Final

Remedial Action Report
for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds

Ravenna Army Ammunition Plant
Ravenna, Ohio

March 5, 2010

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

Prepared for:

US Army Corps of Engineers

United States Army Corps of Engineers
Louisville District

Prepared by:

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14. ABSTRACT

This Remedial Action Report provides documentation that the remedial action objectives and cleanup goals were achieved in accordance with the Remedial Design for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds at the Ravenna Army Ammunition Plant. Additionally, this report summarizes the field activities performed; presents field changes that were proposed, approved, and implemented; and describes the current condition of the construction and removal area.

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CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Science Applications International Corporation (SAIC) has completed the Final Remedial Action Report for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds at the Ravenna Army Ammunition Plant, Ravenna, Ohio. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of data quality objectives; technical assumptions; methods, procedures, and materials to be used; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing United States Army Corps of Engineers policy.

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

3/3/10
Date

Tia Rutledge
Independent Technical Review Team Leader

3 Mar 10
Date

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

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

Scott Armstrong
Principal w/ A-E firm

March 4, 2010
Date

Final

Remedial Action Report
for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds

Volume One - Main Report
Version 1.0

Ravenna Army Ammunition Plant
Ravenna, Ohio

GSA Contract No. GS-10F-0076J
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Prepared for:
U.S. Army Corps of Engineers
600 Martin Luther King, Jr. Place
Louisville, Kentucky 40202

Prepared by:
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8866 Commons Boulevard, Suite 201
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March 5, 2010

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NGB = National Guard Bureau
OHARNG = Ohio Army National Guard
Ohio EPA-NEDO = Ohio Environmental Protection Agency-Northeast District Office
REIMS = Ravenna Environmental Information Management System
RVAAP = Ravenna Army Ammunition Plant
SAIC = Science Applications International Corporation
USACE = United States Army Corps of Engineers
USAEC = United States Army Environmental Command

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ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
AOC	Area of Concern
ARAR	Applicable and Relevant or Appropriate Requirements
BGS	Below Ground Surface
BRACD	Base Realignment and Closure Division
COC	Chemical of Concern
CUG	Cleanup Goals
DFFO	Director's Final Findings and Orders
DoD	Department of Defense
EPC	Exposure Point Concentrations
FBQ	Fuze and Booster Quarry Landfill/Ponds
FS	Feasibility Study
GSA	United States General Services Administration
IRP	Installation Restoration Program
MEC	Munitions and Explosives of Concern
MI	Multi-Increment
MMRP	Military Munitions Response Program
NGB	National Guard Bureau
NPDES	National Pollutant Discharge Elimination System
NWP	Nationwide Permit
O&M	Operations and Maintenance
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
PBA	Performance-Based Acquisition
PBC	Performance-Based Contract
PCB	Polychlorinated Biphenyl
RAO	Remedial Action Objective
RAR	Remedial Action Report
RD	Remedial Design
RI	Remedial Investigation
RL	Reporting Level
ROD	Record of Decision
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SSHO	Site Safety and Health Officer
SVOC	Semi-Volatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine

ACRONYMS AND ABBREVIATIONS (CONTINUED)

USFWS	United States Fish and Wildlife Service
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound

1.0 INTRODUCTION

Science Applications International Corporation (SAIC) has been contracted by the U.S. Army Corps of Engineers (USACE), Louisville District, to provide environmental services in support of six high priority areas of concern (AOCs) at the Ravenna Army Ammunition Plant (RVAAP) in Ravenna, Ohio. This Remedial Action Report (RAR) describes the field activities and documents attainment of the remedial action cleanup goals (CUG) as a result of implementing a remedial action for the drainage ditch at the Fuze and Booster Quarry Landfill/Ponds (FBQ).

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

1.1 PURPOSE

The purpose of this Remedial Action Report (RAR) is to document the fulfillment of the selected remedy for soil and dry sediment at FBQ as stated in the *Record of Decision (ROD) for Soil and Dry Sediment at the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16)* (USACE 2007a). Fulfillment of this selected remedy was executed in accordance with the *Remedial Design for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds* (USACE 2009).

This RAR summarizes all administrative and field activities performed as specified in the FBQ remedial design (RD). The report also includes a presentation of the confirmation sampling scheme and analytical results which verify the achievement of soil and dry sediment CUG for the anticipated future land use (National Guard Trainee) of FBQ.

1.2 REPORT ORGANIZATION

This RAR is organized as follows:

- Section 1: Introduction
- Section 2: Background Information
- Section 3: Project Organization
- Section 4: Construction Mobilization
- Section 5: Excavation and Sampling Activities
- Section 6: Site Restoration
- Section 7: Conclusions
- Section 8: References

- Appendices:
  - Appendix A: Permits, Notifications, and Approvals
    - A-1. United States Fish and Wildlife Service (USFWS) Concurrence Letter
    - A-2. Ohio Historic Preservation Office (OHPO) Concurrence Letter
    - A-3. Ohio EPA Approval of Backfill Source
  - Appendix B: Laboratory Analytical Results
  - Appendix C: Data Quality Control Summary Report
  - Appendix D: Field Change Request Orders
  - Appendix E: Waste Manifests

2.0 BACKGROUND INFORMATION

This section describes the facility, describes the AOC, discusses the previous investigations at FBQ, and presents the remedial action objectives (RAOs) and remedial action CUG.

2.1 GENERAL FACILITY DESCRIPTION

When the RVAAP Installation Restoration Program (IRP) began in 1989, RVAAP was identified as a 21,419-acre installation. The property boundary was resurveyed by Ohio Army National Guard (OHARNG) over a 2-year period (2002 and 2003) and the total acreage of the property was found to be 21,683.289 acres. As of February 2006, a total of 20,403 acres of the former 21,683-acre RVAAP has been transferred to the National Guard Bureau (NGB) and subsequently licensed to OHARNG for use as a military training site.

The current RVAAP consists of 1,280 acres scattered throughout the OHARNG Camp Ravenna Joint Military Training Center, herein referred to as Camp Ravenna. Camp Ravenna is in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 km (3 miles) east-northeast of the City of Ravenna and approximately 1.6 km (1 mile) northwest of the City of Newton Falls. The RVAAP portions of the property are solely located within Portage County. Camp Ravenna/RVAAP is a parcel of property approximately 17.7 km (11 miles) long and 5.6 km (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east (Figures 2-1 and 2-2). Camp Ravenna is surrounded by several communities: Windham on the north; Garrettsville 9.6 km (6 miles) to the northwest; Newton Falls 1.6 km (1 mile) to the southeast; Charlestown to the southwest; and Wayland 4.8 km (3 miles) to the south.

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

2.2 FUZE AND BOOSTER QUARRY LANDFILL/PONDS DESCRIPTION AND HISTORY

FBQ encompasses approximately 45 acres in the south-central part of RVAAP. Site features are presented in Figure 2-3. FBQ operated from 1945 until 1993. The western part of the AOC contains 11 small, shallow settling basins, and an abandoned rock quarry is located in the eastern portion. The RVAAP-16 AOC was expanded in 1998 to include two debris piles and three settling ponds.

Reportedly, the quarry was used for open burning and as a landfill before 1976. The debris resulting from these activities was reportedly removed during construction of three settling ponds (quarry ponds) in 1976. These quarry ponds, up to 20 to 30 ft deep and separated by earthen berms, were constructed to receive spent brine regenerate, groundwater iron oxide filtrant, and sand filtration backwash water discharge from one of the RVAAP water plants. The discharge was regulated under a National Pollutant Discharge Elimination System (NPDES) permit and continued until 1993.

2.3 PREVIOUS INVESTIGATIONS AND ACTIVITIES

The following sections provide a summary of the previous investigations and activities performed to date at FBQ.

2.3.1 Relative Risk Site Evaluation

The U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) performed a Relative Risk Site Evaluation at RVAAP. The Relative Risk Site Evaluation provided the U.S. Army with qualitative and quantitative data to score sites, which provided the U.S. Army with a basis for prioritizing cleanups and allocating funds. Each site evaluated was given a score of "High," "Medium," or "Low."

The Relative Risk Site Evaluation (USACHPPM 1996) assessed sediment and surface water samples from each of the three quarry ponds; groundwater and soil samples were not collected. The samples that were collected were analyzed for metals and explosives. The evaluation concluded there was no evidence of contaminant migration from the unlined quarry ponds at FBQ. The evaluation gave FBQ a final score of "High."

2.3.2 Phase I/Phase II Remedial Investigation

A Phase I/Phase II Remedial Investigation (RI) (USACE 2005a) was performed to determine the extent of contamination in affected media (e.g., soils, sediments, surface water, and groundwater). Arsenic and manganese were identified as chemicals of concern (COCs) in soil and dry sediment for the National Guard Trainee at FBQ. Calculated risks from these two metals were primarily associated with the very high dust loading factor and inhalation rate assumed for the National Guard Trainee. The exposure point concentrations (EPCs) for arsenic and manganese in soil were less than surface soil background values. The arsenic and manganese EPCs in dry sediment in the drainage ditch aggregate were greater than dry sediment background values.

The Phase I/Phase II RI did not completely determine the lateral and vertical extent of soil and dry sediment contamination.

2.3.3 Supplemental Phase II Remedial Investigation

In response to the recommendation in the Phase I/Phase II RI report (USACE 2005a), a Supplemental Phase II RI was conducted. Implementation of the *Supplemental Phase II Remedial Investigation of Central Burn Pits, Fuze and Booster Quarry Landfill/Ponds, and Open Demolition Area #2* (USACE 2005b) was completed to fill additional data needs regarding the extent of contamination in affected soil media following the Phase I/II RI. The primary objective of the Supplemental Phase II RI was to provide an updated assessment of the nature and extent of soil contamination and potential risks to receptors at FBQ at RVAAP. The sampling at FBQ defined the nature and extent of explosive and inorganic compounds detected during the previous Phase I/Phase II RI and to evaluate potential risks to receptors in support of the feasibility study (FS).

The extent of explosive contamination was defined to below reporting limits in surface and subsurface soils at FBQ. Only one explosive (nitrobenzene) was detected in the discrete samples; however, all detections of nitrobenzene were below reporting limits. The extent of manganese was defined in the Supplemental Phase II RI. The Supplemental Phase II RI results indicated inorganics above background concentrations in the perimeter samples collected; however, no substantial data gaps were identified following completion of the Supplemental Phase II RI. Results of the Supplemental Phase II RI are presented in the *Feasibility Study for Fuze and Booster Quarry Landfill/Ponds (RVAAP-16)* (USACE 2006).

2.3.4 Feasibility Study

Preliminary CUGs for soil and dry sediment were developed in the *Feasibility Study for Fuze and Booster Quarry Landfill/Ponds (RVAAP-16)* (USACE 2006) to support the remedial alternative selection process for soil and dry sediment remediation at FBQ. Remedial alternatives were assembled for impacted soils and dry sediment at FBQ. The remedial alternatives were constructed by combining general response actions, technology types, and process options retained from the screening processes described in the FS. Remedial alternatives assured adequate protection of human health and the environment, achieved RAOs, met applicable and relevant or appropriate requirements (ARARs), and permanently and significantly reduced the volume, toxicity, and/or mobility of COCs.

The analysis of chemical concentration data indicated there were no soil COCs requiring remediation to achieve National Guard Trainee and Resident Subsistence Farmer land use standards. The only dry sediment COC that required remediation was manganese within the drainage ditch aggregate at FBQ. (Sediment COCs were identified in the quarry ponds, but the sediment aggregate within the ponds is considered wet sediment.) Consequently, the recommended remedial alternative for FBQ, as presented in the FS, was Alternative 3 - Excavation of Soil/Dry Sediment with Offsite Disposal ~ National Guard Trainee Land Use. This alternative addressed dry sediment in the drainage ditch at FBQ that exceeded CUG for the anticipated future land use (National Guard Trainee), and also attained CUG for a residential land use (Resident Subsistence Farmer).

2.3.5 Community Involvement and Regulatory Approval

The *Proposed Plan for Soil and Dry Sediment at Fuze and Booster Quarry Landfill/Ponds (RVAAP-16)* (USACE 2007b) was presented to the public on April 4, 2007 and a 30-day public comment period was conducted until May 3, 2007. On April 10, 2007, a public meeting was held in Newton Falls, Ohio presenting the recommended alternative. Comments were collected and incorporated into the ROD.

The *Record of Decision for Soil and Dry Sediment at the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16)* (USACE 2007a) documented the selected remedial action alternative (Alternative 3 - Excavation of Soil/Dry Sediment with Offsite Disposal ~ National Guard Trainee Land Use), RAO, and remedial action CUG for soil and dry sediment at FBQ.

The ROD includes a Responsiveness Summary addressing public comments received during the public comment period and public meeting. The ROD was signed by the Branch Chief for the Base Realignment and Closure Division (BRACD) on October 30, 2007 and the Director of the Ohio EPA on January 28, 2008.

2.3.6 Remedial Action Objective and Remedial Action Cleanup Goal

As stated in the ROD, the RAO for FBQ was to prevent National Guard Trainee exposure to contaminants in soil and dry sediment that exceed CUG to a depth of 4 ft below ground surface (BGS). The selected remedy addressed soil and dry sediment to a depth of 4 ft BGS because potential disturbance of soil to that depth is possible under the National Guard Trainee future land use.

There was no remedial action required for soil at FBQ. For dry sediment, manganese required remediation within the drainage ditch aggregate. From previous investigations, the manganese EPC in the drainage ditch was 4,100 mg/kg, which exceeded the CUG for the National Guard Trainee (1,950 mg/kg) and the Resident Subsistence Farmer (2,900 mg/kg). Based on the risk evaluation, remediation of dry sediment within the drainage ditch was required to achieve National Guard Trainee and Resident Subsistence Farmer CUGs. Table 2-1 presents the CUG for FBQ.

