample locations FBQ-032 and FBQ-048, as well as the manganese detection that exceeded the background value of 1,450 mg/kg at location FBQ-051.

- One surface and subsurface soil sample will be collected south of FBQ-002. This location will attempt to bound FBQ-002, which also had a manganese concentration in excess of background (1,450 mg/kg).

- Two surface and subsurface soil samples will be collected at the southern end of FBQ to attempt to bound sample locations FBQ-003, FBQ-005, and FBQ-060. Explosives were detected at these locations in previous Supplemental Phase II RI sampling activities.

In addition, a field survey will be conducted of piles at FBQ to collect location and approximate dimension data.

4.1.1.2 ODA2 Surface and Subsurface Soil Sample Locations

Six discrete surface and subsurface soil samples will be collected at ODA2 (Figure 4-2). The final sample locations will be marked in the field based on site conditions, access considerations, visual survey of the area, and OE considerations. The six discrete surface and subsurface soil locations are as follows:

- Three surface and subsurface soil samples will be collected along the northwestern limit of ODA2. These samples will encompass and attempt to define the explosives detections at Phase II sample locations DA2-114, DA2-035, DA2-037, and DA2-040.

- One surface and subsurface soil sample location will be located southwest of location DA2-MW111.

- One surface and subsurface soil sample location will be located northeast of location DA2-MW108.

- One surface and subsurface soil sample location will be located northeast of location DA2-093 to attempt to define explosives detections from DA2-093.

4.1.1.3 CBP Surface and Subsurface Soil Sample Locations

Five discrete surface and subsurface soil sample locations will be collected from the established CBP AOC. The proposed locations are shown in Figure 4-3. The final sample locations will be marked in the field based on site conditions, access considerations, visual survey of the area, and OE considerations. The five discrete surface and subsurface soil locations are as follows:

- Two discrete surface and subsurface soil sample locations will be collected to attempt to define the manganese concentration which exceeded background at location SS-026. One of the locations will be directly west of SS-026, and one will be slightly southwest of the previous sample location.

- The other three discrete surface and subsurface soil sample locations will attempt to define the cluster of preliminary RGO exceedances at the eastern portion of the site. This cluster extends from sample location SS-004 to SS-021. This cluster of samples is bounded except to the northeast. The three sample locations will attempt to define this area.

Multi-increment samples will be collected from the piles and berms at Central Burn Pits not previously sampled during the RI. Multi-increment samples collected from the piles/berms at Central Burn Pits will be used to evaluate disposition options/requirements for the FS. One MI sample (up to 12) will be collected for each pile/berm identified (Figure 4-3). Seven piles and five berms were identified during a site walkover at CBP. The piles and berms and aggregation for sampling will be agreed to during field mobilization.

Three discrete samples will be collected to speciate hexavalent chromium at CBP. These locations include CBPSS-004, CBPSS-018, and SS-033 (Figure 4-3).

4.1.1.4 Soil Sampling Requirements

Discrete Soil Samples

Discrete surface soil samples [from 0 to 0.3 m (0 to 1 ft)] will be collected using a stainless steel hand auger in accordance with Section 4.5.2.1.1 of the Facility-wide SAP. For explosives analysis, surface soils will be collected from three subsamples located approximately 3 ft from one another in a roughly equilateral triangle pattern and homogenized to obtain a representative sample. Equal portions of soil from the three soil subsamples will be placed into a decontaminated, stainless steel bowl and mixed thoroughly with a decontaminated, stainless steel spoon before placement into appropriate sample containers. Surface soil samples for analyses other than explosives will be collected from a point in the approximate center of the triangle from which the explosives and propellant samples noted above were collected. The soil collected from the center of the triangle will be placed into a decontaminated, stainless

steel bowl, mixed thoroughly with a decontaminated stainless steel spoon, and placed into appropriate sample containers in accordance with Section 4.5.2.1 of the Facility Wide SAP.

Note, if MKM homogenization techniques are employed (Section 4.1.2.2), samples for inorganic and explosives analysis will be collected from the 3 points of the roughly equilateral triangle. Otherwise, samples will be collected in accordance with Section 4.5.2.1 of the Facility-wide SAP.

Subsurface samples are planned at each discrete sample location from 0.3 to 0.9m (1 to 3 ft) or until auger refusal. Soil borings for the collection of subsurface samples will be located at the center point of the equilateral triangle created during surface soil composite sampling for explosives analyses.

Surface and subsurface samples will be collected following the protocols in Section 4.5.2.5 of the Facility Wide SAP. Homogenization techniques will be employed to reduce particle size and facilitate mixing of the sample as described in Section 4.1.2.2.

Multi-increment Samples

Surface soil samples under this classification will be collected using multi-increment techniques. Multi-increment samples are composite samples collected from multiple stratified random points within each of the designated multi-increment sampling areas. The sample aliquots comprising the sample are collected at random. For soils, approximately equal sample aliquots are collected using a small-diameter push tube or hand auger. 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. For an approximately 0.5-acre area (exposure unit), no less than 30 aliquots will be collected to provide the requisite statistical confidence (95%).

The entire volume of all aliquots is composited into a single sample, dried, sieved, and ground finely for specified non-volatile constituent analyses. Homogenization techniques presented in Section 4.1.2.2 will be followed. The MKM procedure will be implemented by MKM to ensure consistency with homogenization techniques at RVAAP. If MKM is not available to assist with the homogenization procedure implementation, Sample grinding and analyses will be conducted at the fixed-base laboratory. Volatile organic analyses are not conducted on samples collected using this technique.

4.1.1.5 Sample Collection for Field and Laboratory Analysis

Field screening of surface soil for organic vapors will be performed using a PID, per Section 4.3.2.3; samples for headspace analyses will not be performed. Geotechnical logging, including estimates of United Soil Classification System (USCS) classification, will be performed at the time of sampling.

Sample aliquots for laboratory analyses will be collected as discussed in Section 4.3.1.3.

4.1.1.6 Field QC sampling procedures

Soil quality assurance (QA)/quality control (QC) samples will be collected during the Supplemental Phase II RI. Duplicate and split soil samples will be collected at a frequency of 10% (1 per 10 environmental samples) for each matrix (soil). Matrix spike/matrix spike duplicate samples will be collected at a rate of 10% of total samples per media. Split samples will be submitted to the USACE contract laboratory for independent analysis, as noted in Section 4.2.1.5. Duplicate and split samples will be derived from the same sampling station, selected on a random basis, and submitted for the same analyses as the environmental samples. One rinsate blank will be collected for surface soil equipment per

field cycle. Sections 5.0 and the Quality Assurance Project Plan (QAPP) addendum (Section 8.0) summarize QA/QC sampling requirements.

4.1.2 Sampling Procedures

4.1.2.1 Sampling methods for soil

Soil sampling collection methods will follow the methods presented in Section 4.5.2.1.1 of the Facility Wide SAP; however, once the sample is collected, the preference will be to use homogenization techniques presented in Section 4.1.2.2. This will include sieving, grinding, and subsampling. The MKM procedure will be implemented by MKM to ensure consistency with homogenization techniques at RVAAP. If MKM is not available to assist with the homogenization procedure implementation, discrete samples will be homogenized using the protocol established in Section 4.5.2.1.1 of the Facility-wide SAP.

Bucket Hand-Auger Method

Surface and subsurface soil samples will be collected with a bucket hand auger in accordance with Section 4.5.2.1.1 of the Facility Wide SAP.

Trowel/Scoop Method

A stainless steel trowel or scoop may be used, as presented in Section 4.5.2.1.2 of the Facility Wide SAP, to collect surface soil samples in soft, loose soil, if feasible. The protocol for compositing, homogenization, and discrete VOC sample collection will follow that described in Section 4.5.2.1.1 for bucket hand augers.

Multi-increment Sampling

Multi-increment samples collected from the piles/berms at Central Burn Pits will be used to evaluate disposition options/requirements for the FS. One MI sample will be collected from each pile/berm. The multi-increment sample area is defined as an individual pile or berm (Figure 4-3). Piles and berms to be sampled will be confirmed with USACE and Ohio EPA during field mobilization. Up to 12 multi-increment samples will be collected and analyzed for inorganics and explosives.

Once the piles and berms to be sampled have been confirmed in the field, each pile/berm will have 30 sub-samples collected. These sub-samples will be selected on a stratified-random basis. The stratification assures coverage over the entire sample area and the randomness provides repeatability and accuracy. The sub-sample locations will be located by a "drunken-sailor" approach wherein the sample personnel will wander over the entire sample area throwing out sampling location stakes randomly as they walk over the entire area. In addition, the sub-samples will be collected at random depths down to land surface to provide representativeness of the pile interior. Sub-samples of approximate equal aliquot volumes will be collected from the surface and subsurface of each berm/pile. Subsurface aliquots will be collected after first augering (either using a hand auger or powered hand auger) to random depths, then using the step probe or auger to collect an approximate equal aliquot. The entire sub-sample aliquot collected from each sample area will be placed in a container, such as a large baggie or bowl for transport back to the sample processing location.

4.1.2.2 Sample Homogenization

More sample material will be collected in the field than will be tested in the laboratory; therefore field sample processing will be completed prior to shipment of a sample to the laboratory. The samples will be processed using the procedure implemented by MKM Engineers during the 14 Sites AOC field effort. The procedure is briefly summarized below.

The combined sub-samples collected in the field will be brought back to Building 1036 and logged for processing to ensure chain-of-custody is maintained. The soil will be spread and allowed to air-dry overnight. The air-dried soil will be prepared for sieving by crushing and removing rocks and organic material. The soil will then be sieved using a #10 and #4 stainless steel sieve. Any materials not passing through the sieve will be considered IDW. The remaining air-dried, sieved material will then be ground to better homogenize the sample. Grinding will be accomplished using a MC200 Miracle Mill or Hamilton Beach Custom Grind coffee grinder. The ground soil will be incrementally placed into sample jars to be sent to the laboratory.

The MKM procedure will be implemented by MKM to ensure consistency with homogenization techniques at RVAAP. As noted above, if MKM is not available to assist with the homogenization procedure implementation, discrete samples will be homogenized using the protocol established in Section 4.5.2.1.1 of the Facility-wide SAP.

4.1.2.3 Field Measurement Procedures and Criteria

All field measurement procedures and criteria will follow Section 4.4.2.3 of the Facility Wide SAP, with the following exception. Headspace sampling of individual soil samples will not be performed. Because there were no previous notable detections of VOCs, organic vapor monitoring of headspace gases is not necessary. Organic vapor analyzer (OVA) readings will be taken in the breathing zone and will be noted in the field boring logs.

4.1.2.4 Sampling for chemical analysis

Procedures for sampling surface soil for chemical analyses are presented in Section 4.5.2.1 of the Facility Wide SAP. As indicated in Section 5.0, all surface and subsurface soil samples (discrete and multi-increment) will be analyzed for Target Analyte List (TAL) metals and explosives. In addition, three Phase I surface soil samples and multi-increment samples collected at CBP will be analyzed for hexavalent chromium.

The maximum number of samples to be analyzed for each parameter group is provided in Table 4.1. Requirements for sample containers and preservation techniques for surface soil samples are presented in Section 4.4.2.6 of the Facility Wide SAP and in the QAPP addendum for CBP, FBQ, and ODA2 (Part II).

4.1.2.5 Decontamination procedures

The decontamination procedure for surface soil sampling activities is presented in Section 4.4.2.8 of the Facility Wide SAP. A final decontamination inspection of any equipment leaving RVAAP at the end of field activities will be conducted to ensure proper decontamination.

4.1.2.6 Sample container/preservation techniques

Sample container and preservation technique requirements will follow those prescribed in Table 4-1 in the QAPP Addendum.

4.1.3 OE Avoidance

The protocol for OE avoidance for sampling activities is discussed in Section 4.2.3 and detailed in the OE Avoidance Plan (Appendix A). In addition to the protocol in Section 4.2.3, OE technicians will collect soil samples in areas known or suspected (i.e., red soil or raw product) to have explosives concentrations greater than 10% by weight (100,000 mg/kg).

4.2 SITE SURVEY

Following sampling, the horizontal coordinates of all sampling stations will be determined to within 0.3 m (1 ft). The surface elevations of soil sampling stations will be determined at the point of collection. For multi-increment samples, the corners of the area will be surveyed and the elevation will be determined in the approximate center of the sample area. All locations will be conveyed in Ohio State Plane Coordinates (NAD83). The vertical datum for all elevations will be 1929 National Geodetic Vertical Datum. All coordinates and elevations will be recorded on the boring logs upon receipt of quality assured survey results. In addition, electronic results will be provided to USACE and RVAAP in ASCII format.

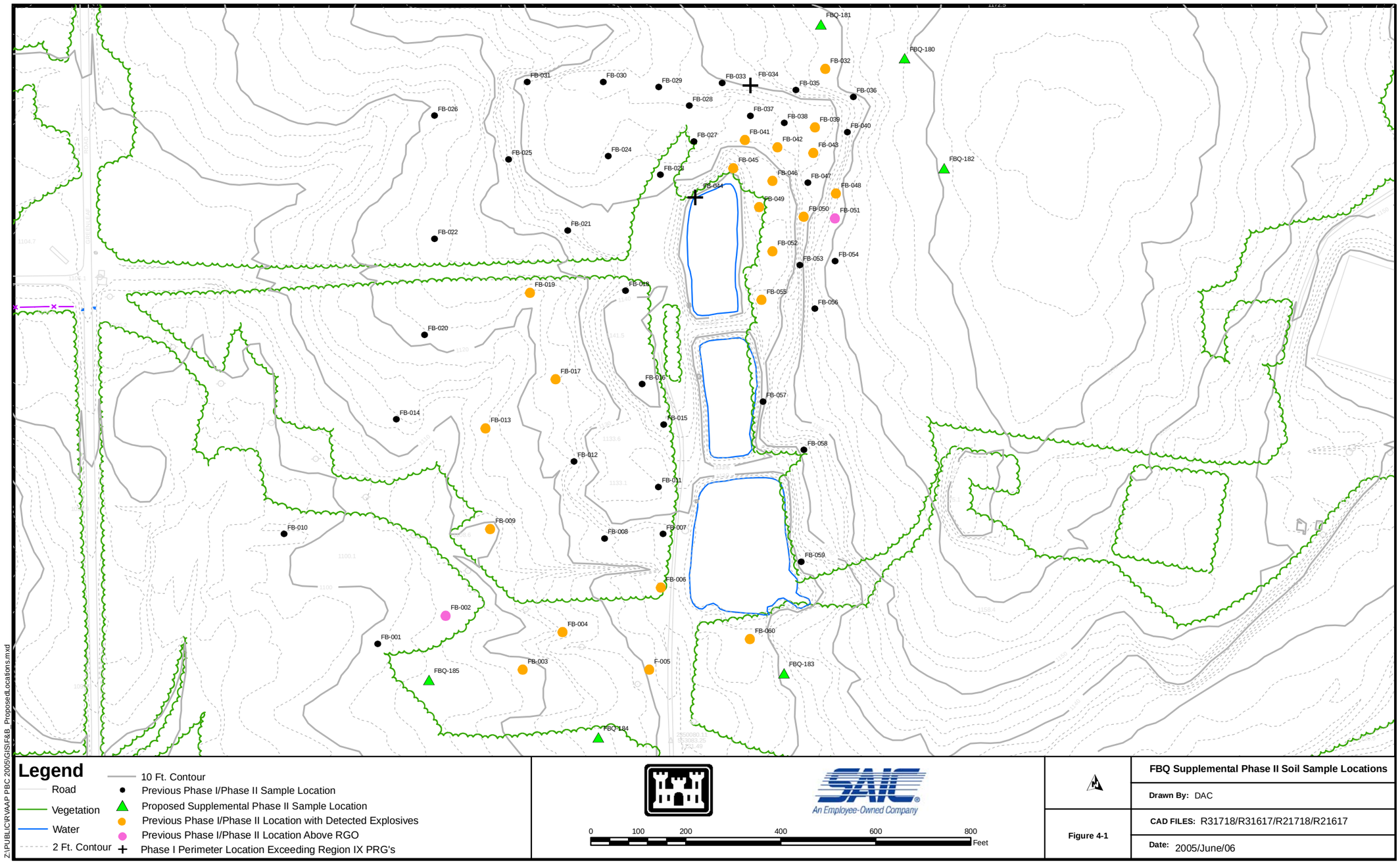

Figure 4-1. Proposed Soil Sampling Locations at FBQ

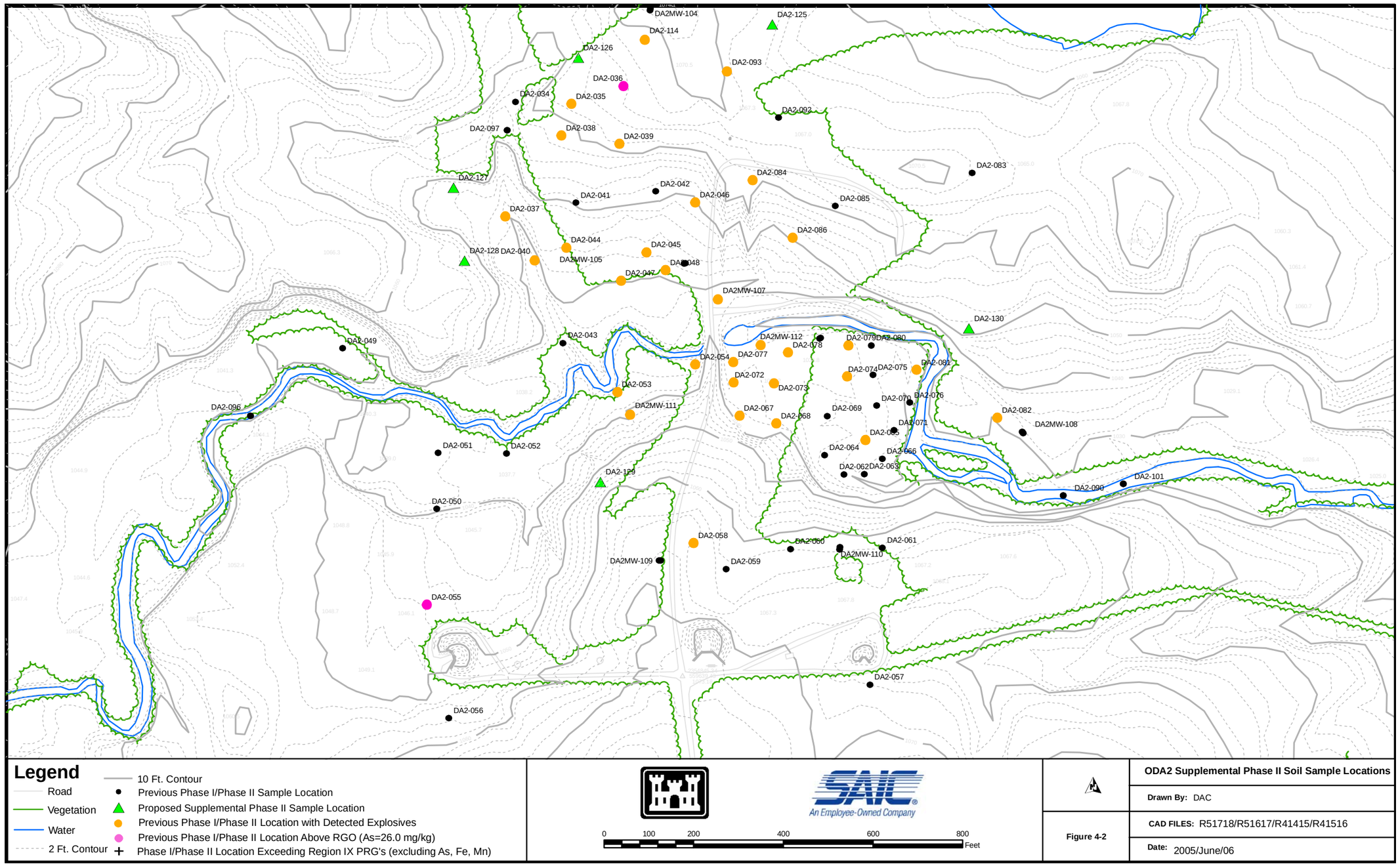

Figure 4-2. Proposed Soil Sampling Locations at ODA2

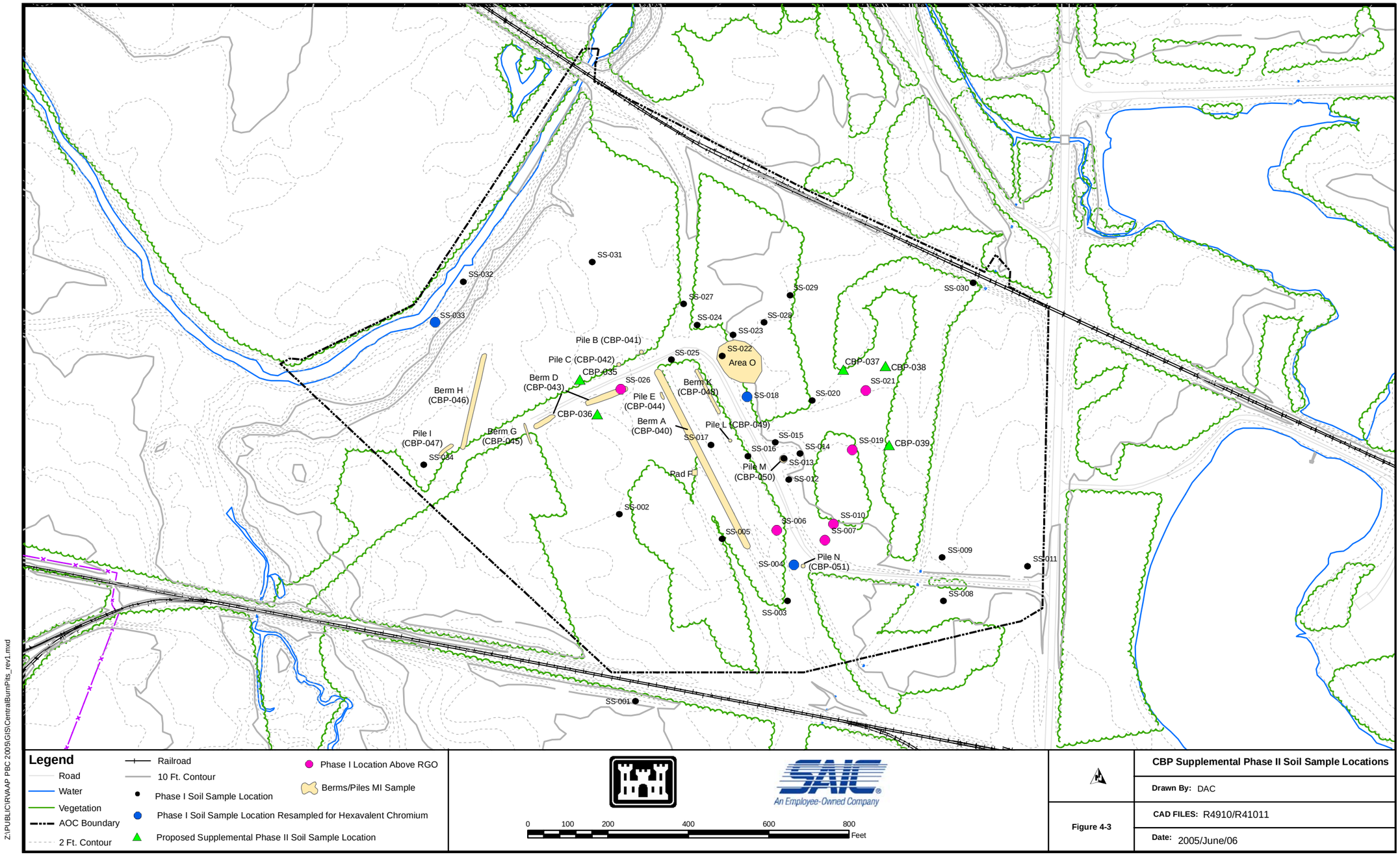

Figure 4-3. Proposed Soil Sampling Locations at CBP

5.0 SAMPLE CHAIN OF CUSTODY/DOCUMENTATION

5.1 FIELD LOGBOOK

All field logbook information will follow structures identified in Section 5.1 of the Facility Wide SAP.

5.2 PHOTOGRAPHS

Information regarding the documentation of photographs for the Supplemental Phase II RI is presented in Section 4.3.2.4.3 of the Facility Wide SAP. Representative photographs will be taken of the investigative measures during the Supplemental Phase II RI and any significant observations that are made during the field effort. Photographs will be suitable for presentation in a public forum, as well as for documenting scientific information.

5.3 SAMPLE NUMBERING SYSTEM

The sample numbering system that will be used to identify samples collected is explained in Section 5.3 of the Facility Wide SAP. The specific identifying information that will be used to implement this system is presented in Figure 5-1. Samples have already been collected at CBP, FBQ, and ODA2 under their respective RIs; therefore, sample numbering will continue the sequence established in the previous investigation. Table 5-1 presents the baseline sample identification listing for the Supplemental Phase II RI. Samples collected in addition to the baseline set will be identified sequentially by following the numbering system. If a sample in the baseline set is not collected or is reassigned to another location, a specific reason and notation will be given in the project field books.

5.4 SAMPLE DOCUMENTATION

All sample label, logbook, field record, and field form information will follow structures identified in Section 5.4 of the Facility Wide SAP.

5.5 DOCUMENTATION PROCEDURES

Documentation and tracking of samples and field information will follow the series of steps identified in Section 5.5 of the Facility Wide SAP. If MKM Engineers are utilized to homogenize samples, strict chain of custody will be adhered to including signature documentation of sample transfer between companies (MKM and SAIC) and control of Building 1036.

5.6 CORRECTIONS TO DOCUMENTATION

Any corrections to documentation will follow guidance established in Section 5.6 of the Facility Wide SAP.

5.7 MONTHLY REPORTS

A summary of field activities during implementation of the Supplemental Phase II RI field investigation will be included in monthly reports in accordance with the PMP (SAIC, 2005).

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

CBP, FBQ, or DA2 = 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
c = Stream or Drainage Channel Sample
p = Pond Sample
b = Railroad Ballast Sample
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

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

Figure 5-1. Supplemental Phase II RI Sample Identification System

Table 5-1. Baseline Sample Identification for the Supplemental Phase II RI[a]

Facility/Area	Depth (ft)	Station	Sample ID	Explosives	Hexavalent Chromium	TAL Metals
Central Burn Pits	0 to 1	CBP-035	CBPss-035-0100-SO	1		1
Discrete Soil Locations (5)	1 to 3		CBPso-035-0101-SO	1		1
	0 to 1	CBP-036	CBPss-036-0102-SO	1		1
	1 to 3		CBPso-036-0103-SO	1		1
	0 to 1	CBP-037	CBPss-037-0104-SO	1		1
	1 to 3		CBPso-037-0105-SO	1		1
	0 to 1	CBP-038	CBPss-038-0106-SO	1		1
	1 to 3		CBPso-038-0107-SO	1		1
	0 to 1	CBP-039	CBPss-039-0108-SO	1		1
	1 to 3		CBPso-039-0109-SO	1		1
Central Burn Pits	0 to 1	CBP-004	CBPss-039-0122-SO		1	
Discrete Surface Soil Locations at previous locations	0 to 1	CBP-018	CBPss-039-0123-SO		1	
for Chromium Speciation (3)	0 to 1	CBP-033	CBPss-039-0124-SO		1	
Central Burn Pits	0 to land surface	CBP-040	CBPss-040-0110M-SO	1	1	1
Multi-increment Surface Soil Locations (up to 12)	0 to land surface	CBP-041	CBPss-041-0111M-SO	1	1	1
	0 to land surface	CBP-042	CBPss-042-0112M-SO	1	1	1
	0 to land surface	CBP-043	CBPss-043-0113M-SO	1	1	1
	0 to land surface	CBP-044	CBPss-044-0114M-SO	1	1	1
	0 to land surface	CBP-045	CBPss-045-0115M-SO	1	1	1
	0 to land surface	CBP-046	CBPss-046-0116M-SO	1	1	1
	0 to land surface	CBP-047	CBPss-047-0117M-SO	1	1	1
	0 to land surface	CBP-048	CBPss-048-0118M-SO	1	1	1
	0 to land surface	CBP-049	CBPss-049-0119M-SO	1	1	1
	0 to land surface	CBP-050	CBPss-050-0120M-SO	1	1	1
	0 to land surface	CBP-051	CBPss-051-0121M-SO	1	1	1
Fuze and Booster Quarry Landfill/Ponds	0 to 1	FBQ-180	FBQss-180-0500-SO	1		1
Discrete Soil Locations (6)	1 to 3		FBQso-180-0501-SO	1		1
	0 to 1	FBQ-181	FBQss-181-0502-SO	1		1
	1 to 3		FBQso-181-0503-SO	1		1
	0 to 1	FBQ-182	FBQss-182-0504-SO	1		1
	1 to 3		FBQso-182-0505-SO	1		1
	0 to 1	FBQ-183	FBQss-183-0506-SO	1		1
	1 to 3		FBQso-183-0507-SO	1		1
	0 to 1	FBQ-184	FBQss-184-0508-SO	1		1
	1 to 3		FBQso-184-0509-SO	1		1
	0 to 1	FBQ-185	FBQso-184-0510-SO	1		1
	1 to 3		FBQso-184-0510-SO	1		1

Table 5-1. Baseline Sample Identification for the Supplemental Phase II RI (continued)

Facility/Area	Depth (ft)	Station	Sample ID	Explosives	Hexavalent Chromium	TAL Metals
Open Demolition Area	0 to 1	DA2-125	DA2ss-125-0900-SO	1		1
Discrete Soil Locations (6)	1 to 3		DA2so-125-0901-SO	1		1
	0 to 1	DA2-126	DA2ss-125-0902-SO	1		1
	1 to 3		DA2so-125-0903-SO	1		1
	0 to 1	DA2-127	DA2ss-125-0904-SO	1		1
	1 to 3		DA2so-125-0905-SO	1		1
	0 to 1	DA2-128	DA2ss-125-0906-SO	1		1
	1 to 3		DA2so-125-0907-SO	1		1
	0 to 1	DA2-129	DA2ss-125-0908-SO	1		1
	1 to 3		DA2so-125-0909-SO	1		1
	0 to 1	DA2-130	DA2so-125-0910-SO	1		1
	1 to 3		DA2so-125-0911-SO	1		1

[a]Please refer to QAPP Table 1-1 for QA/QC Sampling and analytical requirements.

6.0 SAMPLE PACKAGING AND SHIPPING REQUIREMENTS

Sample packaging and shipping will generally follow Section 6.0 of the Facility Wide SAP. If the contract laboratory provides courier service for coolers containing samples, this reduces the need for some of the packaging measures described in the Facility Wide SAP, which are intended for air-shipped coolers. Specifically:

- Chain-of-custody forms can be hand-carried by the courier to the laboratory;
- No airbills will be attached to couriered coolers; and
- "THIS END UP" and "FRAGILE" stickers will not be required for containers transported by courier.

The addresses and points-of-contact for laboratories used for chemical and geotechnical analyses for this field effort are listed in Section 2.0 of the QAPP.

7.0 INVESTIGATION-DERIVED WASTE

All investigation-derived waste (IDW), including auger cuttings, personal protective equipment (PPE), disposable sampling equipment, and decontamination fluids, 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. Seven types of IDW are anticipated, which will be contained separately. The types and estimated quantities for each include:

- Soil from depths <1.8 m (6 ft), including residual surface and subsurface soil, following sample homogenization. An estimated one 55-gal drum of soil IDW is anticipated. Disposition shall be based on the laboratory analyses of these soil samples.

- Decontamination fluids, including those derived from decontamination of sampling equipment. An estimated single 55-gal drum of decontamination fluid is anticipated from soil sampling equipment decontamination. A representative sample of the decontamination fluid will be subjected to full Toxicity Characteristic Leaching Procedure (TCLP) testing.

- Expendables/solid wastes, including PPE and disposable sampling equipment. One 55-gal drum of expendable IDW is anticipated.

All IDW shall be appropriately accounted for as soon as possible and prior to conclusion of the task order. Any shipment of IDW solid waste off-site shall comply with all appropriate federal and state laws.

7.1 INVESTIGATION-DERIVED WASTE COLLECTION AND CONTAINERIZATION

Indigenous solid IDW (soil) from borehole installations < 1.8 m (6 ft) will be collected and contained in labeled U.S. Department of Transportation (DOT)-approved, open-top, 55-gal drums equipped with plastic drum liners and sealed with bung-top lids.

All solid non-indigenous (expendable sampling equipment and trash) IDW will be segregated as non-contaminated and potentially contaminated material. Potentially contaminated and non-contaminated solid non-indigenous IDW will be identified in the field on the basis of visual inspection (e.g., soiled versus non-soiled), usage of the waste material (e.g., outer sampling gloves versus glove liners), and field screening of the material using available field instrumentation (e.g., OVA). All non-indigenous IDW will be contained in trash bags with potentially contaminated non-indigenous IDW being additionally contained in labeled DOT-approved, open-top, 55-gal drums equipped with plastic drum liners and sealed with bung-top lids.

All liquid non-indigenous (decontamination rinse water) IDW will be combined due to the small volume anticipated and contained in labeled DOT-approved, 55-gal closed-top drums.

7.2 WASTE CONTAINER LABELING

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.

7.3 INVESTIGATION-DERIVED WASTE FIELD STAGING

An FSA will be designated at the beginning of field activities and approved by the RVAAP Environmental Coordinator. A centralized Field Staging Area (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.

Final inventories of IDW will be taken and provided to the RVAAP Environmental Coordinator by the designated IDW coordinator. All liquid waste not transported off of the facility within 30 days following project completion will require secondary containment.

7.4 INVESTIGATION-DERIVED WASTE CHARACTERIZATION AND CLASSIFICATION FOR DISPOSAL

All indigenous IDW (soil) will be characterized for disposal on the basis of analytical results from environmental samples collected from each sampling station. Non-indigenous IDW (decontamination fluids, laboratory residuals) except for PPE and expendable sampling equipment, will be characterized for disposal on the basis of composite samples collected from segregated waste stream storage containers. Composite waste samples will be submitted for laboratory analysis of full TCLP to characterize each waste stream for disposal. Procedures for composite waste sampling are presented in Sections 7.4.1 and 7.4.2 of the Facility Wide SAP. PPE and expendable sampling equipment will be managed in accordance with Section 7.4 of the Facility Wide SAP.

At the conclusion of field activities, a letter report will be submitted to the USACE and RVAAP Environmental Coordinator documenting the characterization and classification of the wastes.

7.5 INVESTIGATION-DERIVED WASTE DISPOSAL

Upon approval of IDW classification reports, all solid and liquid IDW will be removed from the site and disposed of 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. All shipments of IDW off-site will be coordinated through the RVAAP Environmental Coordinator.

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APPENDIX A
ORDNANCE AND EXPLOSIVES AVOIDANCE PLAN

MEC AVOIDANCE WORK PLAN

Open Demolition Area 2, Fuze and Booster Quarry Ponds and Central Burn Pits

At

Ravenna Army Ammunition Plant

Ravenna, Ohio

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FINAL

November 2005

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

AAR	After Action Report
AOCs	area of concern
DMM	Discarded military munitions
CBP	Central Burn Pits
FBQ	Fuze and Booster Quarry Landfill/Ponds
GOCO	government-owned, contractor-operated
IRP	Installation Restoration Program
MC	Munitions Constituents
MEC	munitions and explosives of concern
NPDES	National Pollutant Discharge Elimination System
ODA2	Open Demolition Area 2
OE	ordnance and explosives
OHARNG	Ohio Army National Guard
RCWM	Recovered chemical warfare materiel
RTLS	Ravenna Training and Logistics Site
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SSHP	Site Safety and Health Plan
USA	USA Environmental, Inc.
USNAVSCLEOD	Naval Explosive Ordnance Disposal
USP&FO	United State Property and Fiscal Officer
UXOTIII	UXO Technician III

MEC AVOIDANCE WORK PLAN

1. PURPOSE

This plan outlines the procedures USA Environmental, Inc. (USA) will use to perform munitions and explosives of concern (MEC) Services required for the soil sampling manual boring activities at three area of concern (AOCs) on the Ravenna Army Ammunition Plant (RVAAP) located in Ravenna, Ohio. The three AOCs are as follows;

- The Open Demolition Area 2;
- The Fuze and Booster Quarry Landfill/Ponds; and
- The Central Burn Pits.

This MEC Avoidance Work Plan is included as an attachment to and tiers under the Sampling and Analysis Plan Addendum No. 1 for the Supplemental Phase II Remedial Investigation of Central Burn Pits, Fuze and Booster Quarry Landfill/Ponds, and Open Demolition Area #2 which tiers under the Facility-Wide Sampling and Analysis Plan and Facility-Wide Site Safety and Health Plan. It is based on information provided by the prime contractor, Science Applications International Corporation (SAIC). Emergency procedures are detailed in the SSHP including notification lists and directions to the hospital. The SAIC SSHO is responsible for site safety. The SAIC SSHO and the USA UXO Technician III will work in concert, with the USA UXO Technician III having lead responsibility for all MEC related issues.

1.1 GENERAL

USA operations will be executed in three distinct phases: Phase 1: Mobilization, Phase 2: Operations, and Phase 3: Demobilization. This plan describes the activities USA will accomplish during each phase and the methodology USA will use to accomplish these activities. The sole purpose of this work is avoidance of munitions and explosives of concern (MEC) which includes unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC) (e.g. TNT, RDX) present in high enough concentrations to pose an explosive hazard.

1.2 SITE DESCRIPTIONS

RVAAP is a 1,481-acre portion of the 21,419-acre Ravenna Training and Logistics Site (RTLS) of the Ohio Army National Guard (OHARNG). A total of 19,938 acres of the former 21,419-acre RVAAP was transferred to the United State Property and Fiscal Officer (USP&FO) for Ohio in 1996 and 1999 for use by the OHARNG as a military training site. The current RVAAP consists of 1,481 acres in several distinct parcels scattered throughout the confines of the OHARNG RTLS. The RVAAP and RTLS are co-located on contiguous parcels of property and the RTLS perimeter fence encloses both installations. Since the Installation Restoration Program (IRP) encompasses past activities over the entire 21,419 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) U.S. Army facility. Currently, the installation is jointly operated by the U.S. Army Rock Island BRAC Field Office and the OHARNG.

The RVAAP is located within the confines of the RTLS which is in northeastern Ohio within Portage and Trumbull counties, approximately 4.8 kilometers (3 miles) east northeast of the town of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the town of Newton Falls. The RVAAP portions of the installation are solely located within Portage County. The installation consists of a 17.7-kilometer (11-mile) long, 5.6-kilometer (3.5-mile)-wide tract bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garrett, McCormick and Berry roads on the west; State

Route 534 to the east, and the Norfolk Southern Railroad on the north (Figures 1-1 and 1-2). The installation is surrounded by several communities: Windham on the north, Garrettsville 9.6 kilometers (6 miles) to the northwest, Newton Falls 1.6 kilometers (1 mile) to the east, Charlestown to the southwest, and Wayland 4.8 kilometers (3 miles) southeast.

1.2.1 OPEN DEMOLITION AREA 2 (RVAAP-04)

Open Demolition Area 2 (ODA2), designated as AOC-04, covers approximately 25 acres and is situated in the central portion of the facility. ODA2 was used since 1948 to detonate large caliber munitions and off-spec bulk explosives that could not be deactivated or demilitarized by any other means due to their condition. Materials treated by open detonation in ODA2 have included primer elements, bombs, and various caliber munitions. The past standard operating procedures for demolition by open detonation were to place the ordnance to be detonated in a pit that had been excavated to a minimum depth of 4 feet. The trench was then backfilled with 2 feet of soil, and the ordnance were detonated. After detonation, the site was carefully policed for shrapnel, scrap metal, or any unexploded ordnance. It should be noted, however, that fragments of exploded or unexploded ordnance items forcefully propelled away from the detonation pits during detonation activities (kick-outs) can be found several thousand feet away from the detonation site. Default distances for fragment protection range from 1,250 feet for non-fragmenting explosives materials to 4,000 feet for munitions 5-inch caliber or larger (DoD, 1999). In addition, past operations at this AOC may have included the burial of munitions and ordnance components.

1.2.2 FUZE AND BOOSTER QUARRY LANDFILL/PONDS (RVAAP-16)

Fuze and Booster Quarry Landfill/Ponds (FBQ) was operated during the period 1945 through 1993. The eastern part of the AOC consists of three larger ponds located in an abandoned rock quarry. The ponds are 20 to 30 feet deep and are separated by earthen berms. The western part of the AOC consists of 11 smaller, shallow basins. Prior to 1976, the quarry was reportedly used for open burning and as a landfill. The resultant debris from the burning and from the landfill operation was reported to have been removed during construction of the ponds. From 1976 through 1993, spent brine regenerate and sand filtration backwash water from one of the RVAAP drinking water treatment plants was discharged into the ponds. This discharge was regulated under a National Pollutant Discharge Elimination System (NPDES) permit. In 1998, this AOC was expanded to include three other shallow settling ponds and two debris piles bringing the AOC to approximately 45 acres in size. Based on the operational history for FBQ, waste constituents and potential contaminants at this AOC include explosive compounds; propellants; and metals. The lands adjacent to the quarry were utilized as an impact area to test 40mm projectiles (USACE 2004a).

1.2.3 CENTRAL BURN PITS (RVAAP-49)

Central Burn Pits (CBP), AOC-049 is located in the east-central area of the facility on Paris-Windham Road at the intersection of Lumber Yard Road. The site is approximately 47 acres in size and was originally used as a lumber and building materials storage area. CBP was later utilized for open burning of non-explosive waste material electrical components, wooden boxes, and scrap and the disposal of other non-hazardous waste material. The actual period of operation of the burn pits is unknown but it is believed to have begun shortly after the installation opened and continued into the mid 1970's. CBP is bounded by Paris-Windham Road to the east, old railroad beds to the north and south, and Sand Creek to the west-northwest.

1.3 SCOPE OF WORK

USA will provide one certified UXO Technician III and support equipment to perform MEC avoidance surveys of proposed soil sampling locations and work areas. The sole purpose of the surveys is to avoid any surface MEC or subsurface anomaly that could potentially represent MEC. MEC characterization and removal is not included in this scope of work. USA will provide visual and magnetometer surveys to clear prospective soil boring locations, and will provide clearance of subsurface soils to a maximum depth of 4 ft. Specific work elements will include:

- Preparation of an MEC Avoidance Work Plan. This work plan will be incorporated into SAIC's Overall Work Plan for the Phase II RIs;
- As part of SAIC's pre-work orientation and safety briefing, USA UXO Technician III will conduct an MEC awareness training session (approximately 1/2-hr) at the field site for sampling crews.
- Up to 5 days UXO Technician III MEC Avoidance Service; and
- Preparation of an After Action Report (AAR) following the fieldwork that documents the field activities.

USA will provide on-site MEC services for the following tasks:

- UXO technician support will be present during all field operations;
- A Schonstedt Models GA-52 and GA-72 (or equivalent) magnetic locators will be used for surface anomaly surveys;
- A Forster Ferex, MK 26 ordnance locator or Schonstedt downhole instrument for down-hole monitoring;
- UXO technicians will continue surveys of the subsurface soil as the soil boring is performed;
- The UXO Technician III (Team Leader) will train all field personnel to recognize and stay away from MEC;
- Safety briefings for MEC avoidance will be provided to all site personnel and visitors;
- All soil boring locations will be surveyed for potential MEC and clearly defined prior to field activities using visual and magnetometer surveys. Existing roads at ODA#2 will also require a munitions and explosives of concern (MEC) avoidance survey; and
- If during excavation activities, suspected MEC is encountered, work will be halted until UXO personnel give the clearance. USA UXO Technician III will contact the SAIC Project Manager, who will contact the USACE and Ohio EPA. The scope of this field project is avoidance only and no disposal or movement for disposal of MEC will be performed.

1.4 RECOVERED CHEMICAL WARFARE MATERIEL (RCWM)

There has been no evidence of recovered chemical warfare materiel (RCWM) at the AOCs, however, if onsite UXO personnel suspect that an item is a potential RCWM, the UXO Technician III will implement the following procedure:

- Work will immediately stop and all personnel will leave the area to an upwind location;
- The UXO Technician III will notify SAIC Site Manager and the USA home office. SAIC will immediately notify the SAIC PM, USACE, and Ohio EPA;
- The UXO Technician III will clearly mark the area containing the RCWM. The discovery of suspected RCWM report will be made available to SAIC within one hour of the discovery. The content of the report are;

    1. Date and local time of event;
    2. Location;
    3. Quantity and type of munitions or container(s) and chemical agents involved;

4. Description of what has happened;
5. Description of property damage;
6. Personnel casualties and/or injuries;
7. Assistance require; and
8. Any other pertinent information.

- Onsite UXO Technician III will secure the site and will guard the site in an upwind location until relieved by SAIC and/or a government representative.

1.5 PHASE 1: MOBILIZATION

USA will begin mobilization following notification in writing of approval of this work plan and receipt of notification to proceed from SAIC. The goal of this phase of mobilization is to ensure that the proper attention is dedicated to coordinating with the prime contractor and moving to the operational phase as soon as practical. Actions performed during this phase include:

- Identify/procure, package, ship, and inventory project equipment;
- Coordinate with the prime contractor's project manager for communications and other support;
- Finalize operating schedules; and
- Conduct site-specific training if required.

1.6 PERSONNEL

USA will provide a one man UXO Team to support this MEC Avoidance support. The USA UXO Technician working at this site has completed Naval Explosive Ordnance Disposal (USNAVSCLEOD) training which details procedures for evaluation and disposal of MEC and has completed a training program, prior to beginning work on site, which complies with OSHA Regulations 29 CFR 1910.120e(9). All USA employees who work on hazardous sites receive training, which includes an equivalent of 40 hours of training off-site and actual field experience under the direct supervision of a trained, experienced Supervisor. Management and Supervisors receive an additional 8 hours training on program supervision. Each employee receives 8 hours of OSHA refresher training annually.

1.7 PROJECT EQUIPMENT

USA has thoroughly assessed the equipment requirements for this project. During mobilization, USA will:

- Package and ship corporate equipment items to RVAAP;
- Perform maintenance and quality checks of the equipment to ensure that it is operationally ready;
- Coordinate with SAIC for communications and other support equipment; and
- Prepare and issue purchase orders for support equipment items that are not on-hand.

1.7.1 SITE SPECIFIC TRAINING

As part of the mobilization process, USA will perform site-specific training for all personnel assigned to this project. The purpose of this training is to ensure that all personnel fully understand the procedures and methods USA will use to perform operations at RVAAP, their individual duties and responsibilities, and any and all safety and environmental practices/procedures associated with operations. All personnel will be trained as they arrive. Training topics/issues and training responsibilities are as follows:

- The support personnel will receive operational briefings and training on their duties and

responsibilities. All personnel, to include SAIC crews, will receive ordnance recognition, avoidance and safety precaution training. This training will be performed by the UXO Technician III;
- All personnel will receive training on the individual equipment they will operate while on-site;
- All site personnel will receive detailed training on SAIC's Site Safety and Health Plan (SSHP) and emergency procedures; and
- Prior to mobilization, USA UXO Technician will receive HAZWOPER 40 hours (or eight hour refresher) training as required.

1.8 PHASE 2: OPERATIONS

Upon completion of Phase 1 activities, USA will begin Phase 2. The following sub-paragraphs describe the general work practices that USA will follow during all operations and the specific procedures and methods USA will use during this project.

1.9 GENERAL SITE PRACTICES

All operational activities at RVAAP will be performed under the supervision and direction of qualified UXO personnel. Non-essential personnel will be prohibited from entering the MEC operations area or performing operations unless they are accompanied and/or supervised by a UXO Technician. Throughout operations, USA will strictly adhere to the following general practices.

1.9.1 WORK HOURS

Operations will be conducted during daylight hours only. USA will work five 10-hour days per workweek.

1.9.2 SITE ACCESS

USA, in conjunction with SAIC, will control access into operating areas and will limit access to only those personnel necessary to accomplish the specific operations or who have a specific purpose and authorization to be on the site. No hazardous MEC operations will be conducted when unauthorized persons are in the vicinity.

1.9.3 HANDLING OF MEC

No handling of MEC items at anytime during this project. Non-UXO site personnel will be emphatically instructed and closely supervised to ensure they do not handle any MEC. Munition debris will not be handled or touched unless a UXO Technician has first checked it.

--THIS POLICY WILL BE STRICTLY ENFORCED--

1.9.4 SAFETY TRAINING/BRIEFING

USA will routinely conduct two distinct safety meetings and briefings: daily tailgate safety briefings, and daily safety meetings. In addition, the UXO Technician III may hold a safety stand-down at any time he notes any degradation of safety or a safety issue that warrants a review.

1.9.4.1 Daily Tailgate Briefing

The USA Environmental UXO Technician III will conduct tailgate safety briefings as part of the general

H&S briefings in concert with SAIC's SSHO. A written record of this training and the signatures of personnel attending the training will be maintained. The training will focus on the specific hazards anticipated at each work site during that day's operations and the safety measures that will be used to eliminate or mitigate those hazards. It will also refer to other operations within the area whose proximity may have safety ramifications. As work progresses and the team's location changes within a site, or from site-to-site, any corresponding changes in ingress/egress routes and emergency evacuation routes will also be reviewed during this tailgate briefing.

1.9.4.2 Daily Safety Meeting

The UXO Technician III will hold a daily safety meeting for all personnel as part of the general health and safety tailgate briefing conducted by the SAIC SSHO. This training will focus on MEC safety issues observed; any newly identified safety issues, and any needed/required safety or operational refresher training.

1.9.4.3 Visitor Safety Briefing

Site visitors must receive a safety briefing prior to entering the operating area and must be escorted at all times by the UXO Technician III or the SAIC Representative. All visitors entering must sign in at the SAIC field office.

1.9.5 ENVIRONMENTAL AWARENESS

The promotion of environmental awareness will be ongoing as part of safety and operational briefs.

1.9.6 SAFETY AND ENVIRONMENTAL VIOLATIONS

Safety violations or unsafe acts will be immediately reported to the UXO Technician III and the SAIC SSHO. Failure to comply with safety rules/regulations or failure to report violations may result in immediate termination of employment. Reckless interference with sensitive species or disregard for environmental issues will likewise not be tolerated and may lead to termination of employment. Any environmental issue must be immediately reported to the SAIC SSHO. The SAIC SSHO will notify the project manager, USACE, and Ohio EPA of any issues.

1.9.7 WORK CLOTHING AND FIELD SANITATION

Work clothing will be appropriate for the conditions encountered. In most cases this will be Level D PPE. During intrusive operations the PPE will be in accordance with SAIC's SSHP.

- Footwear will be sturdy work boots with toe protection (when working around heavy equipment). UXO personnel using magnetometers for anomaly investigations will not use metal toe protection;
- Hand protection will consist of leather or canvas work gloves. Rubber inner or outer gloves may be required where increased protection is needed;
- Safety glasses with side shields, hearing protection, and hard hats will be available and worn when engaged in activities where their use is required; and
- Clothing will be full-length pants; long or short sleeve shirt (depending on the weather) and a reflective safety vest. In no case will tennis/running shoes or abbreviated attire such as tank tops or shorts be permitted.

The team will be outfitted with field decontamination equipment, which will consist of portable eye-wash

kits, containers of wash water, paper towels and soap. Prior to commencing operations each day, these facilities will be in place and ready for use in the vicinity of the team's work area as needed. Good housekeeping and decontamination measures will be practiced.

1.9.8 COMPLIANCE WITH PLANS AND PROCEDURES

USA will conduct operations at RVAAP in a systematic manner using proven operating methods and techniques. All activities will be conducted under the direction, supervision and observation of the UXO Technician III. All personnel will strictly adhere to approved plans and established procedures. When operational parameters change and there is a corresponding requirement to change procedures or routines, careful evaluation of such changes will be conducted by on-site supervisory personnel in close liaison with the SAIC representative. Any new course of action or desired change in procedures will be submitted with justification for approval as required. Approved changes will be implemented in a manner that will ensure uniformity in procedures and end-product quality on the part of the MEC team. The SAIC project manager, USACE, and Ohio EPA will be notified if a new course of action including changes in environmental sampling locations, is necessary.