Table 2-1. Cleanup Goal for a National Guard Trainee for Dry Sediment at FBQ

Chemical of Concern	Cleanup Goal (mg/kg)
Manganese	1,950

The dry sediment requiring remediation is within the drainage ditch aggregate.

Although future land use at FBQ is not anticipated to include unrestricted land use, the selected remedy achieved CUG for the Resident Subsistence Farmer. Land use controls with respect to chemical contamination in soil or dry sediment are not required when the remedial action attains CUGs protective for residential land use.

2.3.7 Remedial Design for the Fuze and Booster Quarry Landfill/Ponds

The *Remedial Design for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds* (USACE 2009) was developed to detail the implementation of the remedial action for dry sediment within the drainage ditch aggregate at FBQ to achieve the RAO and CUG. The RD presented the project organization, notification requirements, design drawings, and technical guidance and specifications. Additionally, the RD outlined the restoration of the drainage ditch once the contaminated dry sediment was removed. The RD was approved by the Ohio EPA on July 31, 2009.

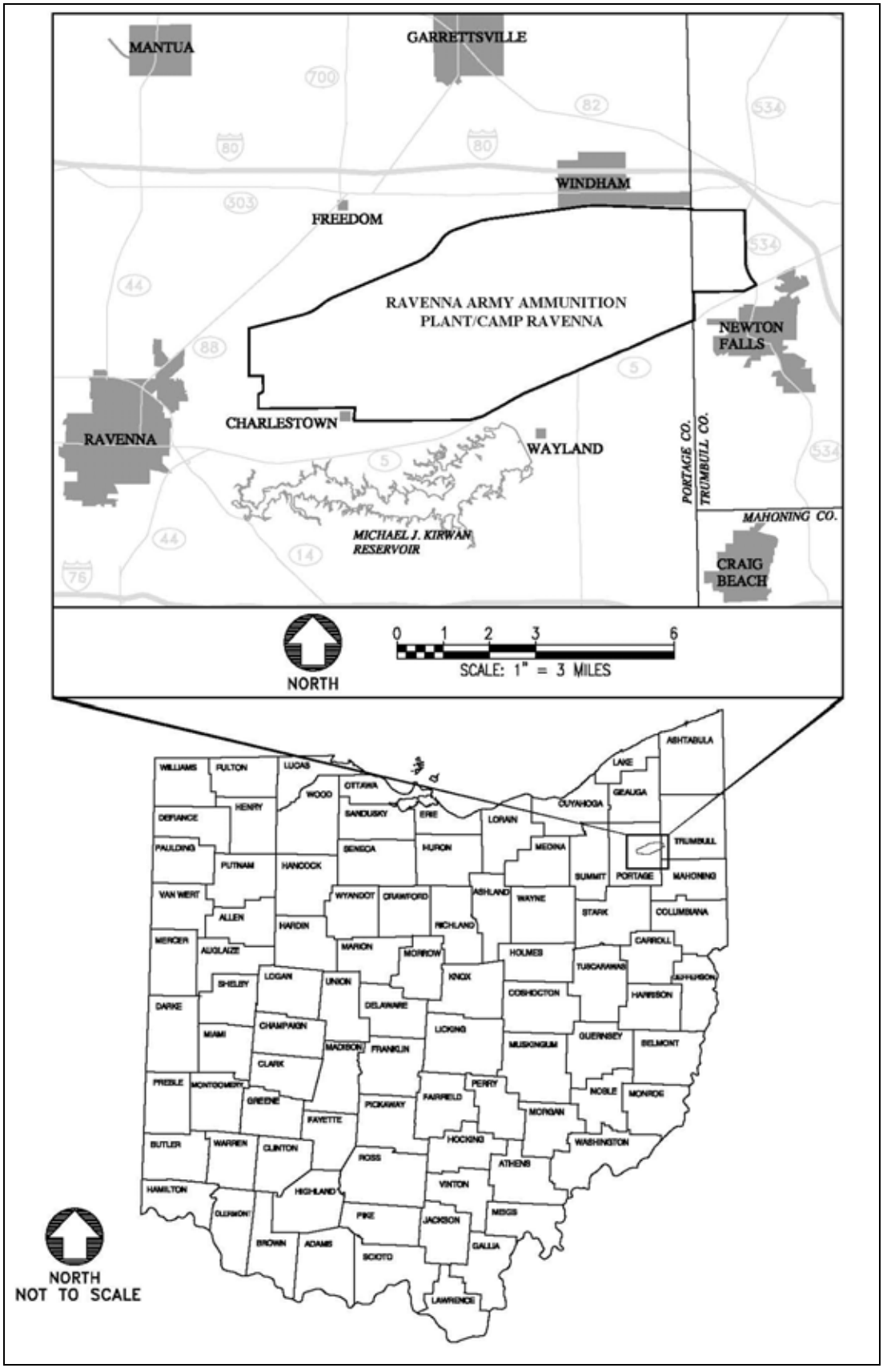
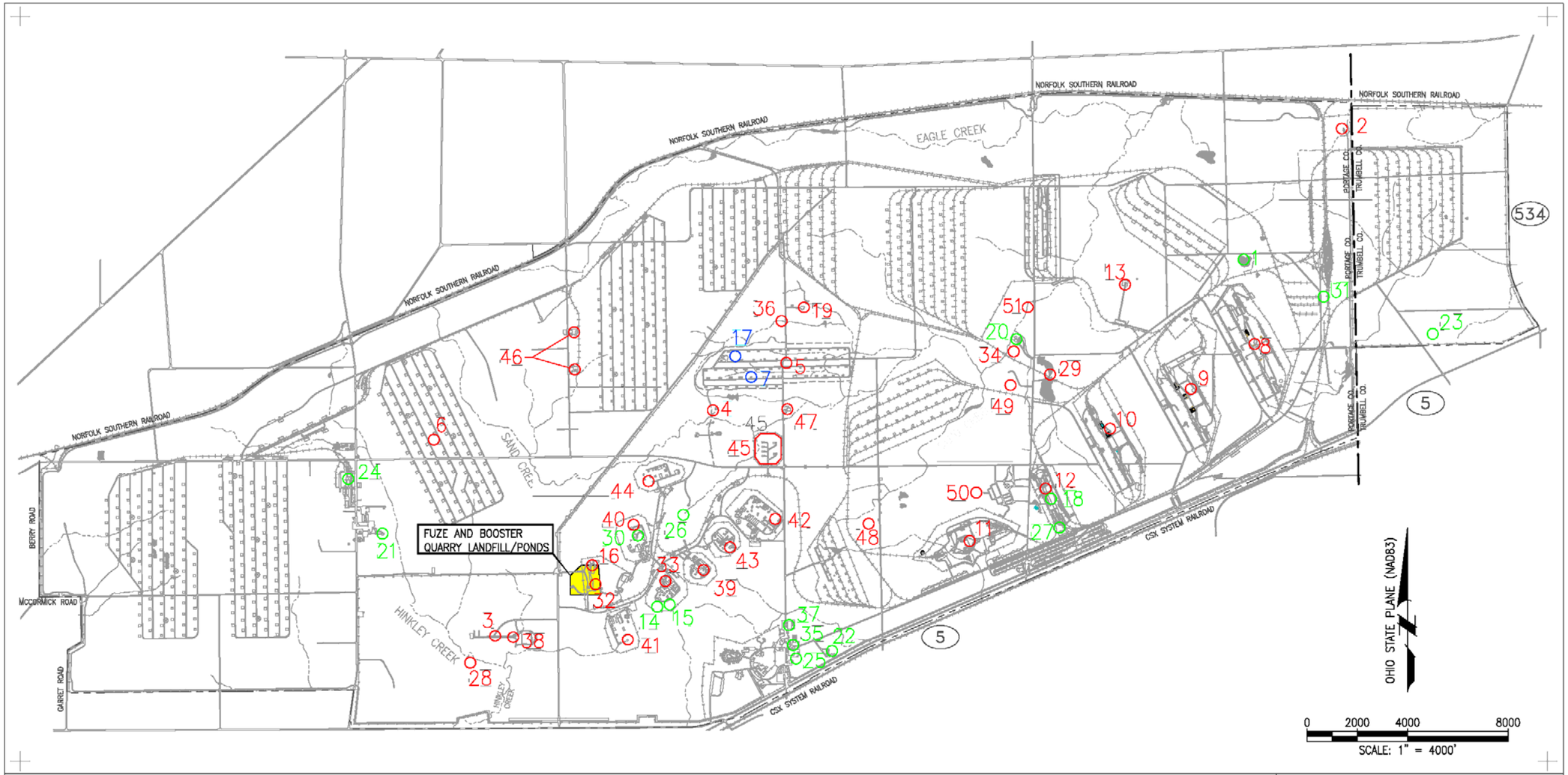


Figure 2-1. General Location and Orientation of RVAAP/Camp Ravenna



LEGEND:

1 RAMSDELL QUARRY LANDFILL
2 ERIE BURNING GROUNDS
3 DEMOLITIONS AREA #1
4 OPEN DEMOLITIONS AREA #2
5 WINKLEPECK BURNING GROUNDS
6 C BLOCK QUARRY
7 BUILDING 1601 HAZARDOUS WASTE STORAGE
8 LOAD LINE 1 AND DILUTION/SETTLING POND
9 LOAD LINE 2 AND DILUTION/SETTLING POND
10 LOAD LINE 3 AND DILUTION/SETTLING POND
11 LOAD LINE 4 AND DILUTION/SETTLING POND
12 LOAD LINE 12
13 BUILDING 1200 AND DILUTION/SETTLING POND
14 LOAD LINE 6, EVAPORATION UNIT
15 LOAD LINE 6, TREATMENT PLANT
16 FUZE AND BOOSTER QUARRY LANDFILL/PONDS
17 DEACTIVATION FURNACE
18 LOAD LINE 12 PINK WASTEWATER TREATMENT
19 LANDFILL NORTH OF WINKLEPECK BURNING GROUND
20 SAND CREEK SEWAGE TREATMENT PLANT
21 DEPOT SEWAGE TREATMENT PLANT
22 GEORGE ROAD SEWAGE TREATMENT PLANT
23 UNIT TRAINING SITE WASTE OIL TANK
24 RESERVE UNIT MAINTENANCE AREA WASTE OIL TANK
25 BUILDING 1034 MOTOR POOL WASTE OIL TANK
26 FUZE BOOSTER AREA SETTLING TANKS
27 BUILDING 854 PCB STORAGE
28 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 BUILDINGS F-15 AND F-16
46 BUILDING T-5301 DECONTAMINATION
47 ANCHOR TEST AREA
48 CENTRAL BURN PITS
49 ATLAS SCRAP YARD
50 DUMP ALONG PARIS-WINDHAM ROAD
51 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/CAMP RAVENNA

DRAWN BY:	REV. NO./DATE:	CAD FILE:
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Figure 2-2. RVAAP/Camp Ravenna Installation Map

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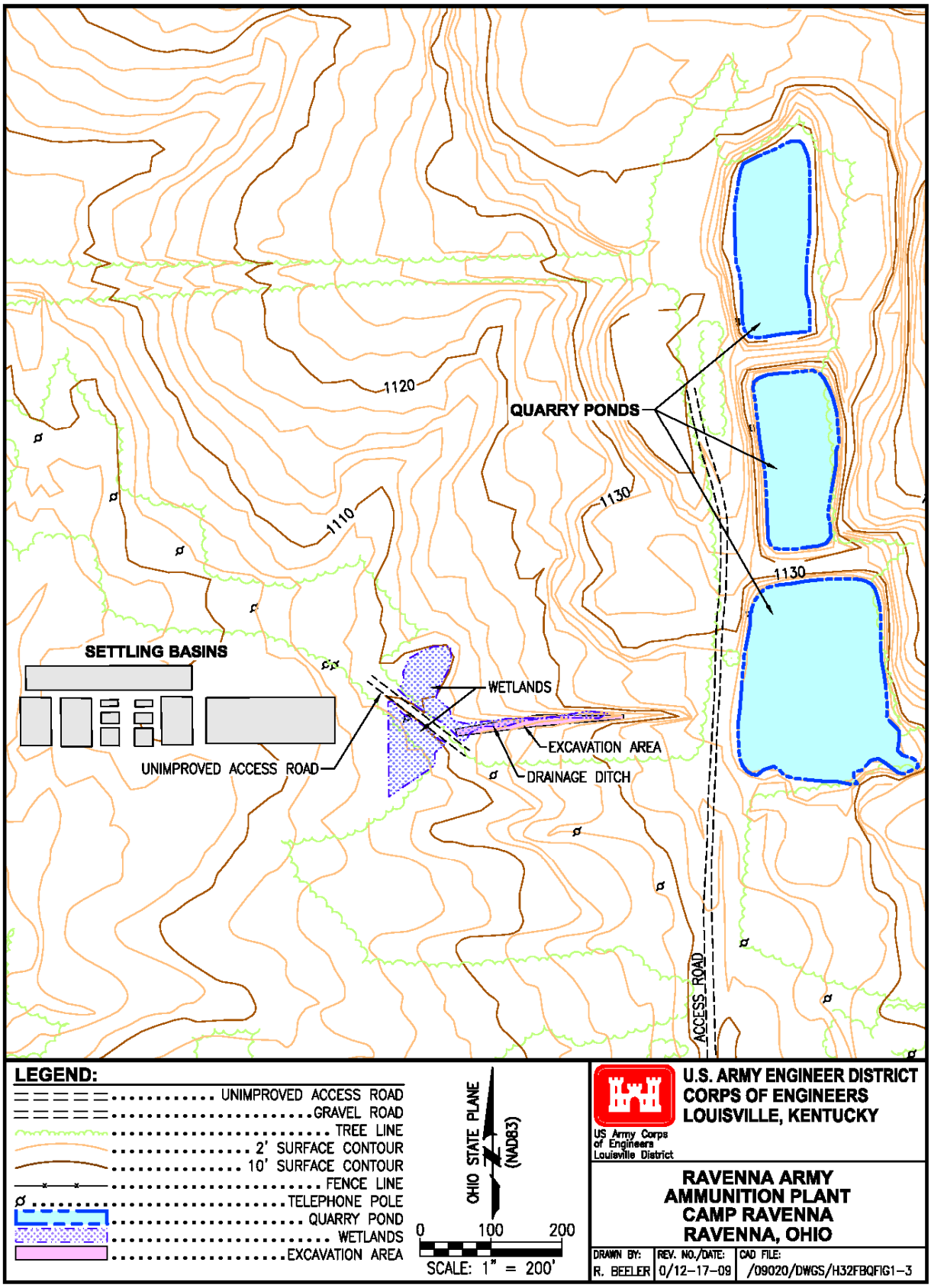

Figure 2-3. Features of Fuze and Booster Quarry Landfill/Ponds

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3.0 PROJECT ORGANIZATION

Figure 3-1 presents the project organization chart for the implementation of this remedial action. The U.S. Army was the lead entity and was responsible for the implementation of this remedial action. The USACE, Louisville District provided implementation and technical oversight on behalf of the U.S. Army. Ohio EPA was the regulatory authority governing work on this remedial action. SAIC was the primary contractor responsible for implementing the RD, which included the following:

1) Selected and procured a qualified remedial subcontractor (Toltest, Inc.) to perform the work described herein;
2) Provided project management and construction oversight;
3) Coordinated transportation and disposal activities with RVAAP; and
4) Collected confirmation samples.