1.9.9 FIELD SANITATION AND WASH POINT

The work team will utilize field sanitation stations provided by SAIC.

1.10 MEC AVOIDANCE FOR SAMPLING AND ESCORT

Throughout this operation, the UXO Technician III (UXOTIII) will closely monitor performance to ensure these procedures are being performed with due diligence and attention to detail. Avoidance operations will consist of a team composed of a UXOTIII. The UXOTIII will not destroy or move any MEC encountered as the scope of this field project is avoidance only. All MEC encountered will be marked, avoided, and will be reported to the on-site SAIC Supervisor who will initiate the appropriate response actions to include immediate notification of the SAIC PM, USACE, and Ohio EPA.

Prior to the start of field operations, and during daily safety briefings, the UXOTIII will provide MEC awareness, identification, safety, and avoidance procedures to all SAIC field crews and visitors.

1.10.1 ACCESS ROUTES

All soil boring locations and access routes (including existing roads at ODA2) will be surveyed for potential MEC and clearly defined prior to entry using visual and magnetometer surveys. Access routes will be at least twice as wide as the widest vehicle that will use the route. Any identified subsurface magnetic anomaly will be clearly marked and the anomaly will be avoided. The cleared approach paths and existing roads will be the only ingress/egress routes. Investigation personnel will be escorted by the UXO Technician at all times in areas potentially contaminated with MEC until the UXOTIII has completed the access surveys and the cleared areas are marked. Escorted personnel will follow behind the UXOTIII escort. If anomalies or MEC are detected, the UXO Technician will halt escorted personnel in place, mark the item(s), select a course around the item, and instruct escorted personnel to follow.

1.10.2 SOIL SAMPLING

The UXO Technician will clear work sites for soil samples and clearly mark the boundaries. The area will be large enough to accommodate equipment and provide a work area for the crews. As a minimum, the cleared area will be a square, with a side dimension equal to twice the length of the largest vehicle or piece of equipment for use on site. If a pre-selected sampling point indicates magnetic subsurface

anomalies, a new sampling point will be chosen. Sampling locations will be checked for subsurface anomalies and every 2-feet of depth down to a maximum depth of 4-feet. If a subsurface anomaly is detected after the initial 2-feet of soil boring, it will be assumed to be MEC, the location abandoned, and a new sampling location chosen.

1.10.3 EQUIPMENT

The equipment requirements for this activity include:

- Schonstedt (Model GA-52Cx) magnetometers or other appropriate instruments;
- A Forster Ferex, MK 26 ordnance locator or Schonstedt downhole instrument for down-hole monitoring;
- Hand Augers and miscellaneous common hand tools (i.e. shovels, garden trowels etc.);
- Forms and logbooks to record activities and MEC encountered;
- Pin Flags and Marking Material; and
- Team vehicle.

1.10.4 LIVE, SUSPECT MEC, OR MEC RELATED MATERIAL

There will be no handling of any MEC, suspect MEC item(s), or MEC related material at anytime during the field operations of the RVAAP. The UXO Technician III will report all MEC items encountered to SAIC who will in turn notify the USACE and Ohio EPA. The scope of this field project is avoidance only and no disposal or movement for disposal will be conducted.

1.10.5 HEAVY EQUIPMENT OPERATION

If heavy equipment support is required, heavy equipment safety will be in accordance with the SSHP.

1.10.6 DISPOSAL OPERATIONS

All hazardous material encountered will be reported to SAIC for disposition.

1.10.7 FINAL DISPOSITION OF MEC SCRAP & OTHER SCRAP

Not applicable to this project.

1.10.8 RECORDS

The UXO Technician III will prepare a Daily Operations Report, which includes a detailed accounting of all MEC encountered, and non-hazardous MEC related scrap recovered. The inventory will include information pertaining to the following:

- The number, type, and description of MEC items encountered; and
- The number, type, and description of non-hazardous items encountered.

1.11 PHASE 3: DEMOBILIZATION

During this phase, USA will remove its operational capability from the area. All USA owned equipment will be shipped to corporate headquarters and all leased equipment will be returned.

1.12 SUMMARY

USA has developed a comprehensive plan to locate and identify MEC-related material in the operational areas located at RVAAP. Our approach is systematic and the methodology proposed is technically sound and operationally safe.

APPENDIX A ~ SITE SAFETY AND HEALTH PLAN

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APPENDIX A

A. SITE SAFETY AND HEALTH PLAN

This Site Specific Safety and Health Plan (SSHP) has been prepared for the munitions and explosives of concern (MEC) Services required for the soil sampling manual boring activities at three areas of concern (AOC) on the Ravenna Army Ammunition Plant (RVAAP) located in Ravenna, Ohio.

This SSHP is to establish site-specific safety and health procedures, practices and equipment to be used to protect affected personnel from the potential MEC hazards associated with the field activities to be performed at the project site. The SSHP supplements the SAIC Work Plan and SSHP and assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while soil sampling operations are being conducted at the RVAAP.

The SAIC SSHO is responsible for site safety. The SAIC SSHO and the USA UXO Technician III will work in concert, with the USA UXO Technician III having lead responsibility for all MEC related issues.

A.1. INSTALLATION/SITE DESCRIPTION

The following subparagraphs provide installation and specific work site information.

A.1.1. RAVENNA ARMY AMMUNITION PLANT, RAVENNA, OH.

Refer to the MEC Avoidance Work Plan for a complete description of the installation.

A.1.2. SITE HISTORY

Refer to the MEC Avoidance Work Plan for a description of the site history.

A.1.3. SCOPE OF WORK (SOW)

USA Environmental, Inc (USA) will provide one certified UXO Technician III and support equipment to perform MEC avoidance surveys of proposed soil sampling locations and work areas. The sole purpose of the surveys is to avoid any surface or subsurface anomaly that could potentially represent MEC. MEC characterization and removal is not included in this scope of work. USA will provide visual and magnetometer surveys to clear prospective soil boring locations, and will provide clearance of subsurface soils to a maximum depth of 4-ft.

A.1.4. SPECIFIC WORK SITES

The MEC avoidance support will be conducted at the three soil sampling locations and work areas. The three areas are:

- The Open Demolition Area 2;
- The Fuze and Booster Quarry Landfill/Ponds; and
- The Central Burn Pits.

A.2. OBJECTIVE

The objective is for USA. to provide a safe working environment for project personnel during activities at the Areas of Concern by employing proven MEC Response techniques.

A.2.1. UXO TECHNICIAN III

The UXO Technician III (Tech III) for this project reports directly to the Project Manager on issues pertaining to the operations at the project site. The Tech III will have the following safety and health related responsibilities:

- Review and become familiar with the site MEC Avoidance Work Plan (WP) and SSHP;
- Furnishes copies of the WP and SSHP to site and subcontract personnel for their review;
- Review the scope of work (SOW) and ensure that the required safety and health elements are addressed in the SSHP and/or WP;
- Ensure implementation of project safety and health procedures;
- Early detection and identification of potential problem areas, including safety and health matters, and instituting corrective measures;
- Communicate directly with the SAIC Site Manager and advise him/her of safety and health matters related to conduct of the site MEC operations.
- Acts as the On-Scene-Incident-Commander (OSIC) in the event of a MEC emergency, notify and coordinate with off-site emergency and medical response agencies;
- Implement and enforce the SSHP, and reports safety violations to the Site Manager, Safety Manager and Project Manager;
- Establish work zones/safe distances and controlling access to these areas;
- Conduct daily General MEC Safety Briefings;
- Implement and document the Site Specific Training Program (as specified by 29 CFR 1910.120);
- Consult with the USA SHM prior to changing or altering PPE or monitoring requirements;
- Investigate accidents/incidents and “near misses”;
- Conducts visitor orientations;
- Continually monitor site personnel for signs of environmental exposure or physical stress;
- Maintains the site safety related documents to include medical, training, and injury;
- Maintains a direct line of communication with the SHM.

A.3. SITE CONTROL

The Tech III and SAIC will coordinate access control and security on site. Due to the hazardous nature of MEC only authorized personnel will be allowed in the exclusion zone (EZ) during hazardous operations. The EZ is the work site, encompassing an area large enough to prevent personnel injuries from fragmentation resulting from unintentional detonations of MEC.

Visitors will report to the SAIC Site Manager, Tech III, or other designated individual for sign-in, briefing, and escort assignment. During all operations on individual sites, the MEC team will cease operations if non-essential or unauthorized personnel are observed within the operating area. Equipment will be returned to a designated area and secured at the end of the workday.

Further site controls to ensure safety are as follows:

- Eating, drinking, and smoking are prohibited except in designated areas;
- Hazardous MEC operations will cease if non-MEC trained personnel enter during MEC operations;
- The Tech III, SAIC Site Manager or other designated individual will escort all authorized visitors to the

site;
- The Tech III will maintain the site entry control log to ensure accurate accountability for personnel;
- The Tech III will brief this SSHP to all personnel entering the site to inform them of the potential site hazards. All personnel will acknowledge this briefing by signing the SSHP acceptance sheet.

In case of an emergency, personnel will exit the site and move to the designated safe area. The safe area will be located upwind of the site and outside of the fragmentation area. The Tech III will assist in determining the severity of the emergency. If the emergency warrants evacuation, the Tech III will notify the SAIC Site Manager.

A.4. HAZARD/RISK ANALYSIS

USA has analyzed the scope of work tasking to determine the work risk hazards associated with each task. The tasks consist of direct tasks and the implied tasks, or sub tasks, to accomplish the work. Task hazard analysis sheets are located at the end of this plan. USA has identified the following hazards/risks for the project site:

A.4.1. PERFORM MEC AVOIDANCE

- Exposure to hazards associated with surface and subsurface MEC. These items if moved or handled improperly could detonate, either killing or seriously injuring personnel at the work site;
- Biological hazards including exposure to irritating or toxic plant life, wildlife, rodents, insects, ticks, and snakes which present the possibility of bites and associated diseases;
- Potential trip hazard associated with ground cover, irregular terrain, and vegetation;
- Cuts and lacerations from cutting tools and exposure to brush;
- Noise, foot, and eye hazards from powered equipment;
- Lifting hazards, such as back strain associated with handling equipment;
- Heat or cold stress as environmentally dictated.

A.5. HAZARD CONTROL, ACCIDENT PREVENTION

USA personnel will follow the below listed procedures to mitigate the hazards/risks outlined in paragraph A.4 of the SSHP:

- Any approach to a suspected MEC will be conducted in accordance with approved procedures outlined in the U.S. Army Corps of Engineers Pamphlet (EP) 385-1-95a;
- Any MEC found within the confines of the work area will be positively identified and marked to provide a visual warning to all project personnel to avoid the MEC;
- While on the job, all personnel will move at a moderate pace and stay alert for possible trip hazards;
- While working on site all personnel will use the “buddy” system. Buddies will be assigned each day prior to beginning work. They will remain in sight of each other at all times to ensure safe working practices. During hazardous operations one buddy will act as a safety observer.

A.6. MEC

These basic safety precautions are the minimum MEC safety requirements required of all personnel on site. Other precautions and requirements are in EP 385-1-95a and other applicable MEC manuals referenced in this document. The following should be taken into consideration when planning or conducting MEC operations:

- SAFETY IS PARAMOUNT;

- Do not move or disturb unidentified items.
- Do not collect souvenirs;
- Do not smoke except in designated areas;
- Do not carry fire or spark producing devices into the site;
- Prohibit unnecessary personnel from visiting the site.

A.6.1. THE FOLLOWING SAFETY PRECAUTIONS ARE APPLICABLE TO ALL MEC:

- Suspend all operations immediately upon approach of an electrical storm;
- Observe the hazards of electromagnetic radiation (EMR) precautions when working in the vicinity of electrically initiated or susceptible MEC;
- Do not handle any MEC unnecessarily;
- Avoid inhalation and skin contact with smoke, fumes, dust, and vapors of detonations and MEC residue;
- Do not attempt to extinguish burning explosives or any fire which might involve explosive materials;
- Incorporate appropriate property and personnel protective measures for shock and fragmentation when conducting MEC operations;
- Do not subject MEC to rough handling;
- Hand carry no more than two items at a time (one in each hand) and then only as required by the operation being performed;
- Avoid movement of armed or damaged MEC unless specifically called for in authorized publications;
- Avoid the forward portions of munitions employing proximity fuzing;
- Assume unknown fuzes contain cocked strikers or anti-disturbance features.

A.6.2. GENERAL SAFETY PRECAUTIONS

- Projectiles
  - DETERMINE IF THE PROJECTILE HAS BEEN FIRED AND IF SO CONSIDER IT ARMED;
  - CHECK FOR THE PRESENCE OF UNBURNED TRACERS;
  - AVOID THE REAR AND FRONT OF ROCKET ASSISTED AND BASE EJECTING PROJECTILES;
  - HANDLE PROJECTILE COMPONENTS SUCH AS POWDER INCREMENTS, CARTRIDGES, AND PRIMERS WITH CAUTION.
- Grenades
  - DO NOT ATTEMPT TO RE-INSTALL SAFETY PINS ON A DUD FIRED GRENADE;
  - DO NOT ATTEMPT TO WITHDRAW IMPINGED FIRING PINS FROM THE FUZE OF A DUD-FIRED GRENADE.
- Rockets
  - APPROACH AND WORK ON ROCKETS FROM THE SIDE;
  - DO NOT DISMANTLE OR STRIP DUD FIRED ROCKETS OR ROCKET MOTORS;
  - DO NOT EXPOSE ELECTRICALLY FIRED MUNITIONS TO RADIO TRANSMISSIONS WITHIN 25 FEET.

A.7. CHEMICAL HAZARDS

If suspected RCWM is located at any time, all work will cease immediately. Site workers will withdraw along cleared paths from the area containing the suspected RCWM. The Tech III will clearly mark the area containing the suspected RCWM, and report the chemical event to the SAIC Site Manager. The Tech III will standby in an upwind location until relieved by a government representative. The report of discovery of suspected RCWM will be made within one hour of the discovery. The SAIC Site Manager will immediately notify the SAIC Project Manager, USACE, and Ohio EPA.

A.8. PERSONNEL HYGIENE AND DECONTAMINATION

Facilities provided by SAIC will be utilized during this MEC Avoidance effort.

A.9. COMMUNICATIONS

A.9.1. OFF SITE COMMUNICATIONS

Off-site communication will be available at all times. Site operations will not be conducted unless off-site communications are available. Off-site communications will be hard-wired telephone service and/or cellular telephones as appropriate.

A.9.2. ON-SITE COMMUNICATIONS

Communication between personnel in the SZ and personnel in the EZ will be maintained at all times using hand held radios provided by USA.

A.10. INFORMATION AND TRAINING

MEC Training will be provided as initial site training prior to beginning work at the site. The MEC training will be documented on the USA ON-SITE SAFETY MEETING RECORD on file as part of initial training. This MEC training will be provided and documented for all project personnel.

The Technician III will give site-specific MEC training to all non-MEC personnel prior to initial site entry. This training will include:

- MEC Identification;
- MEC Precautions;
- PPE worn during MEC Operations;
- Safe Work Practices during MEC Operations;
- Emergency Procedures during MEC Operations;
- Other pertinent MEC related topics.

A.11. QUALIFICATION TRAINING

USA MEC personnel working on site will meet the requirements of the Department of Defense Explosive Safety Board (DDESB) Technical Paper (TP), Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, dated 20 December 2004. All employees at this job site will have completed a training program, prior to beginning work on site, which complies with OSHA Regulations 29 CFR 1910.120e (9). All employees who work on hazardous sites receive training, which includes an equivalent of 40 hours of training off-site and 3 days of actual field experience under the direct supervision of a trained, experienced Supervisor. Management and Supervisors receive an additional 8 hours training on

program supervision. Each employee receives 8 hours of OSHA refresher training annually. Copies of training and qualifications will be maintained at the site by the UXOSO.

A.12. LOGS, REPORTS, AND RECORD KEEPING

A.12.1. MEC SAFETY LOG

The Tech III will maintain a MEC safety record of all safety related site activity. The Tech III is responsible for ensuring that safety and health activities and events for the day are part of the record. The record may include the minutes of the tailgate safety meeting, or the meeting may be documented on the Tailgate Safety Briefing form. As a minimum the safety record should reference the tailgate safety briefing, and mention: accidents, near misses, internal and external audits, the reason for and duration of safety related "stop work" orders, and any other issues pertaining to site or personnel safety or health.

A.12.2. INJURY/ILLNESS/ACCIDENT REPORTS

Any injury or illness, regardless of severity, will be reported using USACE Accident Investigation Report (ENG Form 3394). The completed reports must be submitted to the USACE Safety and Occupational Health Office within 24 hours of the incident. A USA accident report form will be completed and forwarded within 24 hours to the USA home office. All required job related injuries and illnesses should be recorded on OSHA Form 300. If a near miss occurs the Tech III will investigate the near miss and report the results of the investigation to the USA home office and SAIC Site Manager.

A.12.3. TRAINING LOG

The Tech III is responsible for ensuring that all MEC training conducted relative to job site activities is documented in the Training Log and/or on the appropriate training forms. This log will include the initial site-specific training conducted prior to the start of site activities. The Tech III will maintain this log and any associated training forms on-site so they will be available for inspection.

A.13. FIRES AND EXPLOSIONS

The occurrence of a fire on-site can present a serious threat to all site personnel, the environment and the general public. To ensure immediate, aggressive response is possible, dry-chemical-type fire extinguishers will be available at each individual work site. Additionally, a fire extinguisher rated at least 2A: 10B:C in each project vehicle.

A.13.1. SMALL FIRES

A small fire is defined as a fire that can be extinguished with a 2A: 10B:C type fire extinguisher. In the event of a small fire, site personnel will take the following actions:

- All unnecessary personnel will be evacuated from the immediate area, to an upwind location;
- Extinguish the fire using portable fire extinguishers or by smothering from an upwind location;
- Request emergency response assistance (fire, ambulance, police) as needed;
- Do not attempt to extinguish a fire, even a small one, involving explosives;
- Notify the Tech III and the SAIC Site Manager.

A.13.1.1. Large Fires

In the event of a large fire or small fire that cannot be extinguished, the following actions will be taken:

- All unnecessary personnel will be evacuated from the site, to an upwind location;
- The Emergency Response Services (fire, police, ambulance, hospital, etc.) will be notified by the OSIC (Tech III) by Calling RVAAP Post 1 as required;
- If it can be conducted safely, the OSIC will direct personnel to move vital equipment/supplies from the fire path;
- The OSIC will order the appropriate level of protective clothing to be worn by personnel fighting the fire;
- To the extent possible, and with available resources, fight the fire from an upwind location;
- At no time, will attempts be made to extinguish a fire involving explosives;
- Notify RVAAP, USACE, and SAIC Project Manager.

A.13.2. EXPLOSION

In the event of an explosion, all non-essential personnel will evacuate and help secure the site, the OSIC will request the required support equipment and personnel, and ensure proper authorities are notified. It is essential that the site be evacuated and no one is allowed to re-enter, except to possibly save a life, until at least 30 minutes or longer if necessary, after the explosion. The OSIC will determine what actions, if any, are appropriate.

A.13.3. EMERGENCY CONTACTS

Refer to the SAIC Work Plan/SSHP for a complete listing of emergency contacts by name and telephone number, regulatory agencies, and directions to the nearest medical facility.

A.14. ACTIVITY HAZARD ANALYSIS

The attached Activity Hazard Analysis worksheets were used to identify hazards associated with operations at the project site and the safety methods that would be used to mitigate, eliminate, or control exposure to hazards.

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ACTIVITY: MEC AVOIDANCE	**Date: July 18, 2005**
	Project: Ravenna Army Ammunition Plant, Ohio.
Description of the work: Employ approved MEC avoidance techniques and methods during soil sampling operations.	**ANALYZED BY: JOSE J. SOSA, CIH**
	Prepared By: James Walden, UXO Safety and Health Manager
	Review for latest use: Each time before the job is performed.

Task Breakdown	Identify & Analyze the Hazards	Identify Hazard Controls
Locate Anomalies(surface and subsurface) and surface MEC.	• Potential MEC. • Unplanned Detonations. • Unauthorized Personnel.	• Observe all MEC safety precautions, such as movement, heat, shock, and friction. • Only UXO trained personnel will locate anomalies. • Only UXO qualified personnel will escort non-UXO personnel. • Be Alert. Mark and report any MEC encountered. • Establish Exclusion Zones based on the known hazards. • Only UXO qualified personnel will handle MEC items if encountered. • Wear the appropriate PPE for the task being performed. • Keep personnel to a minimum during operations. • Properly position personnel for observing spoils for MEC and establish safety arc prior to commencing operations. • Use and enforce the buddy system. • Ensure 1st. Aid Kits and Fire Extinguishers are in place. • **NO SMOKING, EXCEPT IN DESIGNATED AREAS.**
Identify/Record Anomalies(surface and subsurface) and surface MEC.	• Potential MEC. • Unplanned Detonations. • Unauthorized Personnel.	• Observe all MEC safety precautions, and follow safe work practices. • Identification of MEC items will be made by the UXO Technician. • Be alert. Cease operations if unsafe conditions arise. • Identify safety/hazardous zones of operations. • Maintain positive site control; cease operations if unauthorized entry is made. • **KEEP PERSONNEL TO A MINIMUM DURING OPERATIONS.**

Avoid Anomalies(surface and subsurface) and surface MEC .	• Potential MEC • Unplanned Detonations. • Unauthorized Personnel.	• Mark, avoid and report all MEC encountered. • Do not allow unauthorized personnel into the area of operations. • Maintain positive site control and enforce safe separation distances. • Record all MEC encountered by size, type, condition, and location
	• **WILDLIFE, INSECTS, POISONOUS/TOXIC PLANTS.** • **SUNBURN/WINDBURN, SLIPS, TRIPS, AND FALLS.** • **HEAT AND COLD STRESS.**	• Avoid and do not handle wildlife IAW the SSHP briefing. • Use insect repellant as necessary. • Avoid suspect plants IAW the SSHP briefing. • Use barrier creams/ointments as necessary. • Decontaminate person and equipment as necessary. • Use sunscreen/barrier cream as necessary. • Be aware of footing and terrain, watch for slips, trips, and falls hazards. • Avoid obstacles when possible. • Wear approved and appropriate work boots. • Dress for the weather, in layers of removable clothing. • Drink the appropriate fluids on a frequent basis. • Know the signs and symptoms of Heat and Cold Stress. • Enforce buddy system monitoring. • Observe safe work practices, operating precautions, and instructions for the equipment in use. • Wear the proper PPE for the task being performed.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
	INSPECTION TO BE PERFORMED BY TECHNICIAN III OR DESIGNATED INDIVIDUAL	**TRAINING TO BE PERFORMED BY UXOSO OR DESIGNATED INDIVIDUAL.**
Magnetometers. Communications Equipment. MEC flagging material. First Aid Kit. PPE.	• Daily serviceability check of instruments. • Daily communications checks. • Type and quantity check of flagging material. • Daily checks of first aid kits and weekly inventory of kits. • Daily check for serviceability, fit, and comfort of PPE. • Cover probe or decontaminate instrument to prevent cross contamination of soil samples.	• Instrument familiarity as required. • Knowledge of the Emergency Response and Notifications procedures IAW the SSHP. • Techniques for MEC avoidance. • First Aid and CPR training as required by the SSHP. • Safe work practices and precautions associated with task being performed IAW the WP. • Specific response training IAW the WP/SSHP. • Personnel will meet requirements IAW the applicable regulations for the training and use of PPE. • Evacuation and emergency procedures IAW the SSHP. • MEC identification and safety precautions for UXO and Non-

		UXO personnel IAW the WP/SSHP. • OSHA qualifications and training as required IAW the WP/SSHP.

PRINT **SIGNATURE**

UXO Technician III Name: _____ _____ **Date/Time:** _____

Employee Name(s): _____ _____ **Date/Time:** _____

_____ _____ **Date/Time:** _____

_____ _____ **Date/Time:** _____

_____ _____ **Date/Time:** _____

_____ _____ **Date/Time:** _____

_____ _____ **Date/Time:** _____

Activity: On-Site Vehicle Operation during Field Work	**Date: July 18, 2005**
	Project: Ravenna Army Ammunition Plant, Ohio.
Description of the work: Recognize the hazards associated with vehicle operations during field work	**ANALYZED BY: JOSE J. SOSA, CIH**
	Prepared By: James Walden, UXO Safety and Health Manager
	Review for latest use: Each time before the job is performed.

Task Breakdown	Identify & Analyze the Hazards	Identify Hazard Controls
IDENTIFY THE HAZARDS ASSOCIATED VEHICLE OPERATIONS	• Potential for vehicle accidents during field operations • Proper use of vehicle for field operations	• Always were a seat belt • Use a ground guide when reversing and/or as needed • Obey the speed limit • Obey all traffic signs • Use the parking break if parked on inclines and/or as necessary • Never leave the vehicle running unattended • Daily vehicle inspections will be performed to insure a safe operating vehicle • Must have a valid drivers license • Fire extinguisher and first aid kit must be with vehicle
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
	INSPECTION TO BE PERFORMED BY TECHNICIAN III OR DESIGNATED INDIVIDUAL	Training to be performed by UXOSO or designated individual

Vehicles	• **DAILY PMCS**	• Valid Drivers license • Vehicle familiarity

PRINT **SIGNATURE**

UXOSO Name: _____ _____ **Date/Time:** _____

Employee Name(s): _____ _____ **Date/Time:** _____

_____ _____ **Date/Time:** _____

_____ _____ **Date/Time:** _____

_____ _____ **Date/Time:** _____

_____ _____ **Date/Time:** _____

_____ _____ **Date/Time:** _____

A.15. REGULATIONS AND REFERENCES

Following all applicable requirements and regulations listed in the following publications will ensure the safety and health of on-site personnel and the local community:

- OSHA General Industry Standards, 29 CFR 1910;
- OSHA Construction Standards, 29 CFR 1926;
- Applicable sections of EPA 40 CFR Parts 260 to 299;
- Applicable sections of DOT 49 CFR Parts 100 to 199;
- USA Safety and Health Program (SHP);
- 2003 Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists;
- DOD 6055.9-STD, DOD ammunition and Explosives Safety Standards;
- DOD 4160.21-M, Defense Reutilization and Marketing Manual;
- USACE EP 385-1-95a, Basic Safety Considerations for Ordnance and Explosives Operations;
- USACE EM 385-1-1, Safety and Health Requirements Manual; and
- EP 75-1-2, Unexploded Ordnance (UXO) Support during Hazardous, Toxic, and Radioactive Waste (HTRW) and Construction Activities.