A full description of the roles and responsibilities is included in Section 2.0 of the RD.

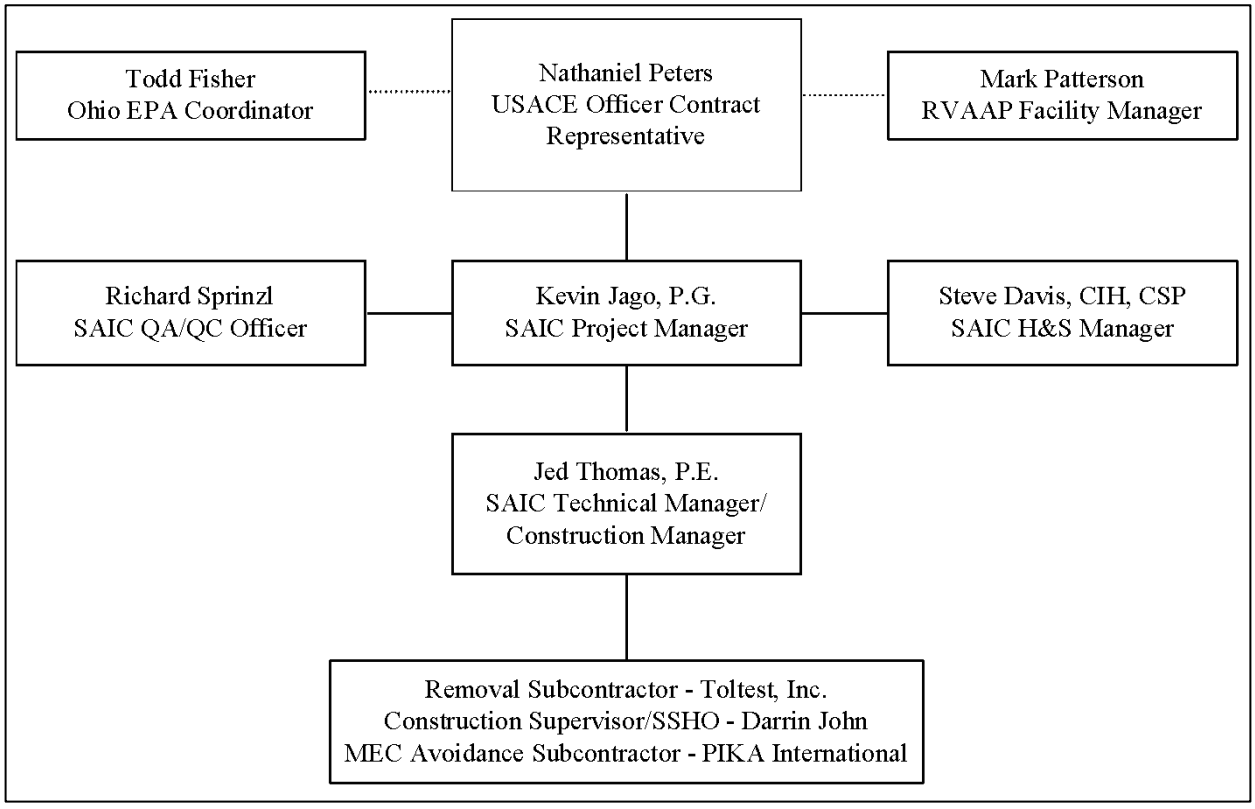

Figure 3-1. Project Organizational Chart

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4.0 CONSTRUCTION MOBILIZATION

This section describes construction mobilization and site preparation activities required to implement the RD, including permit and notification requirements and site preparation activities.

4.1 PERMIT AND NOTIFICATION REQUIREMENTS

Based on review of applicable requirements, the following permits, notifications, approvals, and/or concurrence letters were required for the remedial action:

- USFWS concurrence letter (received April 30, 2009);
- OHPO concurrence letter (received June 12, 2009); and
- USACE, Pittsburgh District authorization to perform this remedial action under NWP #38 (received July 10, 2009).

All signatory documentation (e.g., permits and manifests) were obtained through RVAAP or USACE representatives. The USFWS and OHPO concurrence letters are presented in Appendix A. No other federal, state, or municipal permits, notifications, or requirements were determined to be applicable for this remedial action.

The authorization to use NWP #38 is valid until July 10, 2011 and requires the completion of the Compliance Certification Form following the remedial activities. Once the site is restored and re-vegetated per Section 8.0 of the RD, SAIC will coordinate with appropriate U.S. Army representatives to complete and submit this form.

Additionally, Ohio EPA was notified of the construction start date during a regularly scheduled bi-weekly teleconference on October 13, 2009. Throughout the project, all RVAAP Stakeholders were informed and updated of activities performed and schedule during bi-weekly teleconferences, monthly reports, and e-mail correspondences.

4.2 CHARACTERIZATION SAMPLING

On April 1, 2009, a technical memorandum was submitted to the RVAAP Stakeholders to conduct the characterization sampling specified in Section 4.0 of the RD in advance of Ohio EPA approval of the RD. This memorandum was subsequently approved and on May 1, 2009, dry sediment samples were collected from two multi-increment (MI) areas within the drainage ditch, designated FBQ-200M and FBQ-201M. These samples were collected to provide data for waste profiling and volume estimating for dry sediment to be removed from the drainage ditch. Samples from both MI areas were collected and analyzed for waste characterization parameters. The following is a summary of those sampling results:

1) Both MI sample areas had concentrations exceeding the CUG (FBQ-200M=23,600 mg/kg and FBQ-201M=30,500 mg/kg) and the estimated volume for sediment removal was assumed to be accurate;
2) All Toxicity Characteristic Leaching Procedure (TCLP) metals, Polychlorinated Biphenyls (PCBs), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), herbicides, cyanide, and sulfides were either nondetectable or below the reporting limits; and
3) The pH of the dry sediment was between 6.4-6.7.

Based on these results, there were no changes in the extent of dry sediment removal required. Additionally, the dry sediment was considered nonhazardous waste, which was consistent with assumptions in the RD. A nonhazardous waste profile was generated by the disposal facility and signed by RVAAP facility management.

Sample results are presented in Appendix B.

4.3 MOBILIZATION AND SITE PREPARATION

4.3.1 Utility Clearance

A meeting with the RVAAP Operations and Maintenance (O&M) Contractor (Vista Sciences Corporation) was conducted on September 21, 2009. At this meeting, the Vista Science Corporation representative indicated that no utilities (subsurface or overhead) were expected to be encountered during the remedial activities. The area was cleared for work in accordance with the RD.

4.3.2 Site Preparation

Site mobilization activities began on October 14, 2009. These activities included installation of storm water controls, installation of construction traffic signage, and placement of gravel for a construction entrance/exit, portable water storage tank area, and equipment movement area. Maintenance of the construction entrance/exit, equipment movement area, and storm water controls was performed throughout the project.

Additionally, as part of the site preparation, a site walk was performed by the Munitions and Explosives of Concern (MEC) Avoidance Subcontractor. The drainage ditch requiring removal under this RD is not within the FBQ MRS Footprint Boundary in the *Site Inspection Report for Munitions Response Sites under the Military Munitions Response Program* (E2M 2008). The FBQ MRS is located east of the site. A U.S. Army and/or Department of Defense (DoD) certified unexploded ordnance (UXO) Technician III performed the site clearance and remained on site during the remedial activities. No MEC was encountered during remedial activities.

4.3.2.1 Implementing Site Controls

Prior to implementation of the Remedial Action, SAIC submitted a roster of all personnel (including subcontractors) who would be working at FBQ to the RVAAP O&M Contractor. The roster was maintained and submitted to the RVAAP O&M Contractor on a weekly basis or as necessary. The SAIC Construction Manager coordinated with RVAAP security to ensure that contact with Post 1 was maintained at all times and that Post 1 was notified of incoming deliveries or pickups. Signs were erected along the traffic route to expedite deliveries, maintain traffic flow, promote safety, and prevent interference with other RVAAP/Camp Ravenna operations (Photograph 4-1).

4.3.2.2 Rock Construction Entrance

An equipment movement area and rock construction entrance was installed in accordance with specifications on Attachment B - Drawing C-4 of the RD to facilitate loading and movement of on-road haul trucks (Photograph 4-2). The ground surface at the equipment movement area and rock construction entrance was leveled, geotextile fabric was placed over the ground surface, and courses of crushed stone (American Association of State Highway and Transportation Officials [AASHTO] No. 2) were installed. Each course of crushed stone was graded and compacted.

Photograph 4-1. Construction Traffic Route Sign

Photograph 4-2. Installation of Equipment Movement Area

4.3.2.3 Vegetation Clearing

Clearing and grubbing was required to facilitate equipment access and perform the excavation of the dry sediment. The clearing and grubbing consisted mostly of brush removal along the ditch line. Most large trees did not require removal, as excavation activities were implemented around the trees. The cleared brush and trees were either chipped and spread around the site (as shown in Photograph 4-3) or stacked along the access road (as shown in Photograph 4-4), as requested by OHARNG.

Photograph 4-3. Chipping of Cleared Vegetation

Photograph 4-4. Cleared Trees Left at Project Site

4.3.2.4 Storm Water Controls

In accordance with the RD, silt fencing (Photograph 4-5) was installed to prevent siltation downgradient of the construction area. To further minimize the potential for erosion and sediment run-off, no work was performed during periods of inclement weather, as determined by the SAIC Construction Manager. The excavation areas were opened at the beginning of each day and covered at the end of each day's activities (Photograph 4-6).

The RD required containerization and characterization of any excavation water that collected in the drainage ditch. Excavation water was defined as water (e.g., rainwater, groundwater) that came in contact with any contaminated areas within the drainage ditch. A 20,000 gallon water storage tank with secondary containment was staged on site to collect any potential excavation water. Due to the fact that there was very little rain and through the use of best management practices (e.g., covering the excavated area at night), no excavation water was generated during the remedial activities. The water storage tank was never used and was demobilized from the site once the CUG was achieved and confirmed by the laboratory.

All storm water controls were inspected daily during remedial activities and on a weekly basis during the downtime while confirmation samples were being analyzed and no activities were occurring.

Photograph 4-5. Installation of Silt Fencing

Photograph 4-6. Nightly Cover of Drainage Ditch

4.3.2.5 Dust and Wind Controls

Dust control was generally maintained by keeping traffic on improved roads and maintaining the posted speed limit. Dust generation was monitored visually by the Site Safety and Health Officer (SSHO) (from Toltest, Inc.). Soil moisture content remained sufficiently high during the work so that the area did not require spraying/misting for dust control. Airborne dust was not observed during remedial action activities.

4.3.2.6 Good Housekeeping Practices

Good housekeeping practices were conducted in accordance with Section 5.5 of the RD throughout the remedial action in order to maintain a clean and orderly work environment. The SAIC Construction Manager regularly inspected the construction site for trash and debris. Identified trash or debris was disposed accordingly. There were no leaks or spills of petroleum or chemicals from construction equipment during the remedial action activities.

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5.0 EXCAVATION AND SAMPLING ACTIVITIES

This section summarizes the sediment excavation and disposal activities conducted during this remedial action.

5.1 SEDIMENT REMOVAL ACTIVITIES

Sediment removal activities began on October 20, 2009 and were completed on October 23, 2009. During the dry sediment removal activities, a total of 209 tons of nonhazardous material was transported and disposed at the Waste Management American Landfill in Waynesburg, Ohio. Of the 209 tons of nonhazardous material, 184 tons were the contaminated dry sediment removed from the drainage ditch and 25 tons were inert absorbent material (sawdust) used to mix with the sediment during excavation and loading activities. The following sections describe the sediment removal activities in further detail.

5.1.1 Application of a Absorbent Material

At the onset of the remedial activities, it was determined that the sediment in the western portion of the ditch was potentially too wet to readily transport and dispose. Consequently, 25 tons of inert absorbent material (sawdust generated from untreated lumber) was obtained from an off-site source and used to mix with the dry sediment to ensure excavated material would not release liquid while in transport and would pass the disposal facilities' paint filter test. Photograph 5-1 shows the saturated sediment at the far western portion of the drainage ditch. Photograph 5-2 shows the mixing of sawdust with the dry sediment.