A.16. ATTACHMENT 1: MEC AVOIDANCE SOP

This attachment contains USA Environmental, Inc. MEC Avoidance SOP.

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ATTACHMENT 1

USA Environmental, Inc.

Standard Operating Procedures

MEC Avoidance

Table of Contents

1.0 GENERAL

This document represents USA's Standard Operating Procedures for MEC Avoidance. These policies and procedures are not all inclusive nor are they applicable in all situations. This SOP is not a stand-alone document and is to be used together with Work Plans (WP), other USA SOPs, the USA Site Safety and Health Plan (SSHP), applicable Federal, State, local regulations, and contract restrictions and guidance.

1.1 REFERENCES

- EP 385-1-95a, Basic Safety Concepts and Considerations for Ordnance and Explosives Operations;
- EP 75-1-2, UXO Support during HTRW and Construction Activities;
- USA Safety and Health Program (SHP);
- OSHA, 29 CFR 1910, Occupational Safety and Health Standards;
- OSHA, 29 CFR 1926, Construction Standards;
- Applicable sections of EPA, 40 CFR Parts 260 to 299, Protection of Environment;
- Applicable sections of DOT, 49 CFR Parts 100 to 199, Transportation;
- USACE EM 385-1-1, Safety and Health Requirements Manual;
- USACE ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous Waste Remedial Actions;
- DoD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives;
- DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards;
- DoD 4160.21-M, Defense Reutilization and Marketing Manual;
- DA PAM 385-64, Ammunition and Explosives Safety Standards;
- AR 385-64, Ammunition and Explosives Safety Standards;
- AR 200-1, Environmental Protection and Enhancement;
- AR 385-10, The Army Safety Program;
- AR 385-16, System Safety Engineering and Management;
- AR 385-40 w/USACE supplement, Accident Reporting and Records;
- TM 9-1300-200, Ammunition General;
- TM 9-1300-214, Military Explosives;
- TM 60 Series Publications;
- USA SOPs.

1.2 MEC BASIC AND GENERAL SAFETY PRECAUTIONS

These basic safety precautions are the minimum MEC safety requirements required of all personnel on site. Other precautions and requirements are in other applicable MEC manuals.

1.2.1 BASIC CONSIDERATIONS

The following should be taken into consideration when planning or conducting MEC avoidance support operations:

- SAFETY IS PARAMOUNT;
- Do not move or disturb unidentified items;
- Do not collect souvenirs;
- Do not smoke except in designated areas;
- Do not carry fire or spark producing devices into the site;
- All MEC operations will use the "Buddy" system;

- Prohibit non-essential personnel from visiting the site;

1.2.2 BASIC SAFETY PRECAUTIONS

The following safety precautions are applicable to all MEC's:

- Suspend all operations immediately upon approach of an electrical storm;
- Observe the hazards of electromagnetic radiation (EMR) precautions and grounding procedures when working with, or on, electrically initiated or susceptible MEC;
- Do not dismantle, strip, or handle any MEC unnecessarily;
- Avoid inhalation and skin contact with smoke, fumes, dust, and vapors of detonations and MEC residue;
- Do not attempt to extinguish burning explosives or any fire which might involve explosive materials;
- Do not manipulate external features of ordnance items;
- Incorporate appropriate property and personnel protective measures for shock and fragmentation when conducting MEC operations;
- Do not subject MEC to rough handling or transportation. Sand bag, chock, and block appropriately;
- Hand carry no more than two items (one in each hand) at a time and then only as required by the operation being performed;
- Do not transport damaged WP munitions unless fully submerged in water;
- Avoid unnecessary movement of armed or damaged MEC;
- Avoid the forward portions of munitions employing proximity fuzing;
- Assume unknown fuzes contain cocked strikers or anti-disturbance features.

1.2.3 GENERAL SAFETY PRECAUTIONS

The following sub-paragraphs describe safety precautions for various types of munitions/disposal operations:

1.2.3.1 Bombs

- Ensure fuze wells do not contain fuze components;

1.2.3.2 Clusters, Dispensers, Launchers

- Approach and work from the sides of a dispenser;
- Consider an intact dispenser as fully or partially loaded;
- Consider any payloads outside the container or dislodged inside as armed;
- Take precautions for the most hazardous payloads until positively identified.

1.2.3.3 Projectiles

- Determine if the projectile has been fired and if so consider it armed;
- Check for the presence of unburned tracers;
- Avoid the rear and front of rocket assisted projectiles;
- Handle projectile components such as powder increments, cartridges, and primers with caution;
- Seal the open ends of projectiles or sheared projectile components with tape or other suitable material before transporting.

1.2.3.4 Grenades

- Do not attempt to re-install safety pins on a dud fired grenade;
- Do not attempt to withdraw impinged firing pins from the fuze of a dud fired grenade;
- Do not dispose of grenades by functioning them as designed.

1.2.3.5 Rockets

- Approach and work on rockets from the side;
- Do not dismantle or strip dud fired rockets or rocket motors;
- Do not expose electrically fired munitions to radio transmissions within 25 feet;
- Do not transport an unfired rocket motor until having shielded the motor igniter from EMR;

1.2.3.6 Guided missiles

- When found, restrict vehicular movement in the area of a guided missile;
- Avoid entanglement with guidance wires of wire guided missiles;
- Restrict radio communications in the vicinity of a dud fired missile;
- Approach and work on missiles from the side and rear quarter;
- Do not dismantle or strip dud fired missiles or missile motors;
- Do not transport an unfired missile motor until having shielded the motor igniter from EMR;

1.3 MEC AVOIDANCE FOR SAMPLING AND DRILLING OPERATIONS

MEC avoidance operations may be required in support of soil sampling operations and the drilling of monitoring wells on some contracts. Avoidance operations will consist of a team composed a minimum of one UXO Technician. The team will not destroy any MEC encountered. All MEC contacts and suspected MEC anomalies will be reported to the site manager who will in turn notify the onsite Safety Representative or local Explosive Ordnance Disposal (EOD) unit.

1.3.1 ACCESS ROUTES TO SAMPLING LOCATIONS

Prior to sampling or well drilling crews going on site, the UXO Technician will conduct a reconnaissance of the sampling area. The reconnaissance will include locating the designated sampling or drilling location and insuring that it is free of anomalies. If anomalies are detected the point will be relocated as directed in the Work Plan. Once the designated point has been cleared, an access route for the sampling crews, vehicles and equipment will be cleared. The access route, at a minimum, will be twice the width of the widest vehicle and the boundaries will be clearly marked to prevent personnel from straying into un-cleared areas. If surface MEC is encountered, the UXO Technician will mark and report the item, and divert the approach path around the MEC. A magnetometer will be used to ensure there are no subsurface anomalies within the approach path. If a subsurface magnetic anomaly is encountered, it will be assumed to be a possible MEC and the path diverted to avoid it.

1.3.2 SOIL SAMPLING AND WELL DRILLING SITES

The UXO Technician will clear a work site for soil samples and well drilling and clearly mark the boundaries. The area will be large enough to accommodate the drilling equipment and provide a work area for the crews. As a minimum, the cleared area will be a square, with a side dimension equal to twice the length of the largest vehicle or piece of equipment for use on site. If a pre-selected area indicates magnetic anomalies, a new sampling/drilling site will be chosen.

1.3.3 AVOIDANCE PROCEDURES FOR BOREHOLE SAMPLING

If surface samples are required they will be obtained prior to the start of boring. The borehole procedures will be completed using a hand auger, powered auger or Direct Push Technology (DPT) equipment. The UXO Technician will check the borehole with a down-hole magnetometer, a minimum of every two feet, to the deepest sampling depth or a minimum of six feet to ensure that smaller items of MEC, undetectable from the surface, will be detected.

- **Hand Auger Procedures:** The hand auger will be advanced to the first sampling depth and the auger will be withdrawn. A clean auger bucket will be attached to the handle, returned to the borehole and a sample taken. At this point the UXO Technician will check the borehole with a magnetometer and if no magnetic anomalies are found, the procedure repeated to obtain the required samples.
- **Power Auger Procedures:** The power auger will be advanced to the first sampling depth and the auger will be withdrawn. A clean hand auger will then be used to obtain the sample. The UXO Technician will check the borehole with a magnetometer and if no magnetic anomalies are found, the procedure repeated to obtain the required samples.
- **DPT Procedures:** The DPT rig will be positioned over the sampling point and the sampling completed to a maximum depth of two feet. The DPT rig will then move a minimum of 20 feet away from the sampling point to prevent the rig from influencing the magnetometer. The UXO Technician will then check the borehole with a magnetometer and if no magnetic anomalies are found, the procedure repeated to obtain the required samples.

1.3.4 AVOIDANCE PROCEDURES FOR MONITORING WELL INSTALLATION

Prior to drilling equipment being moved to the proposed site, the UXO Technician will have checked the designated site, using a magnetometer; to assure that the well location is anomaly free to a depth of two feet. If surface samples are required they will be obtained prior to the start of drilling. To complete the subsurface magnetometer checks, one of two methods may be used:

- Monitoring, at two-foot increments, during the actual well drilling operation. This will require the withdrawal of the drill rod or augers from the well and moving the drill rig a minimum of 20 feet away from the well location to prevent the rig from influencing the magnetometer, or
- Installing an offset monitoring hole within two feet of the well location. This monitoring hole can be installed by the UXO Technician, with a hand or power auger, and monitored at two-foot increments to the desired well depth or a minimum of six feet. This will then allow uninterrupted well installation and/or sampling to continue.

1.4 LIVE AND SUSPECT MEC

The UXO Technician or field team shall not handle any live and suspect MEC. If a surface MEC or subsurface magnetic anomaly is encountered, it will be assumed to be a possible MEC and the path diverted to avoid it. All live and suspect live items locations will be marked and reported.

1.5 MEC RELATED MATERIAL

Handling of munitions debris shall not be performed by the UXO Technician or field team during the MEC Avoidance operations.

1.6 DISPOSAL OPERATIONS

All MEC and Material Potentially Presenting and Explosive Hazard (MPPEH) shall not be handled or disposed during the MEC Avoidance operations.

1.7 SUMMARY

USA uses proven procedures and methods to provide MEC Support Services. Only UXO Trained personnel will perform tasks associated with MEC location, identification, and item condition determination. The procedures outlined in this SOP are based on industry standards and ensure that operations are safely and efficiently performed.

APPENDIX B

B.0 BLANK FORMS

This appendix contains USA Environmental, Inc. blank forms for project site use and documentation.

TABLE OF CONTENTS

DAILY OPERATIONS SUMMARY

DATE: ____/____/____ **PAGE ___ OF ___ PAGES**

SITE / LOCATION: _____

1. WORK SUMMARY

a. Work Accomplished: **Number Completed** **Total Remaining**

(1) Survey	_____	_____
(2) Preparation	_____	_____
(3) Mag & Flag	_____	_____
(4) Geophysical	_____	_____
(5) Intrusive	_____	_____
(6) Quality Control	_____	_____
(7) Quality Assurance	_____	_____

b. Discrepancies: _____

_____

_____

_____

c. Inspection Results: **Pass** **Fail**

(1) Quality Control	_____	_____
(2) Quality Assurance	_____	_____
(3) Safety	_____	_____

2. INSTRUCTIONS RECEIVED FROM CUSTOMER REPRESENTATIVE: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Daily Operations Summary Con't. **PAGE ___ OF ___ PAGES**

3. UXO SUMMARY

a. UXO Located:

Type:	Quantity:	Live/Prac.:	Remarks:

Daily Operations Summary Con't. **PAGE ___ of ___ PAGES**

b. Demolition Supplies Expended:

Type:	Quantity:	Remarks:

c. Scrap Generation / Deposition:

Type:	Quantity:	Weight:	Remarks:

Daily Operations Summary Con't. **PAGE ___ of ___ PAGES**

4. Utilization

a. Daily Man-hours:

Labor Category:	Task #:	M/H Used Today:	M/H Remaining:	% M/H Remaining:	Remarks:
Project Manager					
SUXO					
UXO Tech. III					
UXO Tech. II					
UXO Tech. I					
Laborer					
UXOSO					
UXOQCS					
Admin Personnel					
Visitor					
Sub-Contractor Personnel (List by Category)					

Daily Operations Summary Con't. **PAGE ___ of ___ PAGES**

b. Daily Equipment:

Description:	Task:	Hours Used:	Hours Remaining:	% Hours Remaining:	Remarks:
Schonstedt					
Geophysical					
Truck (Heavy)					
Truck (Light)					
Radio, Base					
Radio, Handheld					
Backhoe					
Front-end Loader					
Rental Car					
GPS					
Weedeater					
Chainsaw					
Chipper					

5. Operational Remarks:

_____
_____
_____
_____
_____
_____

6. Signature / Date:

_____ **Date: ____/____/____**
SUXO / Project Manager

USA ENVIRONMENTAL, INC. EMPLOYEE INJURY REPORT

Site/Location: _____ **Control Number**: _____

This is an official document to be initiated by USA supervisors. Be accurate, through, and answer all questions.

BACKGROUND DATA

Today's Date: ____/____/____ Date of Accident: ____/____/____ Time: _____ AM PM

Day of Accident: S M T W T F S Weather Conditions: Sunny Clear Rain Fog Overcast

Temperature: 0-32 32-50 50-70 70-85 85 + Wind Conditions: Still Moderate High None

Location of Accident: _____ Time Accident was Reported: _____ AM PM

_____ Reported to Whom: _____

PERSONAL DATA

Name: Last _____ First _____ MI _____

Sex: F M DOB: ____/____/____ Place of Birth: _____

SSAN: _____-_____-_____ DOH: ____/____/____ Position: _____

Address: _____ City: _____ State: ____

Telephone Number: (_____) _____-_____ Zip: _____

ACCIDENT DATA

Nature of Accident: Near Miss ___ 1st Aid ___ Dr Visit ___ Ambul ___ Hospitalized ___ Fatality ___

If Fatality, Name of Agency Notified: _____ Type of Injury: _____

Did Employee Leave the Work Site: Yes ___ No ___ If Yes, Time Departed: _____ AM PM

Name of Medical Facility: _____ Telephone Number: (____) ____-_____

Address: _____ City: _____ State: ___ Zip: _____

Description of Accident: _____

Activity at Time of Accident: _____

Employee Injury Report Con't.

WITNESS DATA

Witness Name: Last _____ First _____ MI _____

Address: _____ City: _____ State: ____ Zip: _____

Telephone Number: (____) _____-_____ Employed By: _____

Statement Attached: Yes ___ No ___ Telephone Number: (____) _____-_____

ACCIDENT ACTIONS/ANALYSIS

Accident
Cause(s):_____
_____
_____
Lack of Safety Equipment a Factor: Yes ___ No ___ If Yes, Explain: _____
_____

Safety Regulations or Guidance Violated: Yes ___ No ___ If Yes, Explain: _____
_____

Photographs Taken: Yes ___ No ___ If Yes, Located at:
_____

Regulatory Agencies Notified: Yes ___ No ___ If Yes, which: _____

Point of Contact: _____ Date and Time: ____/____/____ _____ AM PM

Corrective Actions Taken or Recommended: _____
_____
_____

Report Prepared By: Signature: _____

SUXOS/PROJECT MANAGER

Corrective Actions/Recommendations: _____

SUXO Signature: _____ Date: ____/____/____

Concur With Actions Taken: Yes ___ No ___ Remarks: _____

Project Manager Signature: _____ Date: ____/____/____

USA Environmental, Inc.

DAMAGED EQUIPMENT/VEHICLE ACCIDENT REPORT

Control Number:_____
Insurance File #:_____
Vendor File #:_____

This is an official document to be initiated by USA Personnel. Be thorough, accurate, and answer all questions that apply.

BACKGROUND INFORMATION

TODAY'S DATE:_____/_____/_____ DAMAGE/ACCIDENT DATE:_____/_____/_____

TIME DAMAGE/ACCIDENT OCCURRED:_____ AM PM DAY: S M T W T F S

TIME DAMAGE/ACCIDENT REPORTED: _____ AM PM

LOCATION OF OCCURRENCE: _____
_____

WEATHER CONDITIONS: CLEAR OVERCAST RAIN FOG SNOW OTHER:_____

TEMPERATURE RANGE: -0 0-32 32-50 50-70 70-85 85-100 100+

WIND: NONE LIGHT MODERATE HIGH

ACTIVITY AT TIME OF DAMAGE/ACCIDENT**:**_____
_____

WERE INJURIES SUSTAINED? _____YES _____NO

IF YES, NUMBER OF PERSONNEL:____ WERE INJURY REPORTS FILED?___YES ___NO

PERSON OPERATING EQUIPMENT/VEHICLE

LAST NAME:_____ FIRST NAME:_____ MI:____

SSN:_____-____-_____DATE OF HIRE:_____/_____/_____ TEAM NUMBER:_____

SUBCONTRACTOR:_____YES _____NO

POSITION/OCCUPATION:_____

ADDRESS/TELEPHONE NUMBER:_____
_____

DAMAGED EQUIPMENT/VEHICLE ACCIDENT REPORT CON'T:

CONTROL NUMBER:_____
INSURANCE FILE #:_____
VENDOR FILE #: _____

EQUIPMENT/VEHICLE DESCRIPTION

OWNERS NAME AND TELEPHONE NUMBER (ie; Hertz, COE, US Rentals):_____
_____
_____

EQUIPMENT/VEHICLE DESCRIPTION (include make, model, type, etc.):_____
_____
_____

IDENTIFICATION NUMBER(S) (ie; VIN, serial, license, Government/company ID number(s):___
_____

DESCRIBE NATURE OR EXTENT OF DAMAGE:_____
_____
_____
_____

HOW WOULD YOU CLASSIFY THE DAMAGE? ___SUPERFICIAL ___MINOR ___MAJOR

SUPPORTING DOCUMENTATION

HAS A POLICE REPORT BEEN FILED? ____ YES ____ NO

IF YES, POLICE REPORT NUMBER:_____

IS POLICE REPORT ATTACHED? ____ YES ____ NO

IF NO, WHEN WILL POLICE REPORT BE AVAILABLE? _____

POLICE TELEPHONE NUMBER:_____

ARE WITNESS STATEMENTS AVAILABLE? ____ YES ____ NO

IF YES AND NOT ATTACHED EXPLAIN:___
_____
_____
_____

DAMAGED EQUIPMENT/VEHICLE ACCIDENT REPORT CON'T:

CONTROL NUMBER:_____
INSURANCE FILE #:_____
VENDOR FILE #:_____

ANALYSIS

WERE SAFETY REGULATIONS, GUIDANCE, POLICIES, OR LAWS VIOLATED?

____ YES ____ NO IF YES, EXPLAIN:_____
_____
_____
_____

PHOTOGRAPHS TAKEN? ____ YES ____ NO IF YES, LOCATION OF PHOTOGRAPHS:
_____
_____

CORRECTIVE ACTIONS/RECOMMENDATIONS TO BE TAKEN/IMPLIMENTED:_____
_____
_____
_____

IDENTIFY ANY SUPPORTING/ADDITIONAL DOCUMENTS:_____
_____

ANALYSIS PREPARED BY:_____ DATE: _____/_____/_____

SIGNATURE:_____

SENIOR UXO SUPERVISOR:

RECOMMENDATIONS:_____

SIGNATURE:_____ DATE: _____/_____/_____

USA PROJECT MANAGER:

CONCUR WITH ACTIONS/RECOMMENDATIONS: ____ YES ____ NO

REMARKS:_____

SIGNATURE:_____ DATE: _____/_____/_____

DAMAGED EQUIPMENT/VEHICLE ACCIDENT REPORT CON'T:

CONTROL NUMBER:_____
INSURANCE FILE #:_____
VENDORS FILE #:_____

REPAIR/REPLACEMENT DATA

ESTIMATED COST OF REPAIR:_____ DOWN TIME:_____

ESTIMATED COST OF REPLACEMENT:_____ REPLACE TIME:_____

INSURANCE CLAIM FILED? ____ YES ____ NO IF YES, DATE:_____/_____/_____

IS THIS A PAY DIRECT? ____ YES ____ NO AMOUNT:_____

DATE DEDUCTIBLE PAID: _____/_____/_____ AMOUNT: _____

DATE VENDOR PAID: _____/_____/_____ AMOUNT: _____

DATE INSURANCE PAID: _____/_____/_____ AMOUNT: _____

DATE CLOSED: _____/_____/_____

SUPPORTING DOCUMENTS ATTACHED? ____ YES ____ NO

IF YES, IDENTIFY:_____
_____
_____

COMMENTS:_____
_____
_____

REVIEWED BY: SIGNATURE _____

NAME _____

TITLE/POSITION _____ DATE:_____/_____/_____

APPROVED BY: SIGNATURE _____

NAME _____

TITLE/POSITION _____ DATE:_____/_____/_____

USA Environmental, Inc.	
TAILGATE SAFETY BRIEFING	
Date: _____/_____/_____	**Location:**_____
Time: _____ **AM PM**	**Team #:** _____

1. Reason for Briefing:			
	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending:		
Name	Signature	Position

Briefing Given By:

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
	Physical Hazards		On-Site Injuries/Illnesses
	Chemical/Biological Hazards		Reporting Procedures
	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
	PPE		Medical Monitoring
	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Being Performed		Confined Spaces
	MEC Precautions		Other:

4. Remarks:

USA Environmental, Inc.

SAFETY MEETING/TRAINING RECORD

DATE: _____/_____/_____ **TIME: _____ AM PM**

LOCATION/SITE: _____

1. Reason for Meeting/Training: (Check all that apply)	
	Daily Safety Meeting/Training
	Initial Site Safety Meeting/Training
	New Task Briefing
	Periodic Safety Meeting/Training
	New Site Procedures
	New Site Information
	Periodic Review of Site Information
	Other (Explain):

2. Personnel Attending Meeting/Training:

Name	Signature	Company

USA Environmental Inc.

Safety Meeting/Training Record Con't:

3. Topics Covered (Check all that apply)			
	Site Safety Personnel		**Decontamination Procedures**
	Site/Work Area Description		**Emergency Response Plan**
	Site Characterization		**Hazard Communities**
	Biological Hazard(s)		**On-Site Emergency**
	Chemical Hazard(s)		**On-Site Injuries/Illnesses**
	Physical Hazard(s)		**Evacuation Procedures**
	Heat Stress		**Rally Point(s)**
	Cold Stress		**Emergency Communication**
	Site Control		**Directions to Medical Facility**
	Work and Support Zones		**Drug and Alcohol Policies**
	PPE		**Medical Monitoring Program**
	Air monitoring		**Specific Task Training**
	Safe Work Practices		**Confined Spaces**
	Engineering Controls and Equipment		**Heavy Equipment**
	Spill Containment Procedures		**Other: (Specify)**

4. Remarks:

5. Verification:

I certify that the personnel listed above on this record received the Information and/or Training described as indicated. Personnel not attending this meeting/training will receive said information/training prior to commencing their assigned duties.

_____ **Date: ____/____/____**

UXO Safety Officer

SAFETY INSPECTION REPORT

USA Environmental, Inc.

Site / Location: _____ Date: ____/____/____

Type of Inspection: ____ Daily ____ Weekly ____ Re-Inspection ____ Other

Type of Operation Inspected:

_____
_____

Equipment Inspected: (Specify if Safety or Operational in Nature)

_____
_____
_____
_____
_____
_____

Comments:

_____
_____
_____
_____
_____
_____

Deficiencies Found or Noted:

_____
_____
_____

Corrective Action:

_____
_____
_____

Re-Inspection Required: ____ Yes ____ No If Yes, Date of Re-Inspection: ____/____/___

Signature:_____ _____
Site Safety Officer SUXO / Project Manager

* Copy to Supervisor if Deficiencies or Corrective Action were found, noted or deemed necessary.

USA Environmental, Inc.

DAILY QUALITY CONTROL REPORT

Date: ____/____/____ Contract #: _____ **Task Order #:** _____

Site/Location : _____

Weather: _____ Temperature: _____ Rainfall: _____

1. Preparatory Inspection: _____
_____
_____
Results: _____

2. QC Audits Performed

a. Operations: _____
_____
_____
Results: _____

b. Safety: _____
_____
_____
Results: _____

c. Administrative: _____
_____
_____
Results: _____

d. Equipment: _____
_____
_____
_____
Results: _____
_____
_____
_____
_____
_____
_____
_____
_____

Daily Quality Control Report Con't:

3. QC Performed (Grids)

Number of Grids QC'd: _____ Results: _____ # Pass _____ # Fail

Comments: _____
_____
_____
_____

4. Follow Up Inspections and Results

Section(s): _____
_____
_____
Results: _____

5. Instructions Received: _____
_____
_____
_____
_____

Remarks: _____
_____
_____
_____

QC Signature: _____ **Date:** ____/____/____

Printed Name: _____

QC INSPECTION RECORD
USA Environmental, Inc.

Site/Location: _____ **Date:** _____/_____/_____

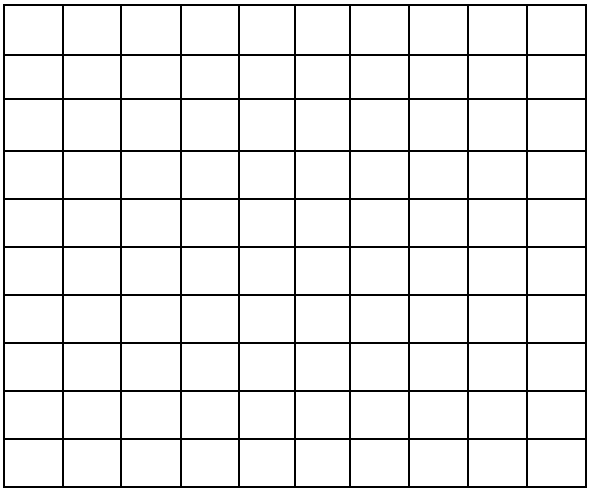
Grid Number: _____ **Inspected By:** _____

Start Time:_____ **AM PM** **Stop Time:** _____ **AM PM**

Personnel:			QC Results:			
Position	**Name**	**Hours**	**Item**	**Yes**	**No**	**Quantity**
QC Officer			MEC Found			
UXO Tech III			Anomalies			
UXO Tech II						
UXO Tech I			Pass Insp.			

Remarks: _____
_____
_____

Draw the approximate location of items that were answered Yes in QC Results.



SW Corner of Grid

QC Specialist Signature:_____

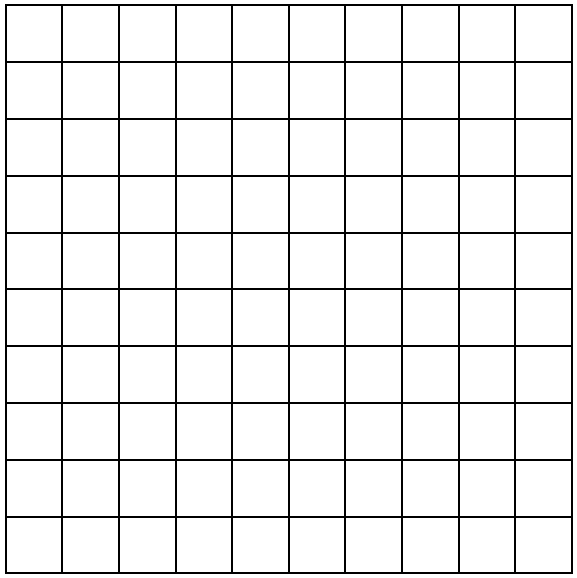
GRID RECORD

USA Environmental, Inc.

Date: ____/____/____ Grid Number: _____ Supervisor Name: _____

Type of Operation:_____ Number of Personnel: _____

Start Time: _____ AM PM Stop Time: _____ AM PM



SW **Corner of Grid**

Remarks:_____
_____
_____
_____

Supervisor Signature: _____

VISITORS LOG

Project Location: ________________________

Month of: ________________

DATE:	NAME:	AGENCY OR COMPANY:	PURPOSE OF VISIT:	SAFETY BRIEFING:	ESCORT REQ:	TIME IN:	TIME OUT:	REMARKS:

FINAL

Part II

Quality Assurance Project Plan
Addendum No. 1
for the
Supplemental Phase II Remedial Investigations of
Open Demolition Area #2
Fuze and Booster Quarry Landfill/Ponds
Central Burn Pits
at the
Ravenna Army Ammunition Plant,
Ravenna, Ohio

November 2005

Prepared for

U.S. Army Corps of Engineers
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Prepared by

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PART II – QUALITY ASSURANCE PROJECT PLAN ADDENDUM

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ACRONYMS AND ABBREVIATIONS

CBP	Central Burn Pits
COC	chain of custody
CQC	Contractor Quality Control
CX	Center of Expertise
EPA	U.S. Environmental Protection Agency
FBQ	Fuze and Booster Quarry Landfill/Ponds
FSP	Field Sampling Plan
HTRW	Hazardous, Toxic, and Radioactive Waste
ICP	inductively coupled plasma
LCS	laboratory control sample
MRL	method reporting level
MS	matrix spike
MSD	matrix spike duplicate
ODA2	Open Demolition Area #2
QA	quality assurance
QAAP	Quality Assurance Administrative Procedure
QAPP	Quality Assurance Project Plan
QC	quality control
RI	Remedial Investigation

ACRONYMS AND ABBREVIATIONS (CONTINUED)

RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SOP	standard operating procedure
USACE	U.S. Army Corps of Engineers

INTRODUCTION

This Quality Assurance Project Plan (QAPP) addendum addresses supplemental project-specific information in relation to the final Facility Wide QAPP for the Ravenna Army Ammunition Plant (RVAAP) (USACE 2001b). Each QAPP section is presented documenting adherence to the Facility Wide QAPP or stipulating project-specific addendum requirements.

Primary analytical direction for these projects will be obtained from the identified EPA SW-846 Methods; the USACE Shell for Analytical Chemistry Requirements, Appendix I, EM200-1-3 (USACE 2001a); and the Louisville Chemistry Guideline, Rev. 5, Samir Mansy (USACE 2002).

1.0 PROJECT DESCRIPTION

1.1 SITE HISTORY/BACKGROUND INFORMATION

This information is contained in Section 1.1 of the Field Sampling Plan (FSP) of the Open Demolition Area #2 (ODA2), Fuze and Booster Quarry Landfill/Ponds (FBQ), and Central Burn Pits (CBP) Supplemental Phase II Remedial Investigation (RI) Sampling and Analysis Plan (SAP) Addendum.

1.2 PAST DATA COLLECTION ACTIVITY/CURRENT STATUS

This information is contained in Section 1.2 of the FSP of the ODA2, FBQ, and CBP Supplemental Phase II RI SAP Addendum.

1.3 PROJECT OBJECTIVES AND SCOPE

This information is contained in Section 3.0 of the FSP of the ODA2, FBQ, and CBP Supplemental Phase II RI SAP Addendum.

1.4 SAMPLE NETWORK DESIGN AND RATIONALE

This information is contained in Section 4.0 of the FSP of the ODA2, FBQ, and CBP Supplemental Phase II RI SAP Addendum.

1.5 PARAMETERS TO BE TESTED AND FREQUENCY

Sample matrix types, analytical parameters, and analytical methods are discussed in Section 4.0 of the FSP of the ODA2, FBQ, and CBP Supplemental Phase II RI SAP Addendum. These sampling and analysis requirements are summarized in Table 1-1 of this Quality Assurance Project Plan (QAPP) Addendum, in conjunction with anticipated sample numbers, quality assurance (QA) sample frequencies, and field quality control (QC) sample frequencies.

Table 1-1. 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	USACE Trip Blanks
Surface and Subsurface Soils									
Explosives	SW-846, 8330	34	4	2	1	-	41	4[c]	-
Metals, TAL	SW-846, 6010B/7471	34	4	2	1	-	41	4[c]	-
Hexavalent Chromium	SW-846 3060/7196	3	1	-	-	-	4	1	-
Multi-Increment Soils									
Explosives	SW-846, 8330	12	2	-	-	-	14	2	-
Metals, TAL	SW-846, 6010B/7471	12	2	-	-	-	14	2	-
Hexavalent Chromium	SW-846 3060/7196	12	2	-	-	-	14	2	-
TCLP		12		-	-	-	12	-	-

[a]Matrix spike/matrix spike duplicate samples will be collected at a rate of 10% of total samples per media.
[b]Source waters = one potable water source and one ASTM water supply lot for the project.
[c]USACE QA Split Samples will be collected as 1 surface soil sample per site (ODA2, FBQ, and CBP) and one subsurface soil sample
A-E = Architect-Engineer
ASTM = American Society of Testing and Materials
EM = Engineering Manual (USACE)
N/A = not applicable
PCB = polychlorinated biphenyl
QA = quality assurance
RI = Remedial Investigation
TAL = Target Analyte List
USACE = U.S. Army Corps of Engineers
- = no applicable/not required

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The functional project organization and responsibilities are described in Section 2.0 of the Facility Wide SAP and the ODA2, FBQ, and CBP Supplemental Phase II RI SAP Addendum.

Analytical support for this work has been not yet been assigned. Information on the selected laboratories will be included in the Final SAP, and the contract laboratory QAPP will be forwarded, if required.

3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT

3.1 DATA QUALITY OBJECTIVES

Data quality objective summaries for this investigation will follow Tables 3-1 and 3-2 in the Facility Wide QAPP. All QC parameters stated in the specific U.S. Environmental Protection Agency (EPA) SW-846 methods will be adhered to for each chemical listed. The SW-846 method references found in the Facility Wide QAPP have been revised to the Update III methods (i.e., 8260A is now 8260B, 8270B is now 8270C, etc.). Laboratories are required to comply with all methods as written; recommendations are considered requirements. Concurrence with the U.S. Army Corps of Engineers (USACE) Shell for Analytical Chemistry Requirements, Appendix I EM200-1-3, 1 February 2001 and Louisville Chemistry Guideline, Rev. 5, June 2002, Samir Mansy is expected.

The contract laboratory will deliver an EDD that is ADR compatible. The contract laboratory must identify variances to the established library prior to any analysis being performed. No variances to the LCG are anticipated.

3.2 LEVEL OF QUALITY CONTROL EFFORT

QC efforts will follow Section 3.2 of the Facility Wide QAPP. Field QC measurements will include field source water blanks, trip blanks, field duplicates, and equipment rinsate blanks. Laboratory QC measurements will include method blanks, laboratory control samples (LCSs), laboratory duplicates, and matrix spike/matrix spike duplicate (MS/MSD) samples. LCS measurements will include the standard mid-level analyte concentration, plus a QC/method reporting level (MRL) low-level concentration, per the Louisville Chemistry Guideline. It is recognized that the laboratory will routinely perform and monitor the QC/MRL; however, guidance check limits will be utilized, as advisory and corrective action will not be required for individual analyte variances.

3.3 ACCURACY, PRECISION, AND SENSITIVITY OF ANALYSIS

Program accuracy, precision, and sensitivity goals identified in Section 3.3 and Tables 3-1 through 3-9 of the Facility Wide QAPP will be imposed for this investigation. In addition, the Louisville Chemistry Guideline (USACE 2002) identifies analytical method quality objectives related to individual method QC protocol.

Program and project reporting levels are identified in Tables 3-1 through 3-9 of the Facility Wide QAPP. Laboratories will make all reasonable attempts to meet these levels for each individual sample analysis. When samples require dilution, both the minimum dilution and quantified dilution must be reported. All samples will be screened to determine optimum dilution ranges. Dilution runs will be performed to quantitate high target analyte concentrations within the upper half of the calibration range, thus reducing the degree of dilution as much as possible. In addition, a five times less diluted run will then be performed to report other target analyte reporting levels as low as possible without destroying analytical detectors and instrumentation. If there are matrix interferences, non-target analyte, or high target analyte concentrations that preclude analysis of an undiluted sample, the laboratory project manager will contact Science Applications International Corporation (SAIC) and USACE, Louisville District, forward analytical and chromatographic information from diluted runs, and obtain direction on how to proceed.

3.4 COMPLETENESS, REPRESENTATIVENESS, AND COMPARABILITY

Completeness, representativeness, and comparability goals identified in Section 3.4 and Tables 3-1 and 3-2 of the Facility Wide QAPP will be imposed for this investigation.

4.0 SAMPLING PROCEDURES

Sampling procedures are discussed in Section 4.0 of the Facility Wide SAP and SAP Addendum for the ODA2, FBQ, and CBP Supplemental Phase II RI.

Table 4-1 summarizes sample container, preservation, and holding time requirements for the soil, sediment, and water matrices for this investigation. The number of containers required is estimated in this table.

As noted in the Facility Wide QAPP, additional sample volumes will be provided, when necessary, for the express purpose of performing associated laboratory QC (MS/MSD). These laboratory QC samples will be designated by the field and identified for the laboratory on respective chain of custody (COC) documentation.

Table 4-1. Container Requirements for Water, Soil, and Sediment Samples for the Supplemental Phase II RI at ODA2, FBQ, and CBP at RVAAP[a]

Analyte Group	Approx. No. of Containers incl. Field QC	Container	Minimum Sample Size	Preservative	Holding Time
		Water (QA/QC Blanks)			
Explosive Compounds	6	Two, 1-L amber glass bottles with Teflon®-lined lid	1000 mL	Cool, 4°C	7 d (extraction) 40 d (analysis)
Metals (total)	3	1-L polybottle	500 mL	HNO_3 to pH <2 Cool, 4°C	180 d
Hexavalent Chromium	3	1-1Lpolybottle	500 mL	Cool, 4°C	24 hours
		Soils			
Explosive Compounds	51	One 4-oz. glass jar with Teflon®-lined cap	100 grams	Cool, 4°C	14 days (extraction) 40 days (analysis)
Metals	54	One 8-oz. wide-mouth glass jar with Teflon®-lined cap	50 grams	Cool, 4°C	180 d
Hexavalent Chromium[b]	3	Included in Metals container	25 grams	Cool, 4°C	14 d

[a]One sample will be tripled in volume for the laboratory to perform appropriate laboratory QC analysis.
[b]Hexavalent Chromium will be included in the same jar as Metals, except for the three soil samples being collected only for hexavalent chromium.
QC = quality control
RI = Remedial Investigation
RVAAP = Ravenna Army Ammunition Plant

5.0 SAMPLE CUSTODY

5.1 FIELD COC PROCEDURES

Sample handling, packaging, and shipment procedures will follow those identified in Section 5.1 of the Facility Wide QAPP.

5.2 LABORATORY COC PROCEDURES

Laboratory COC will follow handling and custody procedures identified in the contract laboratory QAPP.

5.3 FINAL EVIDENCE FILES CUSTODY PROCEDURES

Custody of evidence files will follow those criteria defined in Section 5.3 of the Facility Wide QAPP.

6.0 CALIBRATION PROCEDURES AND FREQUENCY

6.1 FIELD INSTRUMENTS/EQUIPMENT

Field instruments and equipment calibrations will follow those identified in Section 6.1 of the Facility Wide QAPP.

6.2 LABORATORY INSTRUMENTS

Calibration of laboratory equipment will follow procedures identified in the contract laboratory QAPP, laboratory-specific standard operating procedures (SOPs), and corporate and facility-specific operating procedures.

7.0 ANALYTICAL PROCEDURES

7.1 LABORATORY ANALYSIS

Analytical methods, parameters, and quantitation or detection limits are those listed in Tables 3-3 through 3-9 of the Facility Wide QAPP.

The contract laboratory facilities will at all times maintain a safe and contaminant free environment for the analysis of samples. The laboratories will demonstrate, through instrument blanks, holding blanks, and analytical method blanks, that the laboratory environment and procedures will not and do not impact analytical results.

The contract laboratory facilities will also implement all reasonable procedures to maintain project reporting levels for all sample analyses. Where contaminant and sample matrix analytical interferences impact the laboratory's ability to obtain project reporting levels, the laboratory will institute sample clean-up processes, minimize dilutions, adjust instrument operational parameters, or propose alternative analytical methods or procedures. Elevated reporting levels will be kept to a minimum throughout the execution of this work. When samples require dilution, both the minimum dilution and quantified dilution must be reported. The contract laboratory will screen all samples to determine optimum dilution ranges. Dilution runs will be performed to quantitate high target analyte concentrations within the upper half of the calibration range, thus reducing the degree of dilution as much as possible. In addition, a five times less diluted run will then be performed to report other target analyte reporting levels as low as possible without destroying analytical detectors and instrumentation. If there are matrix interferences, non-target analyte, or high target analyte concentrations that preclude analysis of an undiluted sample, the laboratory project manager will contact SAIC and USACE, Louisville District, forward analytical and chromatographic information from diluted runs, and obtain direction on how to proceed.

7.2 FIELD SCREENING ANALYTICAL PROTOCOLS

Procedures for field analysis are identified in Section 6.0 of the Facility Wide SAP and in Section 4.0 of the FSP of this SAP Addendum. Only screening of samples for organic vapors using a photoionization detector will be conducted. Headspace analysis will not be conducted.

8.0 INTERNAL QUALITY CONTROL CHECKS

8.1 FIELD SAMPLE COLLECTION

Field QC sample types, numbers, and frequencies are identified in Sections 4.0 and 5.0 of the FSP of this SAP Addendum. In general, field duplicates will be collected at a frequency of 10%. Field equipment rinsates will be collected at a frequency of 10% for water samples, while one soil equipment rinsate sample will be collected per field cycle. This will constitute a process check for the effectiveness of the decontamination procedure. Two site source water samples (one potable water source and one deionized water source) will be collected for the combined field effort.

8.2 FIELD MEASUREMENT

Refer to Section 4.0 of the FSP of this SAP Addendum for details regarding these measurements.

8.3 LABORATORY ANALYSIS

Analytical QC procedures will follow those identified in the referenced EPA methodologies. These will include method blanks, LCS, MS, MSD, laboratory duplicate analysis, calibration standards, internal standards, surrogate standards, and calibration check standards.

The contract laboratory facilities will conform to their QAPP and implement their established SOPs to perform the various analytical methods required by the project. QC frequencies will follow those identified in Section 8.3 of the Facility Wide QAPP.

Analyses will also be consistent with direction provided by the USACE Shell for Analytical Chemistry Requirements, Appendix I EM200-1-3, 1 February 2001 and the Louisville Chemistry Guideline, Rev. 5 June 2002, Samir Mansy. The following are clarifications to this guidance relative to this project:

- The QC/MDL check will be performed quarterly, until criteria can be established. After performance criteria are determined, the frequency of this QC check may be reduced to biannually or annually per instrument.

- Analytical method blanks will be considered clean as long as analyte concentrations are below reporting levels. Corrective actions will be performed for any analyte detected above the established method reporting level. Any analytes detected between the method detection limit and the MRL will be flagged appropriately.

- LCSs will contain all project target compounds; however, for organic methods, only the SW-846 subset of system monitoring compounds will be used to monitor method performance and initiate analytical method corrective actions.

- For methods that have multi-responders (i.e., archlors and pesticides) within the same analytical process, the laboratory will not include all analytes within the matrix spiking mixture. A representative analyte will be employed for the MS evaluation.

- Inductively coupled plasma initial calibration curves will be confirmed through the analysis of a blank and three standards, and this documentation will be reported as part of the analytical data package.

- ICP serial dilution will be performed on a per batch basis. If the serial dilution falls outside acceptance criteria, a post-digestion spike analyses will be performed.

- Sediment samples having moisture levels that preclude soxlet extraction processes will be extracted by sonication methods.

9.0 DATA REDUCTION, VALIDATION, AND REPORTING

9.1 DATA REDUCTION

Sample collection and field measurements will follow the established protocols defined in the Facility Wide QAPP, Facility Wide SAP, and this SAP Addendum. Laboratory data reduction will follow the contract laboratory QAPP guidance and will conform to general direction provided by the Facility Wide QAPP; the USACE Shell for Analytical Chemistry Requirements, Appendix I EM200-1-3, February 2001; and the Louisville Chemistry Guideline, Rev. 5 June 2002, Samir Mansy.

9.2 DATA VERIFICATION/VALIDATION

Project data verification and validation will follow direction provided in the Facility Wide QAPP Section 9.2 and diagramed in Figure 9-1. Protocol for analytical data verification and validation has been updated to the following references:

- USACE Louisville Chemistry Guideline, Rev. 5, June 2002.
- USACE Shell for Analytical Chemistry Requirements, Appendix I EM200-1-3, 1 February 2001.
- Environmental Data Assurance Guideline, USACE Louisville, May 2000.
- EPA National Functional Guidelines for Organic Data Review, EPA-540/R-99/008, October 1999.
- EPA National Functional Guidelines for Inorganic Data Review, EPA-540/R-94/013, February 1994.

All data will be reviewed and verified by SAIC according to the Facility Wide QAPP.

Validation of 10% of the data will follow the direction provided in the Facility Wide QAPP and the Louisville Chemistry Guideline, Rev.5 June 2002, Samir Mansy. An independent data validation subcontractor qualified by USACE, Louisville District will perform this data validation.

9.3 DATA REPORTING

The contract laboratory will deliver an EDD that is ADR compatible. All data will be processed ADR/EDMS software using the Ravenna library. All errors in the ADR/EDD found by CHECKER must be corrected by the laboratory prior to transmittal. EDDs with errors will not be accepted.

10.0 PERFORMANCE AND SYSTEM AUDITS

10.1 FIELD AUDITS

A field surveillance for the investigation may be performed by the SAIC QA Officer and/or the SAIC Contractor Quality Control (CQC) Field Operations Manager. This audit will encompass the sampling of soil from the land areas. Surveillances will follow SAIC Quality Assurance Administrative Procedure (QAAP) No. 18.3.

USACE, EPA Region 5, or Ohio EPA audits may be conducted at the discretion of the respective agency.

10.2 LABORATORY AUDITS

Routine USACE Hazardous, Toxic, and Radioactive Waste (HTRW) Center of Expertise (CX) on-site laboratory audits may be conducted by USACE, while audits by EPA Region 5 or Ohio EPA may be conducted at the discretion of the respective agency.

Internal performance and systems audits will be conducted by the contract laboratory's QA staff, as defined in their QAPP.

11.0 PREVENTIVE MAINTENANCE PROCEDURES

11.1 FIELD INSTRUMENTS AND EQUIPMENT

Maintenance of all field analytical and sampling equipment will follow direction provided in Section 11.1 of the Facility Wide QAPP.

11.2 LABORATORY INSTRUMENTS

Routine and preventive maintenance for all laboratory instruments and equipment will follow the direction of the contract laboratory QAPP.

12.0 SPECIFIC ROUTINE PROCEDURES TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS

12.1 FIELD MEASUREMENTS DATA

Field data will be assessed as outlined in Section 12.1 of the Facility Wide QAPP.

12.2 LABORATORY DATA

Laboratory data will be assessed as outlined in Section 12.2 of the Facility Wide QAPP.

13.0 CORRECTIVE ACTIONS

13.1 SAMPLE COLLECTION/FIELD MEASUREMENTS

Field activity corrective action protocol will follow directions provided in Section 13.1 of the Facility Wide QAPP.

13.2 LABORATORY ANALYSES

Laboratory activity corrective action protocol will follow directions provided in Section 13.2 of the Facility Wide QAPP and the contract laboratory QAPP.

14.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Procedures and reports will follow the protocol identified in Section 14.0 of the Facility Wide QAPP and those directed by the contract laboratory QAPP.

15.0 REFERENCES

USACE (U.S. Army Corps of Engineers) 2001a. Requirements for the Preparation of Sampling and Analysis Plans, EM200-1-3, Appendix I, *Shell for Analytical Chemistry Requirements*, February.

USACE (U.S. Army Corps of Engineers) 2001b. *Facility Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, DACA62-00-D-0001, Delivery Order CY02, Final, March.

USACE (U.S. Army Corps of Engineers) 2002. *Louisville Chemistry Guideline*, Samir A. Mansey, Environmental Chemistry Branch, Rev. 5, June.

FINAL

Part III

Site Safety and Health Plan
Addendum No. 1
for the
Supplemental Phase II Remedial Investigations of
Open Demolition Area #2
Fuze and Booster Quarry Landfill/Ponds
Central Burn Pits
at the
Ravenna Army Ammunition Plant,
Ravenna, Ohio

November 2005

Prepared for

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Prepared by

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APPROVALS

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Laura Obloy, PE, Phone 330-405-9810 — 9 November 2005
SAIC Project Manager — Date

Stephen Davis, CIH (#4213), CSP (#10044), Phone 865-481-4755 — November 9, 2005
SAIC Health and Safety Officer — Date

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ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
AOC	Area of Concern
CBP	Central Burn Pits
CPR	cardiopulmonary resuscitation
EPA	U.S. Environmental Protection Agency
FBQ	Fuze and Booster Quarry Landfill/Ponds
FSHP	Facility Wide Safety and Health Plan
HTRW	Health Requirements for Radioactive Waste
JMC	Joint Munitions Command
MEC	munitions and explosives of concern
ODA2	Open Demolition Area #2
OE	ordnance and explosives
OEW	ordnance and explosive waste
PPE	personal protective equipment
PRG	preliminary remediation goal
RCRA	Resource Conservation and Recover Act
RI	Remedial Investigation
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
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 *Safety and Occupational Health Requirements for Radioactive Waste (HTRW) and Ordnance and Explosive Waste (OEW) Activities* and the U.S. Army Corps of Engineers (USACE) *Safety and Health Manual, EM-385-1-1-13*, 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 Supplemental Phase II Remedial Investigation (RI) at the following locations:

- RVAAP-04 Open Demolition Area #2 (ODA2);
- RVAAP-16 Fuze and Booster Quarry Landfill/Ponds (FBQ); and
- RVAAP-49 Central Burn Pits (CBP).

These locations were designated as high priority Areas of Concern (AOC) which have the performance objectives to complete all necessary remedial actions to achieve interim closure by September 30, 2007. Copies of the FSHP and this SSHP Addendum will be present at the work site during all fieldwork.

ODA2, which consists of approximately 25 acres, was used from 1948-1992 to detonate large caliber munitions and off-spec bulk explosives that could not be deactivated or demilitarized by any other means due to their condition. Past operations at this AOC may have included the burial of munitions and ordnance components. More recent burning and detonation activities related to facility operations occurred until 1994 in a 2.5-acre area covered under a Resource Conservation and Recovery Act (RCRA) permit application. Since 1994, this area has been used for a small number of non-routine and emergency detonations. MEC clearance to a depth of 4 ft (excavating and sifting) was performed in the RCRA permitted area from 1999-2000. MEC and MEC scrap is ubiquitous within the AOC, along portions of the Sand Creek embankment (which bisects the AOC), and as kickout fragments in adjacent areas. "Rocket Ridge" and adjacent riparian areas of Sand Creek have not been cleared of MEC. As such, Rocket Ridge and associated impacts will be addressed by others and is not part of the scope of this PBC.

FBQ was used as an explosive contaminated sawdust burning area for Load Lines 6 and 11 from 1945-1949. In 1976, settling ponds were constructed, separated by earthen dams, with flow control gates for spent brine regenerant and sand filtration backwash from the Water Works 3 treatment plant, which treated groundwater from facility production wells (1976-1993). Before 1987, 11 ponds/depressions excavated within a low drainage area west of the quarry were used for settling purposes. Historical operational information indicated fuze and booster assemblies, projectiles, residual ash, and sanitary

waste were burned in the quarry prior to pond construction. In 1976, the existing debris was removed from the quarry bottom and transferred to RQL or one of the other burning grounds. In 1998, this AOC was expanded to include the quarry vicinity, the 11 former settling ponds/depressions and drainage conveyance, and a debris pile north of the quarry (containing transite), bringing the site to a total of 45 acres.