Photograph 5-1. Saturated Sediment at Western Portion of Drainage Ditch

Photograph 5-2. Mixing of Absorbent Material in Drainage Ditch

5.1.2 Truck Loading and Transportation

All excavated material was loaded directly into haul trucks for transport to a licensed disposal facility. During the loading process, haul trucks were positioned over plastic sheeting to contain any contaminated dry sediment spilled during load-out. Trucks were inspected for dry sediment on the exterior of the truck bed. Any dry sediment on the exterior of the truck was brushed off and captured prior to the truck pulling out of the loading area and all trucks were covered prior to leaving the construction site. All nonhazardous material was transported to and disposed at the Waste Management American Landfill in Waynesburg, Ohio. Photograph 5-3 shows the loading of contaminated sediment into a haul truck. Additionally, Photograph 5-4 shows the ditch line as the final removal is taking place and the ditch line is being shaped.

Photograph 5-3. Loading Excavated Material into Haul Trucks

Photograph 5-4. Final Removal of Contaminated Sediment and Shaping of the Ditch Line

5.1.3 Equipment Decontamination

Excavation equipment that contacted contaminated sediment was decontaminated prior to contacting other materials. Additionally, the excavation equipment was decontaminated prior to removal from the work site. Limited amounts of potable water (i.e., less than 30 gallons) was used for decontamination activities performed over haul trucks. Toltest, Inc. ensured free water was not present in the haul truck and that no liquids escaped the truck bed. Decontamination liquids did not change the chemical profile of the waste (i.e., addition of solvents or pH). The equipment then air dried.

5.2 CONFIRMATION SAMPLING

At the completion of the excavation activities, three MI samples were collected from the excavation footprint and analyzed in accordance with Section 7.0 of the RD. One MI confirmation sample was collected from each MI Sample Area (locations FBQ-200M and FBQ-201M) and one field duplicate sample was collected. The confirmation sample results provided data to confirm the remedial

activities discussed in the following sections attained the CUG. Photographs 5-5 and 5-6 show the sediment sampling activities. All confirmation soil sampling results are presented in Appendix B.

Photograph 5-5. Multi-Increment Sample Collection in FBQ-201M

Photograph 5-6. Multi-Increment Sample Collection in FBQ-200M

Samples FBQsd-201M-0520-SD, FBQsd-200M-0521-SD, and FBQsd-200M-0521-FD (field duplicate) were dried, sieved, and ground finely by TestAmerica Laboratories, Inc. (located in North Canton, Ohio) and were analyzed for total manganese. The results were compared against the National Guard Trainee CUG for FBQ (1,950 mg/kg). The confirmation soil sample results are presented in Table 5-1 and in Appendix B.

Table 5-1. Confirmation Sample Results

Location	Sample ID	Manganese Concentration		Lab Result below CUG?	Notes
		Laboratory Results	Cleanup Goal		
Eastern half of removal area	FBQSD-200M-0521-SD	454 mg/kg	1,950 mg/kg	Yes	None
Eastern half of removal area	FBQSD-200M-0521-FD	455 mg/kg	1,950 mg/kg	Yes	Duplicate sample of FBQ-200M-0521-SD
Western half of removal area	FBQSD-201M-0520-SD	643 mg/kg	1,950 mg/kg	Yes	None

The laboratory analysis indicated the manganese concentrations were below the remedial action CUG for FBQ. Therefore, no additional removal was required. Figure 5-1 shows the plan and profile view of the excavated area at FBQ.

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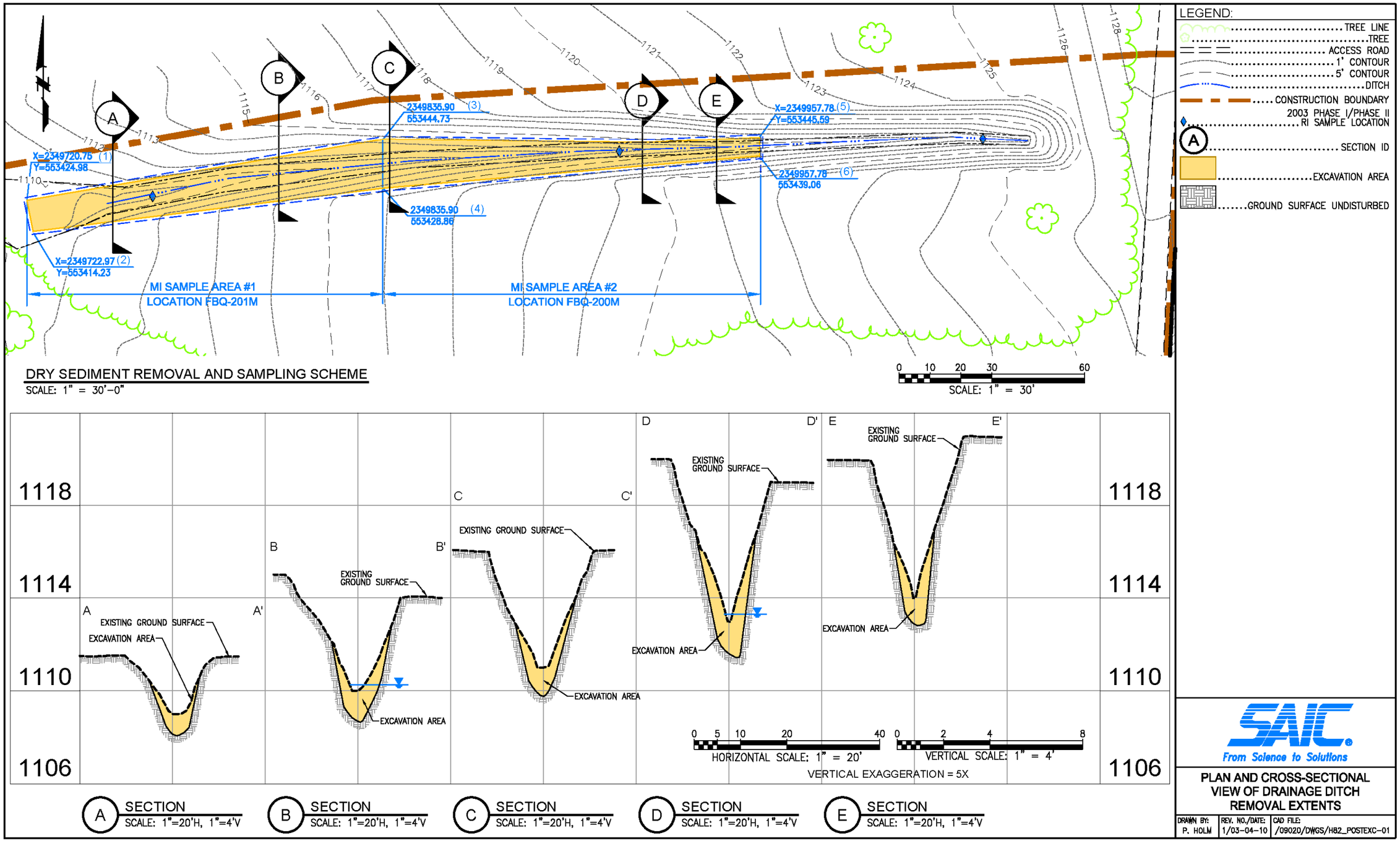

Figure 5-1. FBQ Final Excavation (Plan and Profile View)

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6.0 SITE RESTORATION

The following sections describe the site restoration activities, as performed in accordance with Section 8.0 of the RD.

6.1 BORROW SOURCE SAMPLING

On October 9, 2009, a plot of land at Route 5 Sand and Gravel in Ravenna, Ohio was selected and characterized for suitable backfill material for FBQ. Characterization data were collected for Ohio EPA approval. An excavation area for backfill material within the borrow source area defined by stakes and soil sample FBQ-QC-0519-QC was collected and analyzed for the parameters specified in Table 8-1 of the RD.

The soil sample results are presented in Appendix B. All inorganic concentrations were below either the surface or subsurface RVAAP background concentrations. The VOCs, SVOCs, pesticides, PCBs, explosives, and propellants concentrations were either nondetectable or the lab estimated a concentration below the laboratory reporting levels (RLs).

On November 9, 2009, SAIC provided the Ohio EPA with the borrow source characterization sample results. Ohio EPA provided e-mail correspondence approving the use of this borrow source for the remedial action restoration activities (see Appendix A).

6.2 BACKFILLING OF THE DRAINAGE DITCH

The excavation footprint of the drainage ditch at FBQ was backfilled and graded to match the existing drainage pattern and neighboring and/or original elevations on November 11, 2009. During restoration, the side walls of the drainage ditch were sloped and 55 cubic yards of backfill from the borrow source was incorporated to restore the grade and slope of the base of the ditch. The backfill material was graded and compacted.

One course of rip rap was placed as final backfill in the excavated drainage ditch to prevent erosion and restore the ditch to its current elevation. The rip rap was originally designed to be 4 to 6-inch stone. However, due to the lack of availability of 4 to 6-inch stone, field change request FCR-RVAAPFBQ-001 was issued to request permission to use 6 to 10-inch stone instead. The field change requested was granted by USACE and Ohio EPA. The backfilled drainage ditch is shown in Photograph 6-1.

During the implementation of the remedial action, the unimproved road immediately to the west of the drainage ditch was discovered to prevent water movement and flow from the end of the drainage ditch into a wetland area to the west (shown in Figure 2-3). As part of the field change request FCR-RVAAPFBQ-001, SAIC proposed to excavate a portion of the road from east to west and bring the excavated area up to grade using 6 to 10-inch limestone. Therefore, water exiting the drainage ditch

will be provided a porous media to move beneath the unimproved road and ponding will be avoided. The Subcontractor installed a straw check dam downstream of the excavation footprint to prevent sediment transport to downgradient wetlands. The check dam will remain in place until vegetation coverage on the sidewalls of the drainage ditch is at least 70 percent established.

6.3 DISPOSITION OF PLACED STONE

With the exception of a 12 ft by 90 ft portion of the equipment movement area, all placed stoned remained as installed, at the request of OHARNG. The stone removed from the 12 ft by 90 ft portion of the equipment movement area was spread along the remaining equipment staging area. The geotextile fabric under the removed stone was then removed and disposed as solid waste.

6.4 RE-VEGETATION

Given the time of year that the remedial activities occurred, it was determined that re-seeding the areas with the prescribed seed mixtures in Tables 8-3 and 8-4 of the RD was not practical. Field change request FCR-RVAAPFBQ-002 was issued to request the use of a winter rye seed mix to provide temporary stabilization of disturbed areas until spring 2010, at which time seeding in accordance with Section 8.5 of the RD will occur. The field change request was approved by USACE, OHARNG, and Ohio EPA. The area was seeded with the winter rye seed and straw was used to mulch and cover the area. Photograph 6-2 shows the seeded and mulched construction area.

Photograph 6-1. Drainage Ditch After Backfilling

Photograph 6-2. Current Restoration of the Drainage Ditch following Remedial Actions

6.5 REMOVAL OF EROSION CONTROLS

At the time of submission of the RAR, the construction area will still require re-vegetation in accordance with Section 8.5 of the RD and FCR-RVAAPFBQ-002. SAIC will continue to perform biweekly inspections of the site and the silt fencing to ensure the storm water controls are intact. Once re-vegetation has occurred in accordance with Section 8.5 of the RD and the vegetation is

established to 70 percent coverage, the silt fencing and other storm water controls will be removed and disposed.

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7.0 CONCLUSIONS

The selected remedy for soil and dry sediment at the Fuze and Booster Quarry Landfill/Ponds, as documented in the *Record of Decision for Soil and Dry Sediment at the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16)* (USACE 2007a), was to excavate contaminated dry sediment within the drainage ditch aggregate to achieve a manganese CUG of 1,950 mg/kg for the most reasonably anticipated land use (National Guard Trainee). The remedial action described within this RAR attained the remedial action CUG and RAO established in the FBQ ROD. However, this selected remedy also removed chemical contaminants in soil that exceeded clean-up goals for the Resident Subsistence Farmer; as the manganese CUG for the National Guard Trainee is more stringent than the Resident Subsistence Farmer (2,900 mg/kg).

The RAO to prevent dispersal of contaminants and ensure underlying soil meets the lowest risk-based CUG for the exposure scenarios evaluated in the RI was achieved by the remedial action. Table 7-1 presents the removal totals from the drainage ditch at FBQ.

Table 7-1. FBQ Drainage Ditch Removal Totals

Location	Total Waste Volume (tons)
FBQ Drainage Ditch (Nonhazardous Waste)	184

Table 7-2 presents the final confirmation soil sampling results for the drainage ditch at FBQ.

Table 7-2. Confirmation Soil Sample Results

MI Sample Area	Confirmation Soil Sample Result	Confirmation Sample Result Below Cleanup Goal?[a]
FBQ-200M (Eastern Portion)	454 mg/kg	Yes
FBQ-201M (Western Portion)	643 mg/kg	Yes

[a]Remedial action cleanup goal for manganese in dry sediment is 1,950 mg/kg.

By achieving these remedial action CUG, residual contaminant levels in soil beneath the drainage ditch at FBQ are below the Ohio EPA risk benchmark (10E-5) and well within the range of values observed in surrounding soil at FBQ.

As this remedial action achieved objectives to allow for residential land use, land use controls, CERCLA five-year reviews, or O&M sampling are not required for soil and dry sediment at FBQ. Other media (i.e., surface water, wet sediment, and groundwater) and MEC will be addressed as part of future actions.

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8.0 REFERENCES

Engineering-Environmental Management, Inc (E2M) 2008. *Site Inspection Report for Munitions Response Sites under the Military Munitions Response Program.* May 2008.