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 Phase I and/or Supplemental Phase II RIs were conducted at each of these locations which involved comprehensive sampling of soil, sediment, and surface water within the site. Ordnance and explosives avoidance surveys were conducted.

Planned site activities consist of environmental sampling and support tasks. These tasks include subsurface soil borings and sampling, aerial surveys, 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; 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 and drilling 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 crew will use protective gloves to handle potentially contaminated materials, and, if necessary, the SSHO will upgrade the required PPE to prevent 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 Section 2.0, Table 2-2.

This investigation 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 DESCRIPTOIN AND CONTAMINATION CHARACTERIZATION

1.1 SITE DESCRIPTION

RVAAP is a 1,481-acre portion of the 21,419-acre Ravenna Training and Logistics Site (RTLS) of the Ohio Army National Guard (OHARNG). A total of 19,938 acres of the former 21,419-acre RVAAP was transferred to the United State Property and Fiscal Officer (USP&FO) for Ohio in 1996 and 1999 for use by the OHARNG as a military training site. The current RVAAP consists of 1,481 acres in several distinct parcels scattered throughout the confines of the Ohio Army National Guard (OHARNG) Ravenna Training and Logistics Site (RTLS). The RVAAP and RTLS are co-located on contiguous parcels of property and the RTLS perimeter fence encloses both installations. Since the Installation Restoration Program (IRP) encompasses past activities over the entire 21,419 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) U.S. Army facility. Currently, the installation is jointly operated by the U.S. Army Rock Island BRAC Field Office and the OHARNG.

The RVAAP is located within the confines of the RTLS which is in northeastern Ohio within Portage and Trumbull counties, approximately 4.8 kilometers (3 miles) east northeast of the town of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the town of Newton Falls. The RVAAP portions of the installation are solely located within Portage County. The installation consists of a 17.7-kilometer (11-mile) long, 5.6-kilometer (3.5-mile)-wide tract bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garrett, McCormick and Berry roads on the west; State Route 534 to the east, and the Norfolk Southern Railroad on the north (Figures 1-1 and 1-2). The installation is surrounded by several communities: Windham on the north, Garrettsville 9.6 kilometers (6 miles) to the northwest, Newton Falls 1.6 kilometers (1 mile) to the east, Charlestown to the southwest, and Wayland 4.8 kilometers (3 miles) southeast.

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.

1.1.1 ODA2

ODA2 is situated in the central portion of the RVAAP facility. The AOC is characterized by gently to steeply sloping topography on a weathered shale bedrock surface. Elevations across the AOC vary from approximately 309 meters to 326 meters (1,017 feet to 1,071 feet) above mean sea level (amsl).

Cultural features at ODA2 consist mainly of gravel access roads and three above-ground explosive storage bunkers. Surface soil in much of the AOC was highly disturbed during the detonation, disposal, and unexploded ordnance (UXO) clearance activities that have occurred at the site.

Within the ODA2 AOC, the 2.5 acre RCRA area is sparsely vegetated with native grasses due to the UXO clearance project and subsequent reseeding. Adjacent portions of the AOC historically used for detonation or disposal are characterized by scrub vegetation and immature hardwoods. Areas to the east, west, and south of the detonation/disposal areas are characterized by mature hardwood forest. Wetland areas are found along the Sand Creek drainage channel to the east and west of the historically active portions of the AOC.

In general, explosive/propellant contamination was found at the site. The metal concentrations at the site were compared to Region IX PRGs (residential). The only metals that exceeded these PRGs were iron, arsenic, and manganese.

1.1.2 FBQ

FBQ is also located in the central portion of the RVAAP facility. The AOC is characterized by gently sloping to relatively flat-lying topography on a weathered sandstone bedrock surface. Elevations across the AOC vary from approximately 335 meters on the eastern portion of the AOC, to 353 meters (1,088 feet to 1,160 feet) amsl on the western portion.

Cultural features on the site include gravel access roads and 14 man-made ponds. There are three larger ponds on the eastern portion of the site; eleven smaller and shallower ponds are located in the western portion of the AOC. Surface soils adjacent to the ponds and in the central area of the AOC were removed during quarrying operations. Portions of the AOC generally to the north and west were not disturbed and remain as mature hardwood forest. The disturbed areas are characterized by scrub vegetation and immature hardwood trees. Wetland areas are found in the shallow ponds and shallow areas of the deeper ponds. An unnamed tributary to Hinkley Creek generally flows from north to south just to the west of the 11 shallow ponds.

Nine explosive/propellant compounds were detected at least once in surface soil samples collected during the Supplemental Phase II RI. Seventeen inorganic compounds were detected above background in surface soil samples collected from FBQ, but only five compounds exceeded U.S. Environmental Protection Agency (EPA) Region IX PRGs (residential) (manganese, arsenic, iron, lead, and antimony), with manganese, lead, and antimony exceeding the PRG in one sample.

1.1.3 CBP

CBP is located in the east-central portion of the RVAAP facility on Paris-Windham Road. The AOC has relatively flat topography as a result of historical grading and fill activities that were used during the development of the AOC. Investigations have discovered numerous piles of soil at the west and north portions of the AOC. The RI investigation activities did not evaluate these materials.

Iron and arsenic exceeded the USEPA Region IX PRGs (residential) in soils sampled during the Phase I investigation. There was one exceedance of benzo(a)pyrene, lead, and chromium in soils.

1.2 CONTAMINANTS

Table 1-1 lists contaminants known to occur in soil at ODA2, FBQ, and Central Burn Pits. Inclusion in this tableindicates the potential to encounter a contaminant during the supplemental Phase II RI field activities, but it does not necessarily indicate that the contaminant is present in sufficient quantity to pose a health risk to workers.

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

Analyte	Units	FBQ Maximum Detect	ODA2 Maximum Detect	CBP Maximum Detect
MISC				
Chromium, hexavalent	mg/kg	6.8	28.0	--
Metals				
Aluminum	mg/kg	--	23400.0	29700
Antimony	mg/kg	74.4	--	1.8
Arsenic	mg/kg	27.1	19.9	32.8
Barium	mg/kg	1070	175.0	417
Beryllium	mg/kg	1.5	1.5	3.9
Cadmium	mg/kg	4	9.5	2.2
Chromium	mg/kg	88.9	60.8	48.8
Cobalt	mg/kg	36.8	24.6	22.3
Copper	mg/kg	559	1210.0	1260
Cyanide, total	mg/kg	--	--	99
Lead	mg/kg	887	218.0	493
Manganese	mg/kg	2310	2140.0	6150
Mercury	mg/kg	1.2	9.9	0.079
Nickel	mg/kg	85.4	31.2	26.6
Selenium	mg/kg	7.9	1.9	2
Silver	mg/kg	--	--	0.32
Thallium	mg/kg	--	--	0.24
Vanadium	mg/kg	36	38.0	37
Zinc	mg/kg	1330	557.0	1500
Organics-Explosives				
1,3,5-Trinitrobenzene	mg/kg	1.7	0.1	--
2,4,6-Trinitrotoluene	mg/kg	99	3.2	0.18
2,4-Dinitrotoluene	mg/kg	0.4	0.2	--
2,6-Dinitrotoluene	mg/kg	1.3	0.4	--
2-Amino-4,6-dinitrotoluene	mg/kg	12	0.3	--
4-Amino-2,6-dinitrotoluene	mg/kg	9.7	--	--
Nitrobenzene	mg/kg	0.083	--	--
Nitrocellulose	mg/kg	150	--	1.8
RDX	mg/kg	0.33	0.2	--
HMX	mg/kg	--	0.6	--
Nitroglycerine	mg/kg	--	31.0	--
Nitroguanidine	mg/kg		0.1	--
Tetryl	mg/kg	--	18.0	--

Table 1-1. Maximum Concentrations of Constituents of Potential Concern (continued)

Analyte	Units	FBQ Maximum Detect	ODA2 Maximum Detect	CBP Maximum Detect
Organics-Pesticide/PCB				
4,4'-DDE	mg/kg	0.00037	0.0	0.0018
4,4-DDT	mg/kg	--	--	0.0027
Aroclor-1254	mg/kg	--	--	0.24
Endosulfan I	mg/kg	--	--	0.001
Endosulfan II	mg/kg	--	--	0.0034
Endrin	mg/kg	--	--	0.0024
gamma-Chlordane	mg/kg	--	--	0.0047
Heptachlor Epoxide	mg/kg	--	--	0.00058
Organics-Semivolatile				
Benz(a)anthracene	mg/kg	0.19	--	0.21
Benzo(a)pyrene	mg/kg	0.084	--	0.24
Benzo(b)fluoranthene	mg/kg	0.26	--	0.31
Benzo(k)fluoranthene	mg/kg	0.085	--	0.36
Chrysene	mg/kg	0.37	--	0.26
Di-n-butyl phthalate	mg/kg	0.24	--	--
Fluoranthene	mg/kg	0.87	--	0.33
Pyrene	mg/kg	0.64	--	0.3
n-Nitrosodiphenylamine	mg/kg	--	0.1	--
2-Butanone	mg/kg	--	0.0	--
bis(2-ethylhexyl) phthalate	mg/kg	--	0.1	--
di-n-Butyl Phthalate	mg/kg	--	0.9	--
Indeno(1,2,3-cd)pyrene	mg/kg	--	--	0.16
Phenanthtene	mg/kg	--	--	0.09
Organics-Volatile				
Acetone	mg/kg	0.0051	0.0	--
Carbon disulfide	mg/kg	0.069	--	--
Methylene chloride	mg/kg	0.027	--	--
Trichloroethene	mg/kg	0.0049	--	--
Tetrachloroethylene	mg/kg	--	0.0	--
Toluene	mg/kg	--	0.0	--

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:

- Soil sampling with hand augers, or scoops;
- Vegetations clearing with chainsaws, machetes, and sling blades, as required;
- Surveying;
- Investigation-derived waste handling and disposition; and
- Sampling equipment decontamination.

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 ODA2, FBQ, and CBP are explosives and metals. Information on the potential contaminants, as well as the reagents and chemicals that will be used for the project, is contained in Table 2-3. 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
Gunfire (deer hunting with shotguns loaded with slugs is allowed in some areas on Friday and Saturday during season, October and November)	Fieldwork will not be conducted during 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
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
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
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

Table 2-2. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
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
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

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 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
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
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
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

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 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
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

FSHP = Facility Wide Safety and Health Plan
GFCI = ground-fault circuit interrupter
HAZWOPER = Hazardous Waste Site Operations
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
PVC = polyvinyl chloride
RVAAP = Ravenna Army Ammunition Plant
SAIC = Science Applications International Corporation

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
Health and Safety Manager	Steve Davis CIH, CSP	865-481-4755
Project Manager	Laura Obloy	330-405-9810
Field Operations Manager	Martha Clough	330-405-5804
Site Safety and Health Officer	Martha Clough	330-405-5804
MEC Avoidance Subcontractor	Manok Synakorn	(813) 884-5722

CIH= Certified Industrial Hygienist
CSP = Certified Safety Professional
MEC = munitions and explosives of concern

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

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).

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.

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 Supplemental Phase II RI fieldwork is 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 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	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

8.0 HEAT/COLD STRESS MONITORING

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

9.0 STANDARD OPERATING SAFETY PROCEDURES

Standard operating safety procedures are described in the FSHP.

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.

11.0 PERSONNEL HYGIENE AND DECONTAMINATION

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

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 Environmental Coordinator	(330) 358-7311
USACE, Paul Zorko	(502)315-6353
Ohio EPA, Todd Fisher	(330) 963-1148

13.0 LOGS, REPORTS, AND RECORD KEEPING

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

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.

APPENDIX A

SITE MAP

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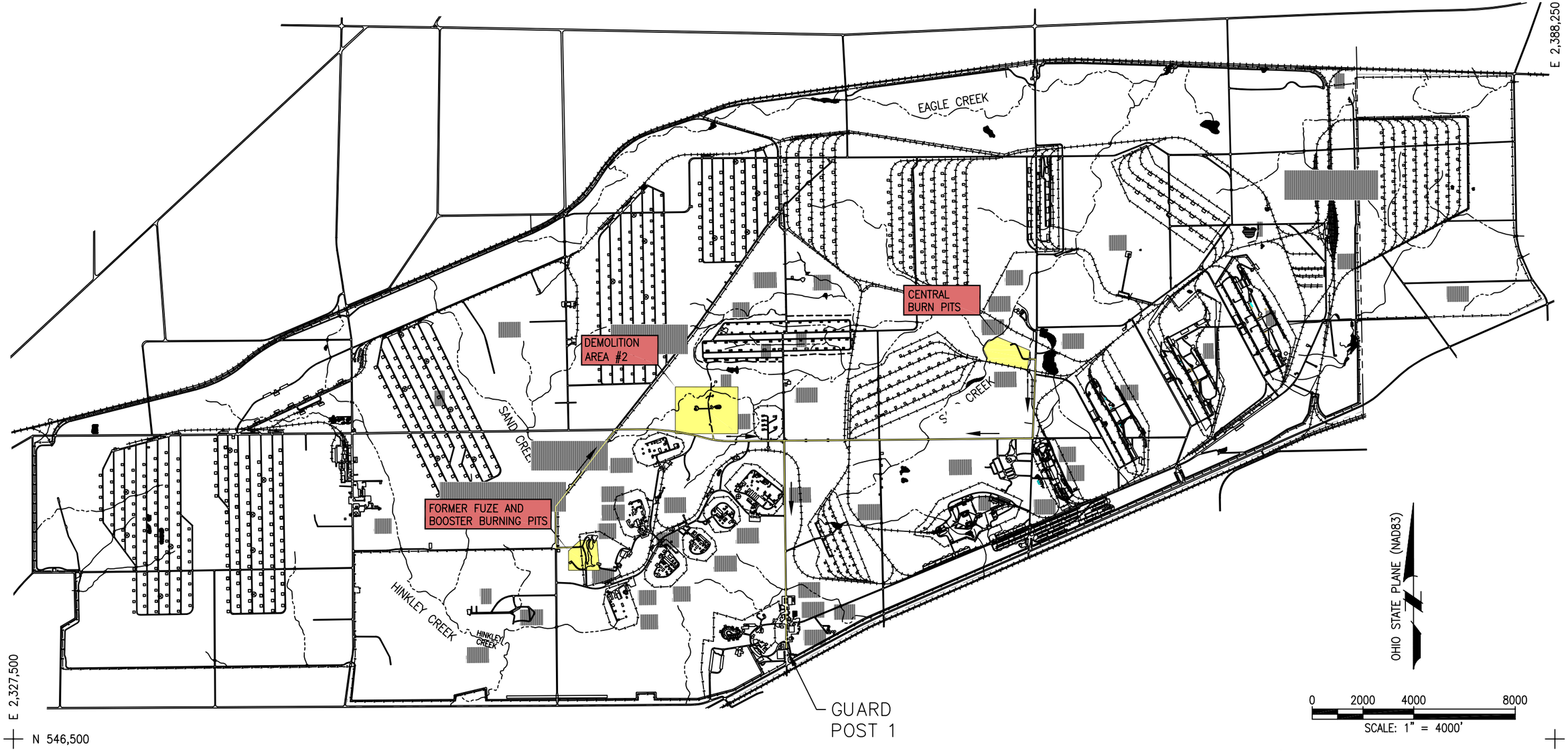

LEGEND:

1 RAMSDELL QUARRY LANDFILL
2 ERIE BURNING GROUNDS
3 DEMOLITIONS AREA #1
4 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 AND DILUTION/SETTLING POND
13 BUILDING 1200 AND DILUTION/SETTLING POND
14 LOAD LINE 6, EVAPORATION UNIT
15 LOAD LINE 6, TREATMENT PLANT
16 QUARRY LANDFILL/FORMER FUZE AND BOOSTER BURNING PITS
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 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

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

DRAWN BY:	REV. NO./DATE:	CAD FILE:
P.H. / S.D.	REV. 1/ 08–08–05	PBC 2005\LOCATION MAP\EGRESS MAP

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APPENDIX B

ROUTE MAP TO PRE-NOTIFIED MEDICAL FACILITY

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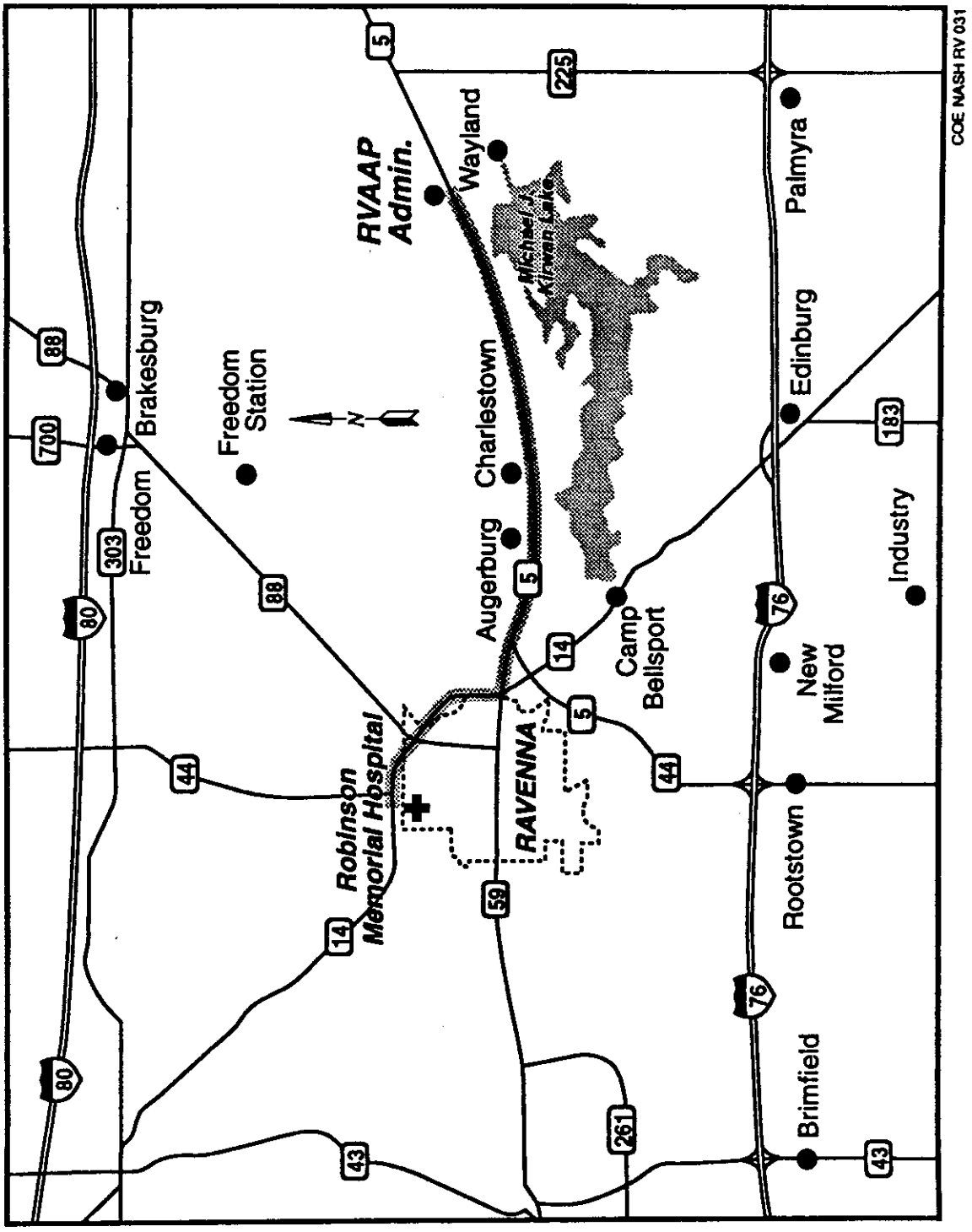

Figure B-1. Route Map to Pre-Notified Medical Facility

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DRAFT Supplemental Phase II RI SAP, Addendum No. 1 for the Performance-Based Contract for Six Environmental Areas of Concern (dated June 10, 2005)
Ravenna Army Ammunition Plant, Ravenna, Ohio
Comment Response Table
OCTOBER 4, 2005

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
The Army (USACE, RVAAP, USAEC)				
1		General; In all subsequent Preliminary Draft and Draft documents, please provide line numbering.		Noted. Subsequent reports will include line numbering.
2	Page 2, Para 1.2.1, line 3	Please change 1987 to 1976.		Agree. Text revised as follows: "FBQ was used as an explosive contaminated sawdust burning area for Load Lines 6 and 11 from 1945-1949. *In 1976*, settling ponds were constructed, separated by earthen dams, with flow control gates for spent brine regenerant and sand filtration backwash from the Water Works 3 treatment plant, which treated groundwater from facility production wells (*1976*-1993)."
3	Page 2, Para 1.2.1, line 6	Please mention that several of these ponds appear on aerial photographs of the facility that predate construction of the facility.		Agree. Text revised follows: "Before 1987, 11 ponds/depressions excavated within a low drainage area west of the quarry were used for settling purposes. *Several of these ponds appear on aerial photographs predating construction of the facility."*
4	Page 2, Para 1.2.2, next to last line	Please mention that rocket ridge is not included with the current contract.		Agree. Text revised as follows: "Rocket Ridge" and adjacent riparian areas of Sand Creek have not been cleared of MEC. *"Rocket Ridge" is not included in the current scope of this PBC."*
5	Page 3, Para 1.3, 2nd para, 2 line	Please add, " some or all"" of the soil samples ---.		Agree. Text revised as follows: "Inorganics, explosive/propellant compounds, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and pesticides were detected in *some or all* of the soil samples collected during the Phase I/Phase II RIs."

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
6	Page 10, Para 4.1.1.1, 1st bullet	Instead of discrete samples, suggest 3 or 4 trench samples into the steep or apparent dump slopes in this area and 3 multi-increment samples about 15' wide by 150' long along the tops of these slopes, but about 5' back from the tops of slope. These samples would provide much better characterization than the discrete samples proposed.		Acknowledged. Discrete samples will be collected at each sample location in a triangular pattern as detailed in the Facility Wide SAP. The preference will be to homogenize discrete samples using the MI processing technique (i.e., sieving, drying, and grinding) as performed by MKM during implementation of the 14 AOC sample activities. If MKM is not available to assist with homogenization techniques, discrete samples will be collected and homogenized in accordance with the Facility Wide SAP. Please see Attachment I to this CRT for further explanation and agreements.
7	Page 10, Para 4.1.1.1, 2nd and 3rd bullets	Instead of discrete surface samples, suggest that each of the three surface soil samples be replaced by multi-increment samples about 15' wide by 150' long with the long axis in the east-west direction at the approximate locations of the proposed discrete sample locations to determine southward extent. For any subsurface samples, place a discrete sample at the approximate middle of the surface soil multi-increment sample location.		Please see response to Army comment #6.
8	Page 10 Para 4.1.1.2	Suggest any additional surface soil sampling to define limits of explosives be multi-increment ones about 15' wide by 150' long with the long axes perpendicular to the direction in which the limit of contamination is being determined; with discrete subsurface samples at the approximate middle of the corresponding multi-increment surface soil samples.		Please see response to Army comment #6..
9	Para 4.1.1.3, 1st bullet	Suggest an approximate 30' x 30' multi-increment sample with previous location SS-026 in the approximate middle of the 30' x 30' area, and a 2nd multi-increment sample about 15' wide that connects the two proposed discrete sample locations shown on Figure 4-3 that are west and southwest of SS-026. Again discrete subsurface samples would be taken in the approximate middle of those surface soil sample locations.		Acknowledged. Per 03 August 2005 Draft Supplemental SAP CRT teleconference, the multi-increment sampling approach will not be used at this point in the process to determine if remediation is required. Please see response to Army comment #6 and Attachment I to this CRT.

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
10	Para 4.1.1.3, 2nd bullet	Suggest any additional sampling to define nature and extent be performed as in Comment 8 above. Moreover, at any individual previous discrete sample locations that showed contamination above levels that would require remediation, suggest a roughly 30' x 30' sample be taken to confirm the need for that remediation.		Please see responses to Army comments #6 and #9.
11	Para 4.1.1.3, last bullet	Suggest that separate multi-increment samples at individual piles if those piles are far apart, or common if some of the piles are close together, as discussed in your 3rd bullet.		Agree. Please see Attachment I to this CRT. Text revised as follows: "*Multi-increment samples will be collected from the piles and berms at Central Burn Pits not previously sampled during the RI. Multi-increment samples collected from the piles/berms at Central Burn Pits will be used to evaluate disposition options/requirements for the FS. One MI sample (up to 12) will be collected for each pile/berm identified (Figure 4-3). Seven piles and five berms were identified during a site walkover at CBP. The piles and berms and aggregation for sampling will be agreed to during field mobilization.*"
12	Page 11, Para 4.1.1.4, 2nd para, 2nd line	Please add, --- multiple stratified random --.		Agree. Text revised as follows: "Multi-increment samples are composite samples collected from multiple *stratified* random points within each of the designated multi-increment sampling areas."
13	Para 4.2	For all multi-increment samples, survey in the corners of the sample, and determine the elevation at the approximate middle of the sample area.		Agree. Text revised to state: "*For multi-increment samples, the corners of the area will be surveyed and the elevation will be determined in the approximate center of the sample area*".
14	Figure 5-1	Please confer with Pat Ryan and MKM on how previous multi-increment samples have been identified and utilize that system.		Agree. An "M" will be added after the location number to indicate that the sample is a multi-increment sample.