EnviroScience, Inc. 2008. *The Wetlands and Other Waters Delineation Report for the Remedial Actions at Ramsdell Quarry Landfill, Load Line 12, and Fuze and Booster Quarry Landfill/Ponds at the Ravenna Army Ammunition Plant/Ravenna Training and Logistics Site*. December 2008.

Ohio Environmental Protection Agency (Ohio EPA) 2004. *Director's Final Findings and Orders in the matter of U.S. Department of the Army, Ravenna Army Ammunitions Plant.* June 2004.

USACE (United States Army Corps of Engineers) 2005a. *Phase I/Phase II Remedial Investigation of the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) at the Ravenna Army Ammunition Plant, Ravenna, Ohio.* November 2005.

USACE 2005b. *Supplemental Phase II Remedial Investigation of Central Burn Pits, Fuze and Booster Quarry Landfill/Ponds, and Open Demolition Area #2 at Ravenna Army Ammunition Plant in Ravenna, Ohio*. June 2005.

USACE 2006. *Feasibility Study for Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) at the Ravenna Army Ammunition Plant, Ravenna, Ohio.* June 2006.

USACE 2007a. *Record of Decision for Soil and Dry Sediment at the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) at the Ravenna Army Ammunition Plant, Ravenna, Ohio.* September 2007.

USACE 2007b. *Proposed Plan for Soil and Dry Sediment at Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) at the Ravenna Army Ammunition Plant, Ravenna, Ohio.* March 2007.

USACE 2009. *Remedial Design for the RVAAP-49 Fuze and Booster Quarry Landfill/Ponds at the Ravenna Army Ammunition Plant in Ravenna, Ohio.* June 2009.

USACHPPM (U.S. Army Center for Health Promotion and Preventive Medicine) 1996. *Hazardous and Medical Waste Study No. 37-EF-5360-97, Relative Risk Site Evaluation (RRSE), RVAAP, Ravenna, Ohio, 28 October – 1 November 1996, Volume 1.* October 1996.

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Appendix A
Permits, Notifications, and Approvals

Appendix A-1.	United States Fish and Wildlife Service Concurrence Letter
Appendix A-2.	Ohio Historic Preservation Office Concurrence Letter
Appendix A-3.	Ohio EPA Approval of Backfill Source

Appendix A-1. United States Fish and Wildlife Service Concurrence Letter

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
614-416-8993 / FAX 614-416-8994
April 30, 2009

Tails: 2009-TA-0560

Mr. Jed Thomas
SAIC
8866 Commons Blvd.
Twinsburg, OH 44087

Re: Fuze and Booster Quarry Landfill/Ponds within the Ravenna Army Ammunition Plan/Camp Ravenna

Dear Mr. Thomas:

We have received your recent correspondence requesting information about the subject proposal. There are no Federal wilderness areas, wildlife refuges or designated critical habitat within the vicinity of the project area. Based on the information you have provided, at this time we have no objection to the proposed project.

ENDANGERED SPECIES COMMENTS: Due to the project type, size, and location, we do not anticipate any impact on federally listed endangered, threatened, or candidate species, or their habitats. Should the project design change, or during the term of this action, additional information on listed or proposed species or their critical habitat become available, or if new information reveals effects of the action that were not previously considered, consultation with the Service should be initiated to assess any potential impacts.

If you have additional questions or require further assistance with your project proposal, please contact me at the following number (614) 416-8993 x12. I would be happy to discuss the project in further detail with you and provide additional assistance if necessary. In addition, you can find more information on natural resources in Ohio by visiting our homepage at: http://www.fws.gov/midwest/Reynoldsburg.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

Appendix A-2. Ohio Historic Preservation Office Concurrence Letter

June 12, 2009

Jed Thomas
Science Applications International
8866 Commons Boulevard
Twinsburg, OH 33087

Dear Mr. Thomas:

Re: Fuze-Booster Quarry Remediation Project, Camp Ravenna, Portage County, Ohio

This is in response to the receipt of the project summary form on May 22, 2009. Our comments are submitted in accordance with the provisions of Section 106 of the National Historic Preservation Act, as amended (36 CFR Part 800).

Based on the information you provided I concur that no historic properties will be affected by the proposed project. No further coordination is required unless the scope of the work changes or historic properties are discovered during the course of the work. In such a situation, this office should be contacted as per 36 CFR 800.13.

If you have any questions please contact me at 298-2043 (or through e-mail at jquinlan@ohiohistory.org).

Sincerely,

Julie Quinlan, Program Reviews Manager
Resource Protection and Review

OHPO 2009-POR-6595/1025467

OHIO HISTORICAL SOCIETY
Ohio Historic Preservation Office
1982 Velma Avenue, Columbus, Ohio 43211-2497 ph: 614.298.2000 fx: 614.298.2037
www.ohiohistory.org

Appendix A-3. Ohio EPA Approval of Backfill Source

Thomas, Jed H.

From: prvs=0564c9aba9=todd.fisher@epa.state.oh.us on behalf of Todd Fisher [todd.fisher@epa.state.oh.us]

Sent: Monday, November 09, 2009 12:32 PM

To: Eileen Mohr; Thomas, Jed H.

Cc: Thomas M LRL Chanda

Subject: Re: SAIC Backfill Source ~ Sampling Results

Jed,

I looked over the laboratory results and conclude that the backfill source is acceptable for use with FBQ Remedial Action activities.

Thanks,

Todd

Todd R. Fisher
Project Coordinator
Ohio Environmental Protection Agency
Division of Emergency and Remedial Response
2110 East Aurora Rd.
Twinsburg, OH 44087

Work: (330) 963-1148
Cell: (330) 389-0521
FAX: (330) 487-0769
email address: Todd.Fisher@epa.state.oh.us

>>> "Thomas, Jed H." <JED.H.THOMAS@saic.com> Monday, November 09, 2009 12:16 PM >>>
Todd and Eileen -

Attached are the sample results for the backfill source at Route 5 Sand and Gravel. The sample collected was Sample ID FBQ-QC-0519-QC. The data summary incorrectly list it as FB2-QC-0519-QC. I will ensure they correct this. Basically, the results are as follows:

1) All the inorganic concentrations were below the RVAAP surface or subsurface background values; and
2) The VOCs, SVOCs, Pesticides, PCBs, Explosives, and Propellants concentrations were either nondetectable or the lab estimated a concentration below the laboratory reporting levels (RLs).

Please let me know if you approve our use of this source for the FBQ Remedial Action. If you can let me know ASAP, I would appreciate it as we are currently mobilizing for the restoration activities.

At this point, we will use minimal quantities of this source at FBQ. If approved, we will use it at LL12 and RQL as well. We have the area staked off and Route 5 Sand and Gravel agreed to reserve the area for our future use.

Thank you,
Jed

Jed Thomas, P.E. | SAIC
Environmental Engineer | Energy, Environment & Infrastructure Business Unit (E2IBU)
phone: 330.405.5802 | fax 330.405.9811
email: jed.h.thomas@saic.com

Appendix B
Laboratory Analytical Results

Table B-1. Characterization Sample Results

Media		Soil	Soil	Soil	Soil	Soil
Station		**FBQSD-200M**	**FBQSD-200M**	**FBQSD-200**	**FBQSD-201M**	**FBQSD-201**
Sample ID		**FBQSD-200M-0515-SD**	**FBQSD-200M-0515-FD**	**FBQSD-200-0516-SD**	**FBQSD-201M-0517-SD**	**FBQSD-201-0518-SD**
Date		**05/01/2009**	**05/01/2009**	**05/01/2009**	**05/01/2009**	**05/01/2009**
Depth (ft)		**0.0 - 0.5**	**0.0 - 0.5**	**0.0 - 0.5**	**0.0 - 0.5**	**0.0 - 0.5**
Field Type		**Multi-increment**	**Multi-increment Field Duplicate**	**Grab**	**Multi-increment**	**Grab**
Analyte (mg/kg)	**Units**					
Inorganics						
Manganese	MG/KG	23600 J/J	23300 J/J	NA	30500 J/J	NA
Cyanide	MG/KG	0.31 B	NA	NA	1.5	NA
Sulfide	MG/KG	31.2 U/UJ	NA	NA	31.8 U/UJ	NA
Organics-Pesticide/PCB						
PCB-1016	MG/KG	0.034 U/U	NA	NA	0.035 U/U	NA
PCB-1221	MG/KG	0.034 U/U	NA	NA	0.035 U/U	NA
PCB-1232	MG/KG	0.034 U/U	NA	NA	0.035 U/U	NA
PCB-1242	MG/KG	0.034 U/U	NA	NA	0.035 U/U	NA
PCB-1248	MG/KG	0.034 U/U	NA	NA	0.035 U/U	NA
PCB-1254	MG/KG	0.034 U/U	NA	NA	0.035 U/U	NA
PCB-1260	MG/KG	0.034 U/U	NA	NA	0.035 U/U	NA
TCLP						
Arsenic TCLP	MG/L	0.0045 B	NA	NA	0.5 U/U	NA
Barium TCLP	MG/L	4.4 B	NA	NA	2.1 B	NA
Cadmium TCLP	MG/L	0.1 U/U	NA	NA	0.1 U/U	NA
Chromium TCLP	MG/L	0.5 U/U	NA	NA	0.5 U/U	NA
Lead TCLP	MG/L	0.5 U/U	NA	NA	0.5 U/U	NA
Mercury TCLP	MG/L	0.002 U/U	NA	NA	0.002 U/U	NA
Selenium TCLP	MG/L	0.25 U/U	NA	NA	0.25 U/U	NA
Silver TCLP	MG/L	0.5 U/U	NA	NA	0.5 U/U	NA
Ignitability (Flashpoint)	DEG F	180 >/J	NA	NA	180 >/J	NA
pH	NO UNITS	6.7	NA	NA	6.4	NA
2,4-D TCLP	MG/L	0.5 U/U	NA	NA	0.5 U/U	NA
Chlordane TCLP	MG/L	0.005 U/U	NA	NA	0.005 U/U	NA
Endrin TCLP	MG/L	0.0005 U/U	NA	NA	0.0005 U/U	NA
Heptachlor TCLP	MG/L	0.0005 U/U	NA	NA	0.0005 U/U	NA
Heptachlor epoxide TCLP	MG/L	0.0005 U/U	NA	NA	0.0005 U/U	NA
Lindane TCLP	MG/L	0.0005 U/U	NA	NA	0.0005 U/U	NA
Methoxychlor TCLP	MG/L	0.001 U/U	NA	NA	0.001 U/U	NA
Silvex TCLP	MG/L	0.1 U/U	NA	NA	0.1 U/U	NA
Toxaphene TCLP	MG/L	0.02 U/U	NA	NA	0.02 U/U	NA
1,4-Dichlorobenzene TCLP	MG/L	0.004 U/U	NA	NA	0.004 U/U	NA
2,4,5-Trichlorophenol TCLP	MG/L	0.02 U/U	NA	NA	0.02 U/U	NA
2,4,6-Trichlorophenol TCLP	MG/L	0.02 U/U	NA	NA	0.02 U/U	NA
2,4-Dinitrotoluene TCLP	MG/L	0.02 U/U	NA	NA	0.02 U/U	NA
2-Methylphenol TCLP	MG/L	0.004 U/U	NA	NA	0.004 U/U	NA

Table B-1. Characterization Sample Results (continued)

Media		Soil	Soil	Soil	Soil	Soil
Station		FBQSD-200M	FBQSD-200M	FBQSD-200	FBQSD-201M	FBQSD-201
Sample ID		FBQSD-200M-0515-SD	FBQSD-200M-0515-FD	FBQSD-200-0516-SD	FBQSD-201M-0517-SD	FBQSD-201-0518-SD
Date		05/01/2009	05/01/2009	05/01/2009	05/01/2009	05/01/2009
Depth (ft)		0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5	0.0 - 0.5
Field Type		Multi-increment	Multi-increment Field Duplicate	Grab	Multi-increment	Grab
Analyte (mg/kg)	Units					
4-Methylphenol TCLP	MG/L	0.04 U/U	NA	NA	0.04 U/U	NA
Hexachlorobenzene TCLP	MG/L	0.02 U/U	NA	NA	0.02 U/U	NA
Hexachlorobutadiene TCLP	MG/L	0.02 U/U	NA	NA	0.02 U/U	NA
Hexachloroethane TCLP	MG/L	0.02 U/U	NA	NA	0.02 U/U	NA
Nitrobenzene TCLP	MG/L	0.004 U/U	NA	NA	0.004 U/U	NA
Pentachlorophenol TCLP	MG/L	0.04 U/U	NA	NA	0.04 U/U	NA
Pyridine TCLP	MG/L	0.02 U/U	NA	NA	0.02 U/U	NA
1,1-Dichloroethene TCLP	MG/L	NA	NA	0.07 U/U	NA	0.07 U/U
1,2-Dichloroethane TCLP	MG/L	NA	NA	0.025 U/U	NA	0.025 U/U
2-Butanone TCLP	MG/L	NA	NA	0.25 U/U	NA	0.25 U/U
Benzene TCLP	MG/L	NA	NA	0.025 U/U	NA	0.025 U/U
Carbon tetrachloride TCLP	MG/L	NA	NA	0.025 U/U	NA	0.025 U/U
Chlorobenzene TCLP	MG/L	NA	NA	0.025 U/U	NA	0.025 U/U
Chloroform TCLP	MG/L	NA	NA	0.025 U/U	NA	0.025 U/U
Tetrachloroethene TCLP	MG/L	NA	NA	0.07 U/U	NA	0.07 U/U
Trichloroethene TCLP	MG/L	NA	NA	0.05 U/U	NA	0.05 U/U
Vinyl chloride TCLP	MG/L	NA	NA	0.025 U/U	NA	0.025 U/U

U – Analyte is not detected.
J – Analyte is detected but below reporting levels. Value is estimated.
UJ – Analyte is not detected but the associated numerical value is an estimate and demonstrates a decreased knowledge of accuracy.
B - Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Table B-2. Confirmation Sample Results

Media		**Soil**	**Soil**	**Soil**
Station		**FBQSD-200M**	**FBQSD-200M**	**FBQSD-201M**
Sample ID		**FBQSD-200M-0521-FD**	**FBQSD-200M-0521-SD**	**FBQSD-201M-0520-SD**
Date		**10/23/2009**	**10/23/2009**	**10/20/2009**
Depth (ft)		**0.0 - 0.5**	**0.0 - 0.5**	**0.0 - 0.5**
Field Type		**Multi-increment Field Duplicate**	**Multi-increment**	**Multi-increment**
Analyte (mg/kg)	**Units**			
Manganese	MG/KG	455	454	643

Table B-3. Backfill Sample Results

Media		**Soil**
Station		**FBQ-QC-0519**
Sample ID		**FB2-QC-0519-QC**
Date		**10/09/2009**
Field Type		**Multi-increment**
Analyte (mg/kg)	**Units**	
Explosives		
1,3,5-Trinitrobenzene	MG/KG	0.25 U/U
1,3-Dinitrobenzene	MG/KG	0.25 U/U
2,4,6-Trinitrotoluene	MG/KG	0.25 U/U
2,4-Dinitrotoluene	MG/KG	0.25 U/U
2,6-Dinitrotoluene	MG/KG	0.25 U/U
2-Amino-4,6-Dinitrotoluene	MG/KG	0.25 U/U
2-Nitrotoluene	MG/KG	0.25 U/U
3-Nitrotoluene	MG/KG	0.25 U/U
4-Amino-2,6-Dinitrotoluene	MG/KG	0.25 U/U
4-Nitrotoluene	MG/KG	0.5 U/U
HMX	MG/KG	0.25 U/U
Nitrobenzene	MG/KG	0.25 U/U
Nitrocellulose	MG/KG	0.97 BJ/U
Nitroglycerin	MG/KG	0.5 U/U
Nitroguanidine	MG/KG	0.25 U/U
PETN	MG/KG	0.5 U/U
RDX	MG/KG	0.25 U/U
Tetryl	MG/KG	0.25 U/U
Inorganics		
Aluminum	MG/KG	7610
Antimony	MG/KG	2.5 UG/U
Arsenic	MG/KG	9
Barium	MG/KG	36.7
Beryllium	MG/KG	0.36 JG/J
Cadmium	MG/KG	0.04 JG/J
Calcium	MG/KG	568 JG/J
Chromium	MG/KG	20.2
Cobalt	MG/KG	6.3
Copper	MG/KG	12.4
Iron	MG/KG	14900
Lead	MG/KG	10.2
Magnesium	MG/KG	1520
Manganese	MG/KG	378 B
Mercury	MG/KG	0.096 J/J
Nickel	MG/KG	16.7 B
Potassium	MG/KG	584
Selenium	MG/KG	0.64 JG/J
Silver	MG/KG	0.019 JG/J
Sodium	MG/KG	506 UG/U
Thallium	MG/KG	1 UG/U
Vanadium	MG/KG	14.8

Table B-3. Backfill Sample Results (continued)

Media		**Soil**
Station		**FBQ-QC-0519**
Sample ID		**FB2-QC-0519-QC**
Date		**10/09/2009**
Field Type		**Multi-increment**
Analyte (mg/kg)	**Units**	
Zinc	MG/KG	42.4
Organic-Semivolatiles		
1,2,4-Trichlorobenzene	MG/KG	1.7 U/UJ
1,2-Dichlorobenzene	MG/KG	1.7 U/UJ
1,3-Dichlorobenzene	MG/KG	1.7 U/UJ
1,4-Dichlorobenzene	MG/KG	1.7 U/UJ
2,4,5-Trichlorophenol	MG/KG	1.7 U/UJ
2,4,6-Trichlorophenol	MG/KG	1.7 U/UJ
2,4-Dichlorophenol	MG/KG	1.7 U/UJ
2,4-Dimethylphenol	MG/KG	1.7 U/UJ
2,4-Dinitrophenol	MG/KG	4 U/UJ
2,4-Dinitrotoluene	MG/KG	1.7 U/UJ
2,6-Dinitrotoluene	MG/KG	1.7 U/UJ
2-Chloronaphthalene	MG/KG	1.7 U/UJ
2-Chlorophenol	MG/KG	1.7 U/UJ
2-Methyl-4,6-dinitrophenol	MG/KG	4 U/UJ
2-Methylnaphthalene	MG/KG	1.7 U/UJ
2-Methylphenol	MG/KG	1.7 U/UJ
2-Nitrobenzenamine	MG/KG	4 U/UJ
2-Nitrophenol	MG/KG	1.7 U/UJ
3,3'-Dichlorobenzidine	MG/KG	1.7 U/UJ
3-Nitrobenzenamine	MG/KG	4 U/UJ
4-Bromophenyl phenyl ether	MG/KG	1.7 U/UJ
4-Chloro-3-methylphenol	MG/KG	1.7 U/UJ
4-Chlorobenzenamine	MG/KG	1.7 U/UJ
4-Chlorophenyl phenyl ether	MG/KG	1.7 U/UJ
4-Nitrobenzenamine	MG/KG	4 U/UJ
4-Nitrophenol	MG/KG	4 U/UJ
Acenaphthene	MG/KG	0.25 U/UJ
Acenaphthylene	MG/KG	0.25 U/UJ
Anthracene	MG/KG	0.25 U/UJ
Benz(a)anthracene	MG/KG	0.25 U/UJ
Benzenemethanol	MG/KG	1.7 U/UJ
Benzo(a)pyrene	MG/KG	0.25 U/UJ
Benzo(b)fluoranthene	MG/KG	0.25 U/UJ
Benzo(ghi)perylene	MG/KG	0.25 U/UJ
Benzo(k)fluoranthene	MG/KG	0.25 U/UJ
Benzoic acid	MG/KG	4 U/UJ
Bis(2-chloroethoxy)methane	MG/KG	1.7 U/UJ
Bis(2-chloroethyl) ether	MG/KG	1.7 U/UJ
Bis(2-chloroisopropyl) ether	MG/KG	1.7 U/UJ
Bis(2-ethylhexyl)phthalate	MG/KG	1.7 U/UJ

Table B-3. Backfill Sample Results (continued)

Media		**Soil**
Station		**FBQ-QC-0519**
Sample ID		**FB2-QC-0519-QC**
Date		**10/09/2009**
Field Type		**Multi-increment**
Analyte (mg/kg)	**Units**	
Butyl benzyl phthalate	MG/KG	1.7 U/UJ
Carbazole	MG/KG	0.25 U/UJ
Chrysene	MG/KG	0.25 U/UJ
Di-n-butyl phthalate	MG/KG	1.7 U/UJ
Di-n-octylphthalate	MG/KG	1.7 U/UJ
Dibenz(a,h)anthracene	MG/KG	0.25 U/UJ
Dibenzofuran	MG/KG	1.7 U/UJ
Diethyl phthalate	MG/KG	1.7 U/UJ
Dimethyl phthalate	MG/KG	1.7 U/UJ
Fluoranthene	MG/KG	0.25 U/UJ
Fluorene	MG/KG	0.25 U/UJ
Hexachlorobenzene	MG/KG	1.7 U/UJ
Hexachlorobutadiene	MG/KG	1.7 U/UJ
Hexachlorocyclopentadiene	MG/KG	1.7 U/UJ
Hexachloroethane	MG/KG	1.7 U/UJ
Indeno(1,2,3-cd)pyrene	MG/KG	0.25 U/UJ
Isophorone	MG/KG	1.7 U/UJ
N-Nitroso-di-n-propylamine	MG/KG	1.7 U/UJ
N-Nitrosodiphenylamine	MG/KG	1.7 U/UJ
Naphthalene	MG/KG	0.25 U/UJ
Nitrobenzene	MG/KG	1.7 U/UJ
Pentachlorophenol	MG/KG	1.7 U/UJ
Phenanthrene	MG/KG	0.25 U/UJ
Phenol	MG/KG	1.7 U/UJ
Pyrene	MG/KG	0.25 U/UJ
m+p Methylphenol	MG/KG	1.7 U/UJ
Organics-Pesticide/PCB		
4,4'-DDD	MG/KG	0.0047 J/J
4,4'-DDE	MG/KG	0.0086 U/U
4,4'-DDT	MG/KG	0.01 U/U
Aldrin	MG/KG	0.02 U/U
Dieldrin	MG/KG	0.0086 U/U
Endosulfan I	MG/KG	0.0086 U/U
Endosulfan II	MG/KG	0.013 U/U
Endosulfan sulfate	MG/KG	0.015 U/U
Endrin	MG/KG	0.0086 U/U
Endrin aldehyde	MG/KG	0.015 U/U
Endrin ketone	MG/KG	0.01 U/U
Heptachlor	MG/KG	0.018 U/U
Heptachlor epoxide	MG/KG	0.013 U/U
Lindane	MG/KG	0.013 U/U
Methoxychlor	MG/KG	0.025 U/UJ

Table B-3. Backfill Sample Results (continued)

Media		**Soil**
Station		**FBQ-QC-0519**
Sample ID		**FB2-QC-0519-QC**
Date		**10/09/2009**
Field Type		**Multi-increment**
Analyte (mg/kg)	**Units**	
PCB-1016	MG/KG	0.033 U/U
PCB-1221	MG/KG	0.033 U/U
PCB-1232	MG/KG	0.033 U/U
PCB-1242	MG/KG	0.033 U/U
PCB-1248	MG/KG	0.033 U/U
PCB-1254	MG/KG	0.033 U/U
PCB-1260	MG/KG	0.033 U/U
Toxaphene	MG/KG	0.34 U/U
alpha-BHC	MG/KG	0.013 U/U
alpha-Chlordane	MG/KG	0.015 U/U
beta-BHC	MG/KG	0.018 U/U
delta-BHC	MG/KG	0.02 U/U
gamma-Chlordane	MG/KG	0.0086 U/U
Miscellaneous		
pH	NO UNITS	5.6 /J
Organic-Volatiles		
1,1,1-Trichloroethane	MG/KG	0.0058 U/U
1,1,2,2-Tetrachloroethane	MG/KG	0.0058 U/U
1,1,2-Trichloroethane	MG/KG	0.0058 U/U
1,1-Dichloroethane	MG/KG	0.0058 U/U
1,1-Dichloroethene	MG/KG	0.0058 U/U
1,2-Dibromoethane	MG/KG	0.0058 U/U
1,2-Dichloroethane	MG/KG	0.0058 U/U
1,2-Dichloroethene	MG/KG	0.0058 U/U
1,2-Dichloropropane	MG/KG	0.0058 U/U
2-Butanone	MG/KG	0.023 U/U
2-Hexanone	MG/KG	0.023 U/U
4-Methyl-2-pentanone	MG/KG	0.023 U/U
Acetone	MG/KG	0.023 U/U
Benzene	MG/KG	0.0058 U/U
Bromochloromethane	MG/KG	0.0058 U/U
Bromodichloromethane	MG/KG	0.0058 U/U
Bromoform	MG/KG	0.0058 U/U
Bromomethane	MG/KG	0.0058 U/U
Carbon disulfide	MG/KG	0.0058 U/U
Carbon tetrachloride	MG/KG	0.0058 U/U
Chlorobenzene	MG/KG	0.0058 U/U
Chloroethane	MG/KG	0.0058 U/U
Chloroform	MG/KG	0.0058 U/U
Chloromethane	MG/KG	0.0058 U/U
Dibromochloromethane	MG/KG	0.0058 U/U
Dimethylbenzene	MG/KG	0.012 U/U

Table B-3. Backfill Sample Results (continued)

Media		**Soil**
Station		**FBQ-QC-0519**
Sample ID		**FB2-QC-0519-QC**
Date		**10/09/2009**
Field Type		**Multi-increment**
Analyte (mg/kg)	**Units**	
Ethylbenzene	MG/KG	0.0058 U/U
Methylene chloride	MG/KG	0.0058 JB/U
Styrene	MG/KG	0.0058 U/U
Tetrachloroethene	MG/KG	0.0058 U/U
Toluene	MG/KG	0.0058 U/U
Trichloroethene	MG/KG	0.0058 U/U
Vinyl chloride	MG/KG	0.0058 U/U
cis-1,3-Dichloropropene	MG/KG	0.0058 U/U
trans-1,3-Dichloropropene	MG/KG	0.0058 U/U

U – Analyte is not detected.
J – Analyte is detected but below reporting levels. Value is estimated.
UJ – Analyte is not detected but the value is an estimate and demonstrates a decreased knowledge of accuracy.
B - Method blank contamination. The associated method blank contains the target analyte at a reportable level.
G - Elevated reporting limit. The reporting limit is elevated due to matrix interference.
JB - Analyte is detected the blank and sample at a level between the detection level and reporting level.
UG - Analyte was not detected but matrix interference was present.
JG - Analyte was detected between the detection level and reporting level but the concentration is estimated due to matrix interference.

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Science Applications International Corporation
151 Lafayette Drive, Oak Ridge, Tennessee 37831(865) 481-4600

CHAIN OF CUSTODY RECORD

COC NO.: RVAAPFBQ-TA-0001

PROJECT NAME: RVAAP - Fuze and Booster Quarry Landfill/Ponds

PROJECT NUMBER: 01-0833-04-3267-103

PROJECT MANAGER: Jed Thomas 330-405-5802

Sampler (Signature): Jed Thomas (Printed Name): Jed Thomas 216-214-2599

LABORATORY NAME: TestAmerica

LABORATORY ADDRESS: 4101 Shuffel Street NW, North Canton, Ohio 44720, Attn: Mark Loeb

PHONE NO: 330-966-9387

Sample ID	Date Collected	Time Collected	Matrix	Manganese	TCLP(Metals,PCBs,Pesticides,SVOCs)	TCLP(VOCs,Cyanide,Sulfide,pH,Flashpoint)	TCLP VOCs	TCLP (Metals, Herb, Pest, SVOCs)	PCBs, Reactive Cyanide, Reactive Sulfide, pH, Ignitability	Total Manganese	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
FBQSD-200M-0515-SD	05/01/09	1700	SD					2			2		MI Processing MI-2
FBQSD-200M-0515-FD	05/01/09	1700	SD	2							2		MI Processing MI-2
FBQSD-200-0516-SD	05/01/09	1705	SD				1				1		MI-2
FBQSD-201M-0517-SD	05/01/09	1715	SD					2			2		MI Processing MI-1
FBQSD-201-0518-SD	05/01/09	1729	SD				1				1		MI-1

Jed Thomas 05/01/09

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 8	Cooler Temperature:
Jed Thomas	5/1/09 800			Cooler ID: 7975 6029 2523 →	FEDEX NUMBER:
COMPANY NAME: SAIC		COMPANY NAME:			
RECEIVED BY: Chris Lyd	Date/Time 5-2-09 9:50	RELINQUISHED BY:	Date/Time	• MI Processing on 0515-SD, 0515-FD, 0517-SD.	
COMPANY NAME: TAL		COMPANY NAME:		• All samples are sediment at 0-0.5 ft bgs	
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	• Samples FBQSD-200M-0515-SD and FBQSD-201M-0517-SD to be analyzed for: Total Manganese, TCLP (Metals, Herbicides, Pest, SVOCs), PCBs, Reactive Cyanide, Reactive Sulfide, pH, and Ignitability	
COMPANY NAME:		COMPANY NAME:			

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CHAIN OF CUSTODY RECORD

COC NO.: RVAAPSFBQ-TA-0002

PROJECT NAME: RVAAP - Fuze and Booster Quarry Landfill/Ponds Remedial Action

PROJECT NUMBER: 06-6199-04-3267-132

PROJECT MANAGER: Jed Thomas 330-405-5802

Sampler (Signature): Jed Thomas (Printed Name): Jed Thomas

LABORATORY NAME: Test America

LABORATORY ADDRESS: 4101 Shuffel Street NW, North Canton, Ohio 44720

PHONE NO: 330-966-9387

Sample ID	Date Collected	Time Collected	Matrix	VOCs	SVOC/Pesticide/PCB/TAL Metals/pH	Explosives	Nitrogycerine/Nitroguanadine/Nitrocellulose	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
FBQ-QC-0519-QC	10/09/09	1150	Soil	1	1	1	1	4		

REQUESTED PARAMETERS

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
COMPANY NAME: SAIC	10/09/2009	COMPANY NAME: Test Americs	10/9/09 1344
RECEIVED BY: 10/9/20 thm	Date/Time	RELINQUISHED BY:	Date/Time
COMPANY NAME:		COMPANY NAME:	
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time
COMPANY NAME: Test Americs	10/9/09 245	COMPANY NAME: TA/NC	10/9/09 2:45

TOTAL NUMBER OF CONTAINERS: 4

Cooler Temperature:

Cooler ID:

FEDEX NUMBER: NA

Note: MI Processing on all but VOC jar. The other 3 jars can be combined prior to the MI processing

No analysis of trip blank

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CHAIN OF CUSTODY RECORD

COC NO.: RVAAP FBQ - TA - 003

PROJECT NAME: RVAAP - Fuze and Booster Quarry Landfill/Ponds

PROJECT NUMBER: PO 1PP26813

PROJECT MANAGER: Jed Thomas 330-405-5802

Jed Thomas

Sampler (Signature): Jed Thomas (Printed Name): Jed Thomas

LABORATORY NAME: TestAmerica

LABORATORY ADDRESS: 4101 Shuffel Street NW, North Canton, Ohio 44720, Attn: Mark Loeb

PHONE NO: 330-966-9387

Sample ID	Date Collected	Time Collected	Matrix	Manganese	TCLP(Metals,PCBs,Pesticides,SVOCs)	TCLP(VOCs,Cyanide,Sulfide,pH,Flashpoint)	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
FBQSD-201M-052P-SD	10/20/09	1600	SD	2			2		

REQUESTED PARAMETERS

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 2	Cooler Temperature:
Jed Thomas	10/20/09 1730	William R Cribbs	10/20/09 1745	Cooler ID:	FEDEX NUMBER:
COMPANY NAME: SAIC		COMPANY NAME: TestAmerica			
RECEIVED BY:	Date/Time	RELINQUISHED BY:	Date/Time	• MI Processing of 2 Jars for Same Sample • Need 5 day TAT after MI Processing for MN analysis	
COMPANY NAME:		COMPANY NAME:			
RELINQUISHED BY: William R Cribbs	Date/Time 10/20/09 1855	RECEIVED BY: Matt Ahlen	Date/Time 21 Oct 09 0800		
COMPANY NAME: TestAmerica		COMPANY NAME: TESTAMERICA			

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Science Applications International Corporation
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CHAIN OF CUSTODY RECORD

COC NO.: RVAAPFBQ-TA-0004

PROJECT NAME: RVAAP - Fuze and Booster Quarry Landfill/Ponds Remedial Action

PROJECT NUMBER: PD/0026813

PROJECT MANAGER: Jed Thomas 330-405-5802
call: 216-214-2599

Sampler (Signature): Jed Thomas (Printed Name): Jed Thomas

LABORATORY NAME: Test America

LABORATORY ADDRESS: 4101 Shuffel Street NW, North Canton, Ohio 44720

PHONE NO: 330-966-9387

REQUESTED PARAMETERS

Sample ID	Date Collected	Time Collected	Matrix	VOCs	SVOC/Pesticide/PCB/TAL Metals/pH	Explosives	Nitroglycerine/Nitroguanadine/Nitrocellulose	Manganese	No. of Bottles/ Vials:	OVA SCREENING	OBSERVATIONS, COMMENTS, SPECIAL INSTRUCTIONS
FBQSD-2000M-0521-SD	10/23/09	1020	SD					1	1		MI Processing
FBQSD-2000M-0521-FD	10/23/09	1020	SD					1	1		MI Processing

RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time	TOTAL NUMBER OF CONTAINERS: 2	Cooler Temperature:
COMPANY NAME: SAIC	10/23/09 1:30 pm	COMPANY NAME: TA	10/23/09 1:30	Cooler ID:	FEDEX NUMBER:
RECEIVED BY:	Date/Time	RELINQUISHED BY:	Date/Time	• MI Processing for each sample • Need 5 day TAT after MI Processing • Sample ID's (if you cannot read above) FBQSD-2000M-0521-SD FBQSD-2000M-0521-FD	
COMPANY NAME:		COMPANY NAME:			
RELINQUISHED BY:	Date/Time	RECEIVED BY:	Date/Time		
COMPANY NAME:		COMPANY NAME:			

North Canton

Appendix C
Data Quality Control Summary Report

TABLE OF CONTENTS

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
ADR	Automated Data Review
C	Centigrade
DoD	Department of Defense
DI	Deionized
DQA	Data Quality Assessment
DQCR	Data Quality Control Report
DQO	Data Quality Objective
EPA	U.S. Environmental Protection Agency
FBQ	Fuze and Booster Quarry Landfill/Ponds
LCS	Laboratory Control Standard
MDL	Method Detection Level
MPR	Monthly Progress Report
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PCB	Polychlorinated Biphenyl
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RD	Remedial Design
RmAWP	Removal Action Work Plan
RI	Remedial Investigation
RPD	Relative Percent Difference
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SDG	Sample Delivery Group
SVOC	Semivolatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
TCMX	tetrachloro-meta-xylene
USACE	U.S. Army Corps of Engineers
VOC	Volatile Organic Compound
%D	Percent Difference

C. DATA QUALITY CONTROL SUMMARY REPORT

C.1 PURPOSE

Environmental data must always be interpreted relative to known limitations and intended use. As can be expected in environmental media of this type, there are areas and data points where the user needs to be cautioned relative to the quality of the project information presented. The data verification process and this data quality assessment (DQA) are intended to provide current and future data users assistance throughout the interpretation of these data.

The purpose of this DQA report is as follows:

1) To describe the quality control (QC) procedures followed to ensure data generated by Science Applications International Corporation (SAIC) during these investigations at the Ravenna Army Ammunition Plant (RVAAP) would meet project requirements;

2) To describe the quality of the data collected; and

3) To describe problems encountered during the course of the study and their solutions.

This report provides an assessment of the analytical information gathered while implementing the *Remedial Design for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds* characterization, confirmation, and backfill sampling efforts. This appendix documents that the quality of the data met the overall objectives of this confirmation sampling effort. References will be directed toward those quality assurance (QA) procedures that establish data credibility. The primary intent of this assessment is to illustrate that data generated for these studies can withstand scientific scrutiny, are appropriate for their intended purpose, are technically defensible, and are of known and acceptable sensitivity, precision, and accuracy.

Multiple activities were performed to achieve the desired data quality for this project. As discussed in the report, decisions were made during the initial scoping of this effort to define the quality and quantity of data required. Data quality objectives (DQOs) were established to guide the implementation of the field sampling and laboratory analysis. A QA program was established to standardize procedures and to document activities [refer to the Facility-wide Quality Assurance Project Plan (QAPP) within the *Facility-wide Sampling and Analysis Plan for Environmental Investigations* (USACE 2001)]. This program provided a means to detect and correct any deficiencies in the process. Upon receipt by the project team, data were subjected to verification and automated data review (ADR) validation as to identify and qualify problems related to the analysis. These review steps contributed to this final DQA where data used in the investigation are identified as having met the criteria and are being employed appropriately.

C.2 QUALITY ASSURANCE PROGRAM

A Facility-wide QAPP was developed to guide the investigation. This QAAPP is found in Part II of the *Facility-wide Sampling and Analysis Plan for Environmental Investigations* (USACE 2001). The purpose of this document was to enumerate the quantity and type of samples to be taken to inspect the area of concern (AOC), and to define the quantity and type of QA/QC samples to be used to evaluate the quality of the data obtained. The parameters and procedures for sampling are presented in Section 4.0 and 7.0 of the *Remedial Design for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds*.

The QAPP and RD established requirements for both field and laboratory QC procedures. In general, field QC duplicates for manganese were collected each environmental sample matrix collected in the area being investigated. No QA split samples, field blanks, or rinsate blanks were collected. Analytical laboratory QC duplicates, matrix spikes (MS), laboratory control samples (LCS), and method blanks were required for every 20 samples or less of each matrix and analyte.

A primary goal of the RVAAP QA Program was to ensure that the quality of results for all environmental measurements was appropriate for their intended use. To this end, the QAPP and standardized field procedures were compiled to guide the investigation. Through the process of readiness review, training, QC implementation, and detailed documentation, the project has successfully accomplished the goals set for the QA Program. Surveillances were conducted to determine the adequacy of field performance as evaluated against the QA plan and procedures.

C.2.1 Monthly Progress Reports

Monthly Progress Reports (MPRs) were completed by the SAIC Project Manager for the duration of the project. The MPRs contained a summary of field activities for this remedial action issued per the *Project Management Plan for the Six High Priority Areas of Concern (*SAIC 2005). The monthly reports included a status and summary of project activities. These reports were issued to the U.S. Army Corps of Engineers (USACE), Louisville District Project Manager, which was then submitted to the Ohio EPA. Access to these reports can be obtained through the USACE, Louisville District Project Manager.

C.2.2 Daily Checklists

The SAIC Construction Manager produced all Daily Checklists. These include information such as, but not limited to, sub-tier contractors on-site, equipment on-site, work performed summaries, QC activities, Health and Safety activities, problems encountered, and corrective actions. The daily reports were submitted to the USACE, Louisville District Project Manager and may be obtained through his office.

C.2.3 Laboratory "Definitive" Level Data Reporting

The QAPP for this project identified requirements for laboratory data reporting and identified Whitewater Associates, Inc. (with TestAmerica, Inc.) as the laboratory for the project. U.S. Environmental Protection Agency (EPA) "definitive" data have been reported, including the following basic information:

- Laboratory case narratives;
- Sample results (soils/sediments reported per dry weight);
- Laboratory method blank results;
- LCS results;
- Laboratory sample MS recoveries;
- Laboratory duplicate results;
- Surrogate recoveries [volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and herbicides];
- Sample extraction dates; and
- Sample analysis dates.

This information from the laboratory, along with field information, provides the basis for subsequent data evaluation relative to sensitivity, precision, accuracy, representativeness, and completeness. These have been presented in Section D4.0.

C.3 DATA VERIFICATION

The objective when evaluating the project data quality is to determine data usability. The evaluation is based on the interpretation of laboratory QC measures, field QC measures, and the project DQOs. This project implemented the ADR electronic review process in combination with technical oversight to facilitate laboratory data review. ADR output was reviewed by the project-designated verification staff and the project laboratory coordinator. The ADR product is retained in the project database and available within that structure.

C.3.1 Field Data Verification

Daily Checklists were completed by the SAIC Construction Manager. The Daily Checklists and other field-generated documents such as forms, logs, and reports were peer reviewed onsite. These logs and all associated field information have been delivered to the USACE, Louisville District Project Manager and can be obtained through his office.

C.3.2 Laboratory Data Verification

Analytical data generated for this project have been subjected to data verification and review. The following describes this systematic process and the evaluation activities performed. Several criteria have been established against which the data were compared and from which a judgment was

rendered regarding the acceptance and qualification of the data. These criteria in addition to project specific QC criteria are entered into the database and evaluated using the ADR programming. Because it is beyond the scope of this report to cite those criteria, the reader is directed to the following documents for specific detail:

- SAIC Technical Support Contractor QA Technical Procedure (TP-DM-300-7) Data Verification and Validation;
- EPA – National Functional Guidelines for Inorganic Data Review, EPA 540-R-04-004, October 2004;
- EPA – National Functional Guidelines for Organic Data Review, EPA-540/R-99/008, October 1999; and
- Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories, Version 3, January 2006.