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
15	QAPP, Para 9.3	Please specify that all data will be processed in ADR/EDMS software, and that both the primary and QA lab will be proficient in the use of this software. Please also state that the Ravenna Library will be utilized for the ADR. This library is available from Dave Brancato. Please ensure that the lab knows that all errors in the ADR/EDD found by CHECKER must be corrected by the lab. LRL will not accept an EDD with any errors once the Project Specific Library is used.		Agree. Section 9.3 of the QAPP revised to state: "*The contract laboratory will deliver an EDD that is ADR compatible. All data will be processed with ADR/EDMS software using the Ravenna library. All errors in the ADR/EDD found by CHECKER will be corrected by the laboratory prior to transmittal. EDDs with errors will not be accepted*."
16	Section 3.0; p8	Chasing Arsenic and iron….What is the source of arsenic at FBQ? What is the source of iron?	Unless we can relate arsenic to a source it may be naturally occurring. Distinguish iron from earth's crust from that which may have resulted from rusting shells.	Please see response to Ohio EPA comment #4.
17	Section 4, p 10	Why the need to take discreet and multi-increment samples.	Use the data sets for the desired objectives. If discrete samples purposed one decision per the decision unit, then keep that sample group with the respective decision. The same with the multi-increment data sets.	Please see response to Army comment #6.
18	Section 4.1.1.1	Use of discrete samples may not achieve your objective.	Define your unit of exposure and determine if the COPC is bounded in the unit via multi-increment sampling.	Please see response to Army comment #6.
19	Section 4.1.1.2	Use of discrete samples may not achieve your objective.	Define your unit of exposure and determine if the nature of the COPC changes within the unit via multi-increment sampling.	Please see response to Army comment #6.
20	Section 4.1.1.3	Use of discrete samples may not achieve your objective of manganese extent.	Define your unit of exposure and determine if the nature of manganese changes within the unit via multi-increment sampling. The aforementioned holds true for the RGO cluster exceedances at the eastern portion of the site.	Please see response to Army comment #6.
21	Section 4.1.1.3 & 4.1.2.1	Purpose multi-increment approach to set the bounds of the average. Remember your decision unit represents an average…..we should not be using probabilistic statistics to focus on quartiles, percentiles, standard deviations; rather, use of a physical method, like multi-increment sampling is used to find the average concentration. Suggest that discrete samples not be used.	This sample will be a 'collection' not 'composite'….. Constitutional and distributional heterogeneity is corrected during multi-increment sampling	Please see response to Army comment #6.

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
22	QAPP…Section 3.0	Any variances to LCG? Selected Laboratory will deliver EDD that is ADR compatible	Project library is defined as LCG in ADR unless variances to the RVAAP-SAP are requested. Please let us know if other than LCG library is needed for ADR.	Agree. The following has been added to QAPP Section 3.1: *"The contract laboratory will deliver an EDD that is ADR compatible. The contract laboratory will identify variances to the established library prior to any analysis being performed. Once analysis begins, no variance to the library will be accepted. No variances to the LCG are anticipated."*
23	SSHP…Section 2.0	Because of the potential for dust….assess the need for HEPA half-mask APRs	Table 7-1…include airborne dust that potentially contains. metals, fibers with DNT; etc. Also not enough is said about West Nile Virus and Lyme Disease….ODH has indicated Ravenna has prevalence for West Nile…also cases of Lyme disease reported at RVAAP remains remarkable.	Disagree. Measured concentrations of SRCs do not warrant the need for HEPA half mask APRs as long as dust levels are kept to a minimum. Text will be added to ensure if visual dust is encountered, dust suppression methods will be used. Text regarding West Nile and Lyme disease is included in the Facility Wide SSHP Section 9. This SSHP is an addendum. Both this addendum and the Facility Wide SSHP will be used by field personnel while performing field activities.
24	Page 2, lines 2/3	a) Please check whether JMC and MKM are correct. b) In line 3, please use "Ohio **Army** National Guard"		Please see response to OHARNG comment #1.
25	Page 3, paragraph 2	**I**norganics…		Agree. Text revised to read "*I*norganics, explosive/propellant compounds,… "
26	Page 3, section 1.3.2, fourth bullet	Please capitalize Furnace		Agree. Text revised as follows: " for the Deactivation *F*urnace Area, Open Detonation Area, Building 1601,…"
27	Page 8, objectives	Please note that the PWS requires that SAIC finalize the RI, not just "further define." This comment applies to several places in the text (section 3.2.1.1, 3.2.1.2, 3.2.1.3, 4.1.1		Acknowledged. It is noted the PWS requires finalization of the RI, but the intent of the sampling and this SAP Addendum is to define extent in support of the RI Reports and collect data for the Feasibility Study.

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
28	SSHP, Add 1, page 3, section 2.2, line 2	What is meant by the term "residues"? If SVOCs are COCs, please state that.		Agree. Term "residues" will be deleted. Text revised as follows: "Prior sampling results indicate that the primary contaminants of concern at ODA2, FBQ, and CBP are explosives and metals. "
29	Page 2, sec. 1.2.1	The statement " Land east of…." Is partially incorrect. To my knowledge there is no historical information indicating that fuze and booster components were incinerated/deactivated in this area.		Agree. This statement refers to the 40 mm range and will be deleted from the text.
30	P. 12, sec. 4.1.1.5, 2nd sentence	Statement should read "…samples for headspace analyses will not be *collected*."		Agree. Text revised as follows: "…samples for headspace analyses will not be *performed*."
31	P. 12, sec 4.1.1.6	MS/MSD samples need to be collected at a rate of 10%. This is an error in the Facility Wide SAP.		Agree. Text will be revised as follows: "Matrix spike/matrix spike duplicate samples will be collected at a rate of *10*% of total samples per media."
32	P. 13, sec 4.1.2.1, last para	MI samples need to be processed using stainless steel sieves.		Agree. Section 4.1.2.1 has been revised in response to comments. Section 4.1.2.2 Text revised as follows: "The soil will then be sieved using a #10 and #4 *stainless steel sieve*. "
33	P. 13, Sec 4.1.2.2	As stated this paragraph is confusing. Re-word to indicate that headspace sampling of individual soil samples will not be performed. Breathing zone OVA screening however will be performed.		Agree. Text revised to read: "All field measurement procedures and criteria will follow Section 4.4.2.3 of the Facility Wide SAP, with the following exception. Headspace *sampling of individual soil samples will not be performed.* Because there were no previous notable detections of VOCs, organic vapor monitoring of headspace gases is not necessary. Organic vapor analyzer (OVA) readings *will be taken in the breathing zone* and will be noted in the field boring logs."
34	Figures 4-1, 4-2 and 4-3	Contour line shading needs to be darkened to improve readability.		Agree. Figures will be revised to darken contour lines.

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
35	Appendix A	Indicate that OE Avoidance Plan will be provided under separate cover. This document will also need to be provided for review and approval prior to initiating field work.		Agree. OE Avoidance Plan provided to Ohio EPA Aug. 04, 2005.
36	SSHP, P. 21, sec 12.0	As in the past, 2-way radios will also be required during performance of field work given the spotty nature of cellular service in areas of the facility. Additionally a map detailing the egress route to Post 1 also needs to be included in the addendum.		Agree. This requirement has been added to the SSHP along with a map detailing the egress route to Post 1. Text revised as follows: "Each field team shall have a cellular *phone and/or a 2-way radio* capable of contacting Guard Post 1 for communications purposes."

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
Ohio EPA, Northeast District Office Division of Emergency and Remedial Response				
1	General	The background and risk based screening levels are used to screen data and help determine nature and extent of contamination. Remove subjective terms such as "slightly" from the text when discussing site specific data compared to screening criteria and just state if you are above or below these levels.		Agree. Subjective terms will not be used. Text revised to remove the word "slightly".
2	Section 1.3.1 FBQ Landfill/Ponds, 2nd paragraph, page 3	Please capitalize the word "inorganics."		Agree. Text revised to "*I*norganics, explosive/propellant compounds..".
3	Section 1.3.1 FBQ Landfill/Ponds, page 3	There is no mention of the perchlorate detection in the surface water. This should be added to the third paragraph of this section.		Agree. The following text has been added to Section 1.3.1: "Explosives/propellants, *perchlorate* and SVOCs were detected in surface water at FBQ. *Perchlorate was detected in surface water samples collected in 2003; however, perchlorate was not detected at these same sample locations in 2004*."

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
4	Section 3.2.1.1 Nature and Extent at FBQ, page 8	a) The objective is to further define nature and extent of explosive compounds that were detected during the Phase I/Phase II RI. However, this SAP proposes the collection of one sample to be analyzed for manganese, an inorganic. It is unclear how one additional sample for manganese will fulfill the objective of defining nature and extent of explosive compounds. What is the planned course of action if this one additional sample is detected above screening levels? b) In addition, the SAP states that arsenic and iron were detected above the Region 9 PRGs (residential) and above background. Has the locations of the arsenic and iron exceedences been bounded by samples detected below screening levels? Please explain the rationale for not including additional samples for nature and extent of arsenic and iron in lieu of sample results. a) Ohio EPA is not sure that one sample for manganese will be enough and recommends collecting an adequate number of samples to facilitate the determination of (nature and) extent of contamination.		Acknowledged. a) Paragraph clarified as follows: "*The objective of this Supplemental Phase II sampling at FBQ is to define the nature and extent of explosive and inorganic compounds detected during the previous Phase I/Phase II RI in the upper northeast corner and southern portion of FBQ. The detections of explosives that have not been bounded reside in the upper northeast corner or southern end of FBQ. In addition, one location exceeds background for manganese (1,450 mg/kg) that is only partially bounded, for which an additional sample will be collected to define the extent in that area*." Please note the location proposed to be "bounded" for manganese is in the proximity of two other locations whose concentrations of manganese were below background. b) Detected concentrations of arsenic at FBQ are similar to naturally occurring concentrations of arsenic. The average concentration of arsenic (11.2 mg/kg) is below background (15.4 mg/kg) at FBQ. The maximum detections of iron occur in samples -044 and -045 located in the piles and are bounded.
5	Section 3.2.1.2 Nature and Extent at ODA2, page 8	a) Text states that "Sample locations will be placed where it is determined explosive contamination has not adequately been bounded." This is too vague and does not present the rationale for making this decision. Please be more specific. b)Explain why no additional samples will be collected to define the extent of aluminum, iron, arsenic, and manganese when these have been detected in previous sampling above screening		Acknowledged. a) Text revised as follows: "*Explosives detected in the northwestern portion of the site require delineation. Sample locations will be placed where explosives have been detected and have not been bounded*." Details on the number and location of samples are provided in Section 4.1.1.2.

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
		levels?		b) Detected concentrations of aluminum, iron, arsenic, and manganese at ODA2 are similar to naturally occurring concentrations. Average results for aluminum, arsenic, manganese are at or below background (please see reference to Ohio EPA #5 attached to this CRT). Text revised as follows: "Inorganics detected at ODA2 were compared to Region IX PRGs (residential). Only aluminum, iron, arsenic, and manganese exceeded these PRGs. *Detected concentrations of aluminum, iron, arsenic, and manganese at ODA2 are similar to naturally occurring concentrations. Average results for aluminum, arsenic, and manganese are at or below background (Table 3-1).* No *further* samples will be collected to delineate the extent of these four inorganics.
6	Section 3.2.1.3 Nature and Extent at CBP, page 9	a) Clarify what RGO values are being referenced in the third sentence? To the best of my knowledge, only the RGO values for Load Lines 1-4 have been agreed upon and approved by Ohio EPA. b) Please specify how many soil samples and what analysis is being proposed for CBP. c) Will analytical methods be utilized to speciate chromium? d) It is unclear if all additional sampling at CBP will be done using multi-increment sampling approach. e) Has all existing data for CBP been collected using multi-increment sampling? f) Clarify, why two multi-increment samples will be collected and how this data will be used for decision making purposes and in the risk assessment. The objective of the second multi-increment sample is to		a) Preliminary RGOs were developed in the Human Health Risk Assessments for Central Burn Pits and Open Demolition Area #2 and were preliminarily calculated for FBQ. These preliminary RGOs were utilized to ensure adequate data is collected for purposes of the Feasibility Study. SAIC understands that RGOs have not been approved by Ohio EPA for these sites, but these preliminary values were used to determine if additional sampling to support the FS may be required. Text has been revised to state: "*Arsenic, manganese, iron, lead, and chromium were detected above background and their respective Region IX PRGs (residential) at CBP. However, the average concentrations of all but lead were below background (Table 3-2). The exceedances of lead, manganese, and chromium are bounded. The Central Burn Pit RI established manganese, chromium, and arsenic as chemicals of concern as well as preliminary Remedial Goal Options (RGOs) for these constituents. Detections*

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		determine if the area has been impacted by previous burning activities however, it is unclear if this is the same objective for the first multi-increment sample? If so, then the objective of this additional sampling at CBP is to determine the nature and not necessarily the extent of contamination - please clarify.		*exceeding these RGOs are proximate to areas associated with previous burn activities at CBP. Soil samples will be collected to delineate the extent of these three COCs*." (please see reference to Ohio EPA #6 attached to this CRT). b) Details on the number of soil samples at CBP are detailed in Section 4.1.1.3. c) There is no known source of chromium VI at CBP; however, samples for analysis of hexavalent chromium will be collected at the location of previous samples SS-004, SS-018, and SS-033 (where chromium was detected at concentrations greater than background) to determine if chromium VI is present. Section 3.2.1.2 revised as follows: *"In addition, hexavalent chromium samples will be collected from previously sampled locations to speciate chromium at CBP. Previous locations selected include the highest detection of chromium (SS-004) in an area associated with burn activities, the third highest detection of chromium (SS-018) in an area associated with burn activities, and a location on the boundary of the limit of assessment where chromium was not detected above background (SS-033)."* d) SAIC proposed to collect five discrete samples and two multi-increment samples at CBP in the SAP. The sampling approach has been updated to include collection of 1 multi-increment sample from each pile and berm at CBP (up to 12). e) Existing data at CBP were collected using discrete sampling techniques. f) The debris piles and berms were not characterized during the Phase I sampling

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
				conducted at CBP. Multi-increment samples were proposed to determine nature and extent. Based on a site walkover and review of aerial photography, two distinct use areas were noted. One area associated with the burn areas, and one area associated with the construction laydown yard. One multi-increment sample was originally proposed for each of the berms/debris piles associated with these two distinct areas. As noted above, the sampling approach has been updated to include 1 multi-increment sample collected from each pile and berm at CBP. Section 3.2.1.3 revised as follows: "*Piles and berms identified at CBP were not characterized during the RI. To determine if these berms/piles have been impacted by previous burning activities, multi-increment sample will be collected from each of the piles/berms. Multi-increment samples collected from the piles/berms at CBP will be used to evaluate disposition options/requirements for the FS*."

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
7	Section 4.1.1 Rationale, page 10	For the soil interval 1' to 3', please use the terminology "deep surface" soil rather than subsurface soil. This is consistent terminology used at other Ravenna AOCs. It is used to distinguish between the soil intervals and exposure.		Acknowledged. In RVAAP's Facility Wide Human Health Risk Manual, Table 5, Surface soil is presented as 0-1 for all receptors except the National Guard trainee which is 0 to 4 feet. Subsurface soil is defined as 4 to 7 feet for the trainee and the resident as 1 to 13 feet. Per 03 August 2005 Draft Supplemental SAP CRT teleconference: Consistent with EBG, RQL, and ODA2 HHRAs ~ the term "deep surface" was given to 0 to 4 to differentiate between 0 to 1 (shallow surface) and 0 to 4 (deep surface). To further clarify these definitions and associate sample intervals, the term is defined in the documents we've developed e.g., surface soil (0 to 1 ft bgs), subsurface soil (1 to 3 ft bgs) and this information is repeated throughout the text and tables to remind the reader of the sampled depth interval.
8	Section 4.1.1.1 FBQ Surface Soil Sample Location, first bullet, page 10	Please change "explosion" to "explosive."		Agree. Text revised to read "…These samples will encompass the *explosive* detections at Supplemental Phase II sample locations…"
9	Section 4.1.1.6 Field QC Sampling Procedures, 3rd sentence, page 12	Please change "5%" to "10%" in the text. Also, please check the QAPP addendum to make sure that 10% MS/MSDs are reflected in the text and table (i.e. Table 1-1).		Agree. Text revised as follows: "Matrix spike/matrix spike duplicate samples will be collected at a rate of *10*% of total samples per media".

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
10	Section 4.1.3 OE Avoidance, last sentence, page 13	The text states that "OE technicians will collect soil samples in areas known or suspected (i.e., red soil or raw product) to have explosive concentrations greater than 10% (100,000 mg/kg)." Please revise the text to indicate whether the 10% is "by weight" or "by volume."		Agree. Text revised as follows: "explosives concentrations greater than 10% *by weight* (100,000 mg/kg)."
11	Figures 4-1, 4-2, and 4-3	Sample locations are marked, however they are not identified with respect to sample numbers and/or station numbers. Please use Table 5-1 to mark locations with station numbers on these figures.		Agree. Figures 4-1, 4-2, and 4-3 will include sample location labels.

Cmt. No.	Page #/ Section #	Comment	Recommendation	Response
OHARNG				
1	General	The draft OE Avoidance Plan doesn't include the comments sent previously for incorporation into paragraph 1.2. Also, this recommended wording should have been included in the SAP comments, and in any other documents / CRT's for documents that contained the original wording.	Recommended wording: Up until 1999, the RVAAP was a 21,419-acre installation. A total of 19,938 acres of the former 21,419-acre RVAAP was transferred to the United States Property and Fiscal Officer (USP&FO) for Ohio in 1996 and 1999 for use by the OHARNG as a military training site. The current RVAAP consists of 1,481 acres in several distinct parcels scattered throughout the confines of the Ohio Army National Guard (OHARNG) Ravenna Training and Logistics Site (RTLS). The RVAAP and RTLS are co-located on contiguous parcels of property and the RTLS perimeter fence encloses both installations. Since the Installation Restoration Program encompasses past activities over the entire 21,419 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) facility. The RVAAP is located within the confines of the RTLS which is in northeastern Ohio within Portage and Trumbull counties, approximately 4.8 kilometers (3 miles) east northeast of the town of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the town of Newton Falls. The RVAAP portions of the installation are solely located within Portage County. The installation consists of a 17.7-kilometer (11-mile) long, 5.6-kilometer (3.5-mile)-wide tract bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garrett, McCormick and Berry roads on the west; State Route 534 to the east, and the Norfolk Southern Railroad on the north (see Figures 1-1 and 1-2). The installation is surrounded by several communities: Windham on the north, Garrettsville 9.6 kilometers (6 miles) to the northwest, Newton Falls 1.6 kilometers (1 mile) to the east, Charlestown to the southwest, and Wayland 4.8 kilometers (3 miles) southeast.	Agree. Section 1.2 revised consistent with the text agreed upon at the Draft RQL/CBP RI Report CRT teleconference – short version. Please see reference to OHARNG Comment #1 attached to this CRT.

Ohio EPA Comment #5: Open Demolition Area #2 Surface Soil Summary Statistics:

Analyte	Units	Frequency of Detection	Minimum Detect	Average Result	Maximum Detect	Site Background Criteria
Aluminum	mg/kg	63/ 63	4,020	11,100	23,400	17,700
Arsenic	mg/kg	63/ 63	3.5	13.1	19.9	15.4
Iron	mg/kg	63/ 63	10,200	23,900	39,300	23,100
Manganese	mg/kg	63/ 63	115	518	2,140	1,450E

Ohio EPA Comment #6: Central Burn Pits Surface Soil Summary Statistics:

Analyte	Units	Frequency of Detection	Minimum Detect	Average Result	Maximum Detect	Site Background Criteria
Arsenic	mg/kg	42/ 43	1.7	11.7	32.8	15.4
Chromium	mg/kg	43/ 43	4.4	15.7	48.8	17.4
Iron	mg/kg	43/ 43	1420	22021	107000	23100
Lead	mg/kg	43/ 43	3.8	59.3	493	26.1
Manganese	mg/kg	43/ 43	107	1084	6150	1450

OHARNG Comment #1: Updated per 01 Sept. 2005 RQL/CBP Draft RI Report CRT teleconference ~ "short version" recommended to encompass first two paragraphs.

RVAAP is a 1,481-acre portion of the 21,419-acre Ravenna Training and Logistics Site (RTLS) of the Ohio Army National Guard (OHARNG). A total of 19,938 acres of the former 21,419-acre RVAAP was transferred to the United State Property and Fiscal Officer (USP&FO) for Ohio in 1996 and 1999 for use by the OHARNG as a military training site. The current RVAAP consists of 1,481 acres in several distinct parcels scattered throughout the confines of the Ohio Army National Guard (OHARNG) Ravenna Training and Logistics Site (RTLS). The RVAAP and RTLS are co-located on contiguous parcels of property and the RTLS perimeter fence encloses both installations. Since the Installation Restoration Program (IRP) encompasses past activities over the entire 21,419 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) U.S. Army facility. Currently, the installation is jointly operated by the U.S. Army Rock Island BRAC Field Office and the OHARNG.

The RVAAP is located within the confines of the RTLS which is in northeastern Ohio within Portage and Trumbull counties, approximately 4.8 kilometers (3 miles) east northeast of the town of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the town of Newton Falls. The RVAAP portions of the installation are solely located within Portage County. The installation consists of a 17.7-kilometer (11-mile) long, 5.6-kilometer (3.5-mile)-wide tract bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garrett, McCormick and Berry roads on the west; State Route 534 to the east, and the Norfolk Southern Railroad on the north (see Figures 1-1 and 1-2). The installation is surrounded by several communities: Windham on the north, Garrettsville 9.6 kilometers (6 miles) to the northwest, Newton Falls 1.6 kilometers (1 mile) to the east, Charlestown to the southwest, and Wayland 4.8 kilometers (3 miles) southeast.

Industrial operations at RVAAP consisted of 12 munitions-assembly facilities referred to as "load lines." Load Lines 1 through 4 were used to melt and load 2,4,6-trinitrotoluene (2,4,6-TNT) and Composition B into large-caliber shells and bombs. The operations on the load lines produced explosive dust, spills, and vapors that collected on the floors and walls of each building. Periodically, the floors and walls were cleaned with water and steam. The liquid, containing 2,4,6-TNT and Composition B, was known as "pink water" for its characteristic color. Pink water was collected in concrete holding tanks, filtered, and pumped into unlined ditches for transport to earthen settling ponds. Load Lines 5 through were used to manufacture fuzes, primers, and boosters. Potential contaminants in these load lines include lead compounds, mercury compounds, and explosives. From 1946 to 1949, Load Line 12 was used to produce ammonium nitrate for explosives and fertilizers prior to its use as a weapons demilitarization facility.

In 1950, the facility was placed in standby status and operations were limited to renovation, demilitarization, and normal maintenance of equipment, along with storage of munitions. Production activities were resumed during the Korean Conflict (July 1954 to October 1957) and again during the Vietnam Conflict (May 1968 to August 1972). In addition to production missions, various demilitarization activities were conducted at facilities constructed at Load Lines 1, 2, 3, and 12. Demilitarization activities included disassembly of munitions and explosives melt-out and recovery operations using hot water and steam processes. Periodic demilitarization of various munitions continued through 1992.

In addition to production and demilitarization activities at the load lines, other facilities at RVAAP include sites that 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.

ATTACHMENT I: SAMPLE COLLECTION AND PROCESSING FOR THE PBC FOR SIX ENVIRONMENTAL AREAS OF CONCERN

- August 9, 2005 – summary of agreements reached during FS kick-off meeting:

A. Discrete sampling will be conducted at FBQ, ODA2, and CBP to complete RI delineation activities. Discrete samples will be collected in accordance with the Facility Wide Work Plan and the SAP Addendum and homogenized using the process implemented by MKM during the 14 AOC field activities for multi-increment samples. The following conditions were agreed by Ohio EPA, OHARNG, and the ARMY:

- At any public meeting regarding this sampling approach the explanation of the shift from discrete sampling to discrete sampling with MI homogenization will be explained by USACE or the Army and not Ohio EPA.
- The Facility Wide Work Plan must be revised to include an SOP for multi-increment sampling and discrete with MI homogenization.
- USACE must provide a response to Ohio EPA's letter on MI sampling dated April 2004.
- Multi-Increment sampling versus discrete sampling will be presented at the RAB meeting to clarify techniques. Potentially Fulton Communications will be called in to help with this public meeting.

These conditions were agreed to by all parties. These conditions do not have to be complete prior to SAIC initiating field work.

B. Multi-increment samples collected from the piles/berms at Central Burn Pits will be used to evaluate disposition options/requirements for the FS. One MI sample will be collected from each pile/berm identified. The SAP Addendum No. 1 will be revised to include either a written SOP for MI sampling including methodology or a reference to the procedure implemented by MKM during the 14 AOCs sampling activities. If detections greater than risk screening values (preliminary RGOs) are found, they will be addressed in the Feasibility Study with proposed disposition.

- Follow-up agreements per teleconference held Monday August 29, 2005 (Laura Obloy, Todd Fisher, & Eileen Mohr):

A. Discrete samples will be collected at each sample location in a triangular pattern as detailed in the Facility Wide SAP. The preference will be to homogenize discrete samples using the MI processing technique (i.e., sieving, drying, and grinding) as performed by MKM during implementation of the 14 AOC sample activities. If MKM is not available to assist with homogenization techniques, discrete samples will be collected and homogenized in accordance with the Facility Wide SAP.

B. The SAP Addendum No. 1 will be revised to reflect this preference and a specific reference to the MI sampling homogenization technique implemented by MKM during the 14 AOCs sampling activities.