Upon receipt of field and analytical data, verification staff performed a systematic examination of the reports, utilizing the ADR process to ensure the content, presentation, and administrative validity of the data. Discrepancies identified during this process were recorded and documented utilizing the dataset. As part of data verification, standardized laboratory electronic data deliverables were subjected to review. This technical evaluation ensured that all contract-specified requirements had been met, and that electronic information conformed to reported hardcopy data. QA Program Nonconformance Report and Corrective Action systems were implemented as required.

During the verification phase of the review and evaluation process, data were subjected to a systematic technical review by examining all field and analytical QC results and laboratory documentation, following EPA functional guidelines, the ADR process, and SAIC internal procedures for laboratory data review. These data review guidelines define the technical review criteria, methods for evaluation of the criteria, and actions to be taken resulting from the review of these criteria. The primary objective of this phase was to assess and summarize the quality and reliability of the data for the intended use and to document factors that may affect the usability of the data. This process did not include in-depth review of raw data instrument out-put or recalculation of results from the primary instrument out-put. This data verification and analytical review process included, but not necessarily limited to, the following parameters:

- Data completeness;
- Analytical holding times and sample preservation;
- Calibration (initial and continuing);
- Method blanks;
- Sample results verification;
- Surrogate recovery;
- LCS analysis;
- Internal standard performance;
- MS recovery;
- Duplicate analysis comparison;

- Reported detection limits;
- Compound and element quantification;
- Reported detection levels; and
- Secondary dilutions.

As an end result of this phase of the review, the data were qualified based on the technical assessment of the verification/validation criteria. Qualifiers were applied to each field and analytical result to indicate the usability of the data for its intended purpose.

C.3.3 Definition of Data Qualifiers (Flags)

During the data verification process, all laboratory data were assigned appropriate data qualification flags and reason codes. Qualification flags are defined as follows:

"B" Indicates that an analyte was present in the method blank and sample at a level above the reporting level for organics or the analyte is detected but at a level between the detection level and reporting level for inorganics.

"JB" Indicates that an analyte was detected both in the blank and sample at a level between the detection level and reporting level in inorganics.

"G" Indicates that analyte was detected but matrix interference was present in the sample.

"UG" Indicates that an analyte was not detected but there was matrix interference present.

"JG" Indicates that an analyte was detected at a level between the detection level and reporting level but the concentration is estimated due to matrix interference.

"U" Indicates the analyte was analyzed for, but not detected above, the level of the associated value.

"J" Indicates the analyte was positively identified; however, the associated numerical value is an approximate concentration of the analyte in the sample.

"UJ" Indicates the analyte was analyzed for, but not detected above, the associated value; however, the reported value is an estimate and demonstrates a decreased knowledge of its accuracy or precision.

"R" Indicates the analyte value reported is unusable. The integrity of the analyte identification, accuracy, precision, or sensitivity has raised significant questions as to the reality of the information presented.

"=" Indicates the analyte has been validated, the analyte has been positively identified, and the associated concentration value is accurate.

C.3.4 Data Acceptability

Seven environmental sediment/soil and two field duplicate samples were collected on September 1, 2009 and October 9, 20, and 23, 2009 resulting in 277 discrete analyses (i.e., analytes) being obtained, reviewed, and integrated into the assessment (these totals do not field measurements and field descriptions). The project produced acceptable results for 100% of the sample analyses performed and successfully collected investigation samples under the direction of the Sampling and Analysis Plan (SAP) and the USACE, Louisville District.

Table D-1 presents a summary of the collected confirmation samples. It tallies the successful collection of all targeted field duplicate samples, while Table D-2 identifies a cross reference for duplicate sample pair numbers. Table D-3 provides a summary of rejected analyses grouped by media and analyte category. The majority of estimated values were based on exceeded SVOC extraction holding time criteria.

Table C-1. FBQ Remedial Action Sampling Summary

Area	Media	Environmental Samples	Field Duplicates	Trip Blanks	Equipment Rinsate Blanks	Site Source Water Blanks	USACE Split Samples
FBQ	TCLP/Soil	7	2	1	-	-	-

TCLP = Toxicity Characteristic Leaching Procedure.

USACE = U.S. Army Corps of Engineers.

Table C-2. Primary, Duplicate, and Split Sample Correlation
FBQ Remedial Action

Media	Station #	Sample #	Duplicate #	Laboratory SDG #	Split #
Sediment	200M	FBQSD-200M-0515-SD	FBQSD-200M-0515-FD	A9E050250	-
Sediment	200M	FBQSD-200M-0521-SD	FBQSD-200M-0521-FD	A9J230352	-

SDG = Sample delivery group.

Table C-3. FBQ Remedial Action
Summary of Rejected Analytes (Laboratory)
(grouped by medium and analysis group)

Media	Analysis Group	Rejected/	Total	Percent Rejected
TCLP/Sediment	TCLP Metals/Hg	0/	16	0.0
	Manganese	0/	3	0.0
	TCLP VOC	0/	20	0.0
	TCLP SVOC	0/	24	0.0
	TCLP Pesticides	0/	14	0.0
	PCBs	0/	14	0.0
	TCLP Herbicides	0/	4	0.0
	General Chem.	0/	8	0.0
Soil	Metals/Hg	0/	23	0.0
	Manganese	0/	3	0.0
	VOC	0/	35	0.0
	SVOC	0/	66	0.0
	Pesticides	0/	21	0.0
	PCBs	0/	7	0.0
	Explosives	0/	17	0.0
	General Chem.	0/	2	0.0
	Project Totals	**0/**	**277**	**0.0**

TCLP = Toxicity Characteristic Leaching Procedure.

For this remedial action, two field duplicates were analyzed for sediment/soil media. Equipment rinsate, site potable water source and Deionized (DI) water source samples were not collected since these samples were for confirmation only at FBQ.

C.4 DATA QUALITY EVALUATION

C.4.1 Toxicity Characteristic Leaching Procedure (TCLP)/SEDIMENT

Sample Delivery Group (SDG) A9E050250 (ID #s: FBQSD-200-0516-SD, FBQSD-201-0518-SD, FBQSD-200M-0515-SD, FBQSD-201M-0517-SD, FBQSD-200M-0515-FD)

TCLP VOCs: Analytical holding times were met for all samples. Initial calibration criteria were achieved for all compounds analyzed. Continuing calibration criteria were achieved with the exception of carbon tetrachloride which exhibited a slightly high %difference (%D) of +26.84%. No qualifications of the associated sample data were required however, since this analyte was not detected. Surrogate recoveries were acceptable. Internal standard area and retention time criteria were acceptable. The method blank was free of contamination. LCS recoveries were within acceptance limits. MS/Matrix Spike Duplicate (MSD) did not apply to any TCLP VOC samples in this Sample Delivery Group (SDG). No dilutions or reanalyses were required. No data were estimated or rejected.

TCLP SVOCs: Holding time criteria were met. Initial and continuing calibrations were acceptable. Surrogate recoveries and internal standard area/retention time criteria were acceptable. The preparation blank was free of contamination. All LCS recoveries were within acceptance limits. MS/MSD did not apply to any TCLP SVOC samples in this SDG. No dilutions or reanalyses were required. No data were estimated or rejected for any reason.

TCLP Pesticides: Holding time criteria were acceptable. Initial and continuing calibrations were acceptable. The preparation blank was free of contamination. Surrogate recoveries were acceptable with the exception of slightly high tetrachloro-meta-xylene (TCMX) recovery at 111% in FBQSD-201M-0517-SD. No qualifications of the sample data were required however, since there were no positive results present in this sample. LCS recoveries were within control limits. MS/MSD did not apply to this sample. No dilutions or reanalyses were required. No data were estimated or rejected.

PCBs: Holding time criteria were met. Initial and continuing calibrations were acceptable. Surrogate recoveries were acceptable. The preparation blank was free of contamination and had no impact on the sample data. All LCS recoveries were within control limits. MS/MSD recoveries (%R) and relative percent differences (RPD) were within acceptance limits in FBQSD-200M-0515-SD of this delivery group. No dilutions or reanalyses were required. No data were estimated or rejected.

TCLP Herbicides*:* Holding time criteria were met. Initial and continuing calibrations were acceptable. The preparation blank was free of contamination. Surrogate and LCS recoveries were within control limits. MS/MSD did not apply to any samples in this sample group. No dilutions or reanalyses were required. No data were estimated or rejected.

TCLP Metals/Mercury and Manganese: Holding time criteria were met. All initial and continuing calibrations were acceptable. The sediment preparation blank contained low level manganese at 0.36mg/Kg. The TCLP Metals/Hg preparation blank contained barium (0.002mg/L) and selenium (0.0053mg/L). No qualifications of the data were required however, since manganese in sediment samples exceeded the action level and barium and selenium were not detected in TCLP samples. All LCS recoveries were acceptable for TCLP Metals/Hg and manganese. All matrix spike (MS) recoveries and laboratory duplicate RPD value for manganese were acceptable in FBQSD-200M-0515-SD. MS/MSD or laboratory duplicate did not apply to any TCLP Metal/Hg samples in this SDG. All 3 sediment samples were reported at 1:20 dilutions for manganese and the 2 TCLP Metals/Hg samples were reported at 1:20 dilutions for cadmium, lead, selenium, and silver. No data were estimated or rejected.

General Chemistry (Sulfide, pH, Total Cyanide, Flashpoint): Due to exceeded holding times from collection to analysis, results for flashpoint (J), and sulfide (UJ) were qualified as estimated in sediment samples FBQSD-200M-0515-SD and FBQSD-201M-0517-SD. All associated initial and continuing calibration criteria were acceptable. All general chemistry parameter laboratory blanks were clean. All LCS recoveries were acceptable. MS/MSD and RPD values for Total Cyanide were within acceptance limits in FBQSD-200M-0515-SD. MS/MSD did not apply to any other general chemistry parameters for samples contained in this SDG. Laboratory duplicate RPD values for

flashpoint and pH were acceptable in FBQSD-200M-0515-SD. No dilutions or reanalyses were required. No data were rejected.

SDG. A9J230103 (ID #: FBQSD-201M-0520-SD)

Manganese: Holding time was met. Initial and continuing calibrations were acceptable. The manganese preparation blank and associated calibration blanks were clean. Manganese LCS recovery of 104% was acceptable. MS/MSD was analyzed on this sample but due to the sample concentration being greater than 4 times the spiking level, percent recovery was not calculated and therefore, does not apply. Serial dilution results were acceptable. Laboratory duplicate did not apply to this sample. Due to the sample matrix, this sample was analyzed and reported at 1:10 dilution. No data were estimated or rejected for any reason.

SDG. A9J230352 (ID #: FBQSD-200M-0521-SD, FBQSD-200M-0521-FD)

Manganese: Holding times were acceptable. Initial and continuing calibration criteria were acceptable. The manganese preparation blank and associated calibration blanks were clean. Manganese LCS recovery of 104% was within control limits. MS/MSD was analyzed a sample not contained directly in the SDG and therefore, did not apply. Laboratory duplicate and serial dilution also did not apply to these samples. It is noted however, that these samples are field duplicates and exhibited acceptable RPD value of 0.22%. Due to the nature of the sample matrix, both samples were analyzed and reported at 1:10 dilutions. No data were estimated or rejected for any reason.

SDG. A9J090368 (ID #s: FB2-QC-0519-QC, FB2-QC-0519-QC (VOC), TRIP BLANK)

This sample was received at the laboratory at 0.4 degrees centigrade (C) which is below the lower 4+/-2 degree limit. Since the temperature is below the limit, preservation and sample integrity should not be compromised so no qualifications of the data were required.

VOCs (Full list): Holding times were met. Initial calibration criteria were acceptable. Surrogate recoveries and internal standard area/retention time criteria were acceptable. Continuing calibration criteria were acceptable for most analytes with the exception of less than -20 percent difference (%D) values for bromomethane (-36.34%), chloroethane (-21.28%), and bromoform (-34.73%) which caused these analytes in associated sample TRIP BLANK to be qualified as estimated (UJ). The VOC trip blank was free of contamination and had no impact on the sample data. The two associated VOC laboratory blanks contained acetone (8.9 ug/Kg), methylene chloride (1.5ug/Kg and 1.2ug/Kg), and 2-hexanone (0.65ug/Kg). Therefore, based on VOC laboratory blank levels, the result for methylene chloride in associated sample FB2-QC-0519-QC (VOC) was qualified as not detected (U). All LCS recoveries were within control limits except for high recoveries for bromoform at 131% and bromomethane at 146%. No qualifications of the associated data were required however, since these analytes were not detected. MS/MSD recoveries and RPD values were within control limits in FB2-QC-0519-QC (VOC). Note that the VOC trip blank sample TRIP BLANK was not listed on the chain of custody. No dilutions or reanalyses were required. No data were rejected.

SVOCs (Full list): The holding time limit of 14 days from collection to extraction was exceeded by 5 days for sample FB2-QC-0519-QC which caused all SVOC results in this sample to be qualified as estimated (UJ). Initial calibration criteria were acceptable. Continuing calibration criteria were acceptable for most SVOC analytes with the exception of less than -20% D values for bis(2-chloroisopropyl)ether (-37.72%) and 2-nitroaniline (-22.91%) which caused these analytes to be qualified as estimated (UJ) in sample FB2-QC-0519-QC. Surrogate recoveries and internal standard area/retention time criteria were acceptable. The SVOC preparation blank was free of contamination and had no impact on the sample data. LCS recoveries were within control limits. MS/MSD did not apply to this sample. Due to matrix interferences