U. S. ARMY ENGINEERING & SUPPORT CENTER, HUNTSVILLE — CORPS OF ENGINEERS

DESIGN REVIEW COMMENTS

PROJECT _____

☐ SITE DEV & GEO	☐ MECHANICAL	☐ SAFETY	☐ SYSTEMS ENG
☐ ENVIR PROT& UTIL	☐ MFG TECHNOLOGY	☐ ADV TECH	☐ VALUE ENG
☐ ARCHITECTURAL	☐ ELECTRICAL	☐ ESTIMATING	☒ OE CX
☐ STRUCTURAL	☐ INST & CONTROLS	☐ SPECIFICATIONS	

REVIEW: Draft
DATE: August 15, 2005
NAME: Bill Veith, MM-CX, 256-895-1592

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	Page 1-2, paragraph 1.3	In the second sentence add “OE” after surface. The purpose is to avoid surface OE and subsurface anomalies that might be OE.	A – The sentence has been revised to include “OE”.
2.	Page 1-5, paragraph 1.9.3	Delete “OE related scrap(ORS)” and replace it with “munitions debris.” This document uses the old terms from EP 75-1-2. I did not recommend replacing the old terms with the new terms. The one term that needs replaced is this one. Future documents should use the new terms.	A – ORS has been changed to “munitions debris”.
3.	Page A-8	Under Identify/Record Anomalies/surface MEC/UXO/MPPEH in the third bullet delete “made by 2 UXO qualified” and insert “made by the UXO technician.” There will only be one UXO technician on site.	A – Sentence has been corrected to reflect 1 UXO Technician.
4.	Page A-13	Add EP 75-1-2 to the list of references.	A – Added reference “EP 75-1-2, Unexploded Ordnance (UXO) Support during Hazardous, Toxic, and Radioactive Waste (HTRW) and Construction Activities”.
5.	General	If this is truly an SOP for OE Avoidance operations it needs to be updated. It makes reference to general MEC safety that discusses the different types of munitions and how they should be approached and handled. This needs to be removed from this document. It gives the wrong impression. The task in all avoidance operations is to mark surface MEC items and subsurface anomalies and avoid them. They should only be investigated to determine if they are in fact MEC and reported. It also states that a team will normally consist of two UXO technicians. All avoidance operations will only require one UXO technician.	A – SOP updated to reflect only OE Avoidance operations.
6.	Page 1-7, paragraph 1.4	Here the documents brings in “construction support.” The procedures and personnel requirements for construction support are much different. Construction support requires a team of 2 UXO technicians, one a UXO technician III and one a UXO technician II. This is where I became confused. If this document is to cover both avoidance and construction support then it needs to state that up front. Combing them is not a bad idea. It just needs to be clear which procedures apply to avoidance operations and which apply to construction support. Correct the document as necessary.	A - A – SOP updated to reflect only OE Avoidance operations.

ACTION CODES
A - ACCEPTED/CONCUR
D - ACTION DEFERRED
W - WITHDRAWN
N - NON-CONCUR
VE - VE POTENTIAL/VEP ATTACHED

Comment Responses for Draft OE Avoidance Work Plan –
Open Demolition Area 2, Fuze and Booster Quarry Ponds and Central Burn Pits at the
Ravenna Army Ammunition Plant, Ravenna, Ohio
UPDATED Comment Response Table
October 18, 2005

Comment Number	Page or Sheet	Comment	Recommendation	Response
Ohio EPA, NEDO, and DERR (Eileen T. Mohr) ***Comments Dated October 13, 2005***				
old #1		As previously requested, cross reference the facility-wide document.		Agree. Proposed revised text to Section 1 revised to read: "This MEC Avoidance Work Plan is included as an attachment to and tiers under the Sampling and Analysis Plan Addendum No. 1 for the Supplemental Phase II Remedial Investigation of Central Burn Pits, Fuze and Booster Quarry Landfill/Ponds, and Open Demolition Area #2 which tiers under the Facility-Wide Sampling and Analysis Plan and Facility-Wide Site Safety and Health Plan. This MEC Avoidance Work Plan is based on information provided by the prime contractor, Science Applications International Corporation (SAIC).
old #3		It is understood that the Army did not request the changes in terminology. However, the contractor is again directed to the Order where this terminology is utilized. The language in the Order was agreed upon after significant discussions with the Army. Additionally, it is noted that these changes were not made to Appendix A of this portion of the document. The requested changes need to be made.		Agree. Terminology will be revised in the SAP Addendum and attachments including the MEC Avoidance Work Plan to be consistent with the Orders. The following text will be added to Section 1.1 of the MEC Avoidance Work Plan to introduce terminology: "The sole purpose of this work is avoidance of munitions and explosives of concern (MEC) which includes unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC) (e.g. TNT, RDX) present in high enough concentrations to pose an explosive hazard."

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old #5		The RTC document and the text reference ODA#3. This needs to be changed to ODA#2.		Agree. Proposed revised text to Section 1 revised to read: "This MEC Avoidance Work Plan is included as an attachment to and tiers under the Sampling and Analysis Plan Addendum No. 1 for the Supplemental Phase II Remedial Investigation of Central Burn Pits, Fuze and Booster Quarry Landfill/Ponds, and Open Demolition Area ~~#3~~ #2 which tiers under the Facility-Wide Sampling and Analysis Plan and Facility-Wide Site Safety and Health Plan. This MEC Avoidance Work Plan is based on information provided by the prime contractor, Science Applications International Corporation (SAIC). Emergency procedures are detailed in the SSHP including notification lists and directions to the hospital." The SAP Addendum and all attachments will be searched and corrected as necessary.
old #8		Please provide clarification as to why sentence "Based on the operational history…" was deleted, when this was not requested.		Clarification. The Fuze and Booster Quarry Landfill/Ponds site description was replaced in its entirety with the site description included in the approved Project Management Plan (dated July 11, 2005).
old #9		Do not agree with the supplied text revision. Change the text to read: "Existing roads at ODA#2 will also require a munitions and explosives of concern (MEC)/OE avoidance survey; and,"		Agree. Proposed revised Section 1.3 text will be revised as requested: "~~Only~~ Existing roads at ODA2 require a munitions and explosives of concern (MEC)~~/OE~~ avoidance survey; and"
old #11		Ensure that there are not other officials that require notification in the event that recovered chemical warfare materiel (RCWM) is encountered. Also applicable to #28.		SAIC is responsible for reporting RCWM to the Army and to Ohio EPA. The Army is responsible for any further reporting or action to be taken. No additional changes with respect to Ohio EPA #28.

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old #15		The change was not made to the requested section, i.e., it was moved to a previous section. This is acceptable; however, in the future, change the section that was initially requested.		Noted. Section 1.9.4.2 will also be revised to state: "The MEC Technician III will hold a daily safety meeting for all personnel as part of the general health and safety tailgate briefing conducted by the SAIC SSHO. This training will focus on MEC safety issues observed; any newly identified safety issues, and any needed/required safety or operational refresher training."
old #26		Unable to locate the area in the appendix where the change was made. Clarify.		Clarification. The requested change was made to Section 1 of the MEC Avoidance Work Plan. Appendix A text will be revised to state: "The SAIC SSHO is responsible for site safety. The SAIC SSHO and the USA Technician III will work in concert, with the USA Technician III having lead responsibility for all MEC related issues."
old #32		The response indicates that it could not be found in the original text where 2 UXO personnel were referenced. Refer to page A-8 of the original document in the cell on the bottom most right portion of the page. The bullet in the original text states: "Identification of MEC items will be made by 2 UXO qualified personnel." Given that this does not appear in the recently-received revision, someone on the contractor's staff must have noted the discrepancy and made the change.		Noted. The change was made in response to U. S. Army Engineering & Support Center, Huntsville Comment #3.
New		Please clarify when the USA Environmental Inc. Standard Operating Procedure (SOP) changed. Specifically, the original section 1.4 was removed.		Clarification. Section 1.4 of the USA Environmental Inc. Standard Operating Procedure was removed as requested in U. S. Army Engineering & Support Center, Huntsville Comment #5 as construction support is not applicable to this scope of work.

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Ohio EPA, NEDO, and DERR (Eileen T. Mohr)				
1.	General	This document should clearly state that its tiers under the sitewide health and safety plan as well as the individual addenda that were prepared for each of these AOCs.	Text revision requested.	Agree. Section 1 Purpose revised as follows: "This OE Avoidance Work Plan is included as an attachment to and tiers under the Sampling and Analysis Plan Addendum No. 1 for the Supplemental Phase II Remedial Investigation of Central Burn Pits, Fuze and Booster Quarry Landfill/Ponds, and Open Demolition Area #3. It is based on information provided by the prime contractor, Science Applications International Corporation (SAIC). The SAIC SSHO is responsible for site safety. The SAIC SSHO and the USA UXO Technician III will work in concert, with the USA UXO Technician III having lead responsibility for all OE related issues."
2.	General	There is no acronym list in the document.	Add an acronym list to the revision.	Agree. An acronym list has been included.
3.	General	The terminology used in this document is no longer in use.	Revise the text to use terms such as MEC, MC, DMM	UXO has been changed to MEC where appropriate. Note, Army Comment #2 did not recommend replacing language.
4.	General	It is standard practice to add line numbers to preliminary-draft and draft documents.	Add numbering in the next iteration of this document.	Agree. Line numbers have been added.

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5.	General	There should be a notification list in this document as well as directions and a route map to the hospital.	Add this to the revised text.	Clarification. This information is included in the SSHP. Section 1 text revised as follows: "This OE Avoidance Work Plan is included as an attachment to and tiers under the Sampling and Analysis Plan Addendum No. 1 for the Supplemental Phase II Remedial Investigation of Central Burn Pits, Fuze and Booster Quarry Landfill/Ponds, and Open Demolition Area #3. It is based on information provided by the prime contractor, Science Applications International Corporation (SAIC). Emergency procedures are detailed in the SSHP including notification lists and directions to the hospital."
6.	1-1/1.2	The text references that OSC jointly operates the RVAPP.	Please confirm OSC involvement, or revise.	Agree. Entire site description replaced with the agreed upon text from comment response meetings on RI Reports. Revised text is presented at the end of this CRT.
7.	1-1/1.2.1	The text indicated that explosives were placed into trenches at ODA2 and detonated. This would tend to suggest that bulk explosives were detonated vs off-spec (etc.) ordnance.	Modify the text to read "ordnance" instead of explosives.	Agree. Text revised as follows: "The past standard operating procedures for demolition by open detonation were to place the ordnance to be detonated in a pit that had been excavated to a minimum depth of 4 feet. The trench was then backfilled with 2 feet of soil, and the ordnance were detonated."

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8.	1-2/1.2.2	The text indicates that at FBQ, fuze and booster components were incinerated/deactivated.	Confirm whether or not incineration was conducted. This term has certain connotations.	Agree. Text revised as follows: "FBQ was operated during the period 1945 through 1993. The eastern part of the AOC consists of three larger ponds located in an abandoned rock quarry. The ponds are 20 to 30 feet deep and are separated by earthen berms. The western part of the AOC consists of 11 smaller, shallow basins. Prior to 1976, the quarry was reportedly used for open burning and as a landfill. The resultant debris from the burning and from the landfill operation was reported to have been removed during construction of the ponds. From 1976 through 1993, spent brine regenerate and sand filtration backwash water from one of the RVAAP drinking water treatment plants was discharged into the ponds. This discharge was regulated under a National Pollutant Discharge Elimination System (NPDES) permit. In 1998, this AOC was expanded to include three other shallow settling ponds and two debris piles bringing the AOC to approximately 45 acres in size. The lands adjacent to the quarry were utilized as an impact area to test 40mm projectiles (USACE 2004a)."
9.	1-3/1.3	The text indicates that existing roads do not require UXO/OE avoidance surveys.	Be advised that ODA2 roads have periodically had MC observed. Adjust text and work accordingly.	Agree. Text revised to state: "Only existing roads at ODA2 require a MEC/OE avoidance survey;"

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10.	1-3/1.3	The text references the procedure to be followed in the event that OE is encountered.	Obtain and cross reference the Ohio EPA final MEC notification procedure dated 04/08/05.	Acknowledged. Ohio EPA final MEC notification was obtained, however during implementation of the field project disposal or movement for disposal of any suspected OE encountered will not be performed – only avoidance. The scope of this project is avoidance only. Text revised as follows: "If during excavation activities, suspected OE is encountered, work will be halted until UXO personnel give the clearance. USA UXO Technician III will contact the SAIC Project Manager, who will contact the USACE and Ohio EPA. The scope of this field project is avoidance only and no disposal or movement for disposal of OE will be performed."
11.	1-3/1.4	The text indicated that "proper authorities" are to be contacted in the event that RCWM is encountered.	List the proper authorities. Make sure Ohio EPA is on the list.	Agree. Text revised as follows: "The UXO Technician III will notify SAIC Site Manager and the USA home office. SAIC will immediately notify the SAIC PM, USACE, and Ohio EPA"
12.	1-3/1.4	The text indicates the time frame in which the discovery of RCWM will be reported to SAIC, but there are no other time frames specified (for example - notification of "proper authorities")	Add this information to the revised text.	Agree. Text revised as follows: "The UXO Technician III will notify SAIC Site Manager and the USA home office. SAIC will immediately notify the SAIC PM, USACE, and Ohio EPA"
13.	1-4/1.7	Text revision requested.	Change text to read: "…will receive ordnance recognition, avoidance and safety precaution training."	Agree. Text revised to state: "All personnel, to include SAIC crews, will receive ordnance recognition, avoidance and safety precaution training."

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14.	1-4/1.7	The text references a site Environmental Protection Plan (EPP).	Clarify and provide a reference for the EPP.	Clarification. Text revised to state: "All site personnel will receive detailed training on SAIC's Site Safety and Health Plan (SSHP) and emergency procedures;"
15.	1-5/1.9.4.2	It is unclear as to how the UXO safety briefings will mesh with the general H&S briefings and who is in charge of them (USA vs. SAIC).	Provide clarification.	Clarification. Text revised to state: "The USA Environmental UXO Technician III will conduct tailgate safety briefings as part of the general H&S briefings in concert with SAIC's SSHO.
16.	1-6/1.9.6	The text indicates that safety violations will be reported to the UXO Tech III.	Add SAIC to the reporting requirements.	Agree. Text revised to state: "Safety violations or unsafe acts will be immediately reported to the UXO Technician III and the SAIC SSHO."
17.	1-6/1.9.6	The text indicates that "blatant disregard for environmental issues" will not be tolerated. If environmental issues arise, Ohio EPA must be notified.	1. There should be no disregard for environmental issues. Remove "blatant". 2. Notify Ohio EPA in the event of environmental issues.	Agree. Text revised as follows: "Reckless interference with sensitive species or disregard for environmental issues will likewise not be tolerated and may lead to termination of employment. Any environmental issue must be immediately reported to the SAIC SSHO. The SAIC SSHO will notify the project manager, USACE, and Ohio EPA of any issues."
18.	1-6/1.9.8	If OE/UXO avoidance requires changes in environmental sampling locations, Ohio EPA must be consulted.	Update the text to indicate this.	Agree. Text revised as follows: "Any new course of action or desired change in procedures will be submitted with justification for approval as required. Approved changes will be implemented in a manner that will ensure uniformity in procedures and end-product quality on the part of the OE team. The SAIC project manager, USACE, and Ohio EPA will be notified if a new course of action including changes in environmental sampling locations, is necessary."

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19.	1-6/1.9.9	The Ohio EPA is not aware of existing sanitation and wash stations at the AOCs to be investigated.	Confirm and if no stations currently exist, adjust the text.	Agree. Text revised as follows: "The work team will utilize field sanitation stations provided by SAIC."
20.	1-7/1.10	The text references the procedure to be followed in the event that OE is encountered.	Obtain and cross reference the Ohio EPA final MEC notification procedure dated 04/08/05.	Acknowledged. Ohio EPA final MEC notification was obtained, however during implementation of the field project disposal or movement for disposal of any suspected OE encountered will not be performed – only avoidance. The scope of this project is avoidance only. Text revised as follows: "The UXOTIII will not destroy or move any OE encountered as the scope of this field project is avoidance only. All OE and MEC encountered will be marked, avoided, and will be reported to the on-site SAIC Supervisor who will initiate the appropriate response actions to include immediate notification of the SAIC PM, USACE, and Ohio EPA."
21.	1-7/1.10.1	The text indicates that existing roads do not require UXO/OE avoidance surveys.	Be advised that ODA2 roads have periodically had MC observed. Adjust text and work accordingly.	Agree. Text revised to state: "All soil boring locations and access routes (including existing roads at ODA2) will be surveyed for potential OE/MEC and clearly defined prior to entry using visual and magnetometer surveys."

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22.	1-7/1.10.3	The text references tools required for the activities to be conducted.	Add in augers.	Agree. Text revised as follows: "The equipment requirements for this activity include: • Schonstedt (Model GA-52Cx) magnetometers or other appropriate instruments; • A Forster Ferex, MK 26 ordnance locator or Schonstedt downhole instrument for down-hole monitoring; • Hand Augers and miscellaneous common hand tools (i.e. shovels, garden trowels etc.); • Forms and logbooks to record activities and MEC encountered; • Pin Flags and Marking Material; and • Team vehicle.
23.	1-7/1.10.4	The text references the procedure to be followed in the event that OE is encountered.	Obtain and cross reference the Ohio EPA final MEC notification procedure dated 04/08/05	Acknowledged. Ohio EPA final MEC notification was obtained, however during implementation of the field project disposal or movement for disposal of any suspected OE encountered will not be performed – only avoidance. The scope of this project is avoidance only. Text revised as follows: "The UXO Technician III will report all OE items encountered to SAIC who will in turn notify the USACE and Ohio EPA. The scope of this field project is avoidance only and no disposal or movement for disposal will be conducted."
24.	1-8/1.10.6	Unaware of any planned excavations.	Remove from text.	Agree. Section 1.10.6 has been deleted.

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25.	1-8/1.10.9	The text discusses disposition of OE/UXO. The section above (1.10.8) indicates that this is not applicable to the project.	Rectify disconnect.	Agree. Text revised as follows: • "The number, type, and description of MEC/OE items encountered; and • The number, type, and description of non-hazardous items encountered.
26.	Appendix A - general	There needs to be more clarity/distinction between the roles of the UXO safety tech and the SAIC health and safety officer. For example (not all inclusive), who is monitoring for environmental exposures, who is determining if evacuation is warranted, who will be calling Post 1 for health emergencies as well as issues regarding fires? (The text makes it sound like it is the UXO tech's responsibility.) If the UXO tech is involved in notification procedures regarding health and safety issues, he/she must be very familiar with the sitewide HASP.	Clarify in the revised text.	The SAIC and USA UXO Tech work in concert with each other. The SAIC SSHO has responsibility for everything onsite except for MEC concerns which the USA UXO Tech is responsible for. Both people will be onsite during field activities. Introduction Text was revised as follows: "The SAIC SSHO is responsible for site safety. The SAIC SSHO and the USA UXO Technician III will work in concert, with the USA UXO Technician III having lead responsibility for all OE related issues."
27.	Appendix A - general	There should be a notification list in this document as well as directions and a route map to the hospital.	Add this to the revised text.	Please see response to Comment #5.

Comment Number	Page or Sheet	Comment	Recommendation	Response
28.	A-5/A.7	The text indicates the time frame in which the discovery of RCWM will be reported to SAIC, but there are no other time frames specified (for example - notification of "proper authorities").	Add this information to the revised text. Make sure Ohio EPA is on the notification list.	Agree. Text revised as follows: "If suspected RCWM is located at any time, all work will cease immediately. Site workers will withdraw along cleared paths from the area containing the suspected RCWM. The Tech III will clearly mark the area containing the suspected RCWM, and report the chemical event to the SAIC Site Manager. The Tech III will standby in an upwind location until relieved by a government representative. The report of discovery of suspected RCWM will be made within one hour of the discovery. The SAIC Site Manager will immediately notify the SAIC Project Manager, USACE, and Ohio EPA."
29.	A-5/A.8	The Ohio EPA is not aware of existing sanitation and wash stations at the AOCs to be investigated.	Confirm and if no stations currently exist, adjust the text.	Agree. Text revised as follows: "Facilities provided by SAIC will be utilized during this OE Avoidance effort."

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30.	A-7/A.13.1	The text references notifying the SANGB authority. This may be residual text from another submittal.	Clarify.	Agree. Text revised as follows: • "All unnecessary personnel will be evacuated from the site, to an upwind location; • The Emergency Response Services (fire, police, ambulance, hospital, etc.) will be notified by the OSIC (Tech III) by Calling RVAAP Post 1 as required; • If it can be conducted safely, the OSIC will direct personnel to move vital equipment/supplies from the fire path; • The OSIC will order the appropriate level of protective clothing to be worn by personnel fighting the fire; • To the extent possible, and with available resources, fight the fire from an upwind location; • At no time, will attempts be made to extinguish a fire involving explosives; • Notify RVAAP, USACE, and SAIC Project Manager.
31.	Page A-8 Hazard Analysis	Unaware of any planned excavations or trenching.	Remove from text. Put in the correct language regarding soil sampling.	Agree. Hazard Analysis revised and attached.
32.	Page A-8 Hazard Analysis	The text references 2 UXO qualified personnel. Previous text indicated that only one UXO Tech III would be onsite.	Rectify discrepancy.	Clarification. Cannot find where two UXO qualified personnel are referenced. Only one UXO qualified personnel will be onsite.
33.	Page A-9 Hazard Analysis	Text revision requested.	Add in subsurface MEC avoidance.	Agree. Text revised and attached.

Ohio EPA Comment #6

RVAAP is a 1,481-acre portion of the 21,419-acre Ravenna Training and Logistics Site (RTLS) of the Ohio Army National Guard (OHARNG). A total of 19,938 acres of the former 21,419-acre RVAAP was transferred to the United State Property and Fiscal Officer (USP&FO) for Ohio in 1996 and 1999 for use by the OHARNG as a military training site. The current RVAAP consists of 1,481 acres in several distinct parcels scattered throughout the confines of the Ohio Army National Guard (OHARNG) Ravenna Training and Logistics Site (RTLS). The RVAAP and RTLS are co-located on contiguous parcels of property and the RTLS perimeter fence encloses both installations. Since the Installation Restoration Program (IRP) encompasses past activities over the entire 21,419 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) U.S. Army facility. Currently, the installation is jointly operated by the U.S. Army Rock Island BRAC Field Office and the OHARNG.

The RVAAP is located within the confines of the RTLS which is in northeastern Ohio within Portage and Trumbull counties, approximately 4.8 kilometers (3 miles) east northeast of the town of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the town of Newton Falls. The RVAAP portions of the installation are solely located within Portage County. The installation consists of a 17.7-kilometer (11-mile) long, 5.6-kilometer (3.5-mile)-wide tract bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garrett, McCormick and Berry roads on the west; State Route 534 to the east, and the Norfolk Southern Railroad on the north (Figures 1-1 and 1-2). The installation is surrounded by several communities: Windham on the north, Garrettsville 9.6 kilometers (6 miles) to the northwest, Newton Falls 1.6 kilometers (1 mile) to the east, Charlestown to the southwest, and Wayland 4.8 kilometers (3 miles) southeast.

Activity: UXO Avoidance of MEC/UXO	**Date: July 18, 2005**
	Project: Ravenna Army Ammunition Plant, Ohio.
Description of the work: Employ approved UXO avoidance techniques and methods during soil sampling operations.	Analyzed By: Jose J. Sosa, CIH
	Prepared By: James Walden, UXO Safety and Health Manager
	Review for latest use: Each time before the job is performed.

Task Breakdown	Identify & Analyze the Hazards	Identify Hazard Controls
Locate Anomalies(surface and subsurface) and surface MEC/UXO/MPPEH.	• Potential MEC/UXO. • Unplanned Detonations. • Unauthorized Personnel.	• Observe all MEC safety precautions, such as movement, heat, shock, and friction. • Only UXO trained personnel will locate anomalies. • Only UXO qualified personnel will escort non-UXO personnel. • Be Alert. Mark and report any MEC encountered. • Establish Exclusion Zones based on the known hazards. • Only UXO qualified personnel will handle MEC items if encountered. • Wear the appropriate PPE for the task being performed. • Keep personnel to a minimum during operations. • Properly position personnel for observing spoils for MEC/UXO and establish safety arc prior to commencing operations. • Use and enforce the buddy system. • Ensure 1st. Aid Kits and Fire Extinguishers are in place. • No smoking, except in designated areas.
Identify/Record Anomalies(surface and subsurface) and surface MEC/UXO/MPPEH.	• Potential MEC/UXO. • Unplanned Detonations. • Unauthorized Personnel.	• Observe all MEC safety precautions, and follow safe work practices. • Identification of MEC items will be made by the UXO Technician. • Be alert. Cease operations if unsafe conditions arise. • Identify safety/hazardous zones of operations. • Maintain positive site control; cease operations if unauthorized entry is made. • Keep personnel to a minimum during operations.

Avoid Anomalies(surface and subsurface) and surface MEC/UXO/MPPEH.	• Potential MEC/UXO. • Unplanned Detonations. • Unauthorized Personnel.	• Mark, avoid and report all MEC/UXO encountered. • **Do not allow unauthorized personnel into the area of operations.** • **Maintain positive site control and enforce safe separation distances.** • **Record all MEC/UXO encountered by size, type, condition, and location**
	• Wildlife, insects, poisonous/toxic plants. • Sunburn/windburn, slips, trips, and falls. • Heat and cold stress.	• **Avoid and do not handle wildlife IAW the SSHP briefing.** • Use insect repellant as necessary. • **Avoid suspect plants IAW the SSHP briefing.** • Use barrier creams/ointments as necessary. • Decontaminate person and equipment as necessary. • **Use sunscreen/barrier cream as necessary.** • Be aware of footing and terrain, watch for slips, trips, and falls hazards. • Avoid obstacles when possible. • Wear approved and appropriate work boots. • **Dress for the weather, in layers of removable clothing.** • Drink the appropriate fluids on a frequent basis. • Know the signs and symptoms of Heat and Cold Stress. • Enforce buddy system monitoring. • Observe safe work practices, operating precautions, and instructions for the equipment in use. • Wear the proper PPE for the task being performed.
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
	Inspection to be performed by Technician III or designated individual	Training to be performed by UXOSO or designated individual.
Magnetometers. Communications Equipment. MEC/UXO flagging material. First Aid Kit. PPE.	• Daily serviceability check of instruments. • Daily communications checks. • Type and quantity check of flagging material. • Daily checks of first aid kits and weekly inventory of kits. • Daily check for serviceability, fit, and comfort of PPE. • Cover probe or decontaminate instrument to prevent cross contamination of soil samples.	• Instrument familiarity as required. • Knowledge of the Emergency Response and Notifications procedures IAW the SSHP. • Techniques for MEC/UXO avoidance. • First Aid and CPR training as required by the SSHP. • Safe work practices and precautions associated with task being performed IAW the WP. • Specific response training IAW the WP/SSHP. • Personnel will meet requirements IAW the applicable regulations for the training and use of PPE. • Evacuation and emergency procedures IAW the SSHP. • UXO identification and safety precautions for UXO and Non-UXO personnel IAW the WP/SSHP. • OSHA qualifications and training as required IAW the WP/SSHP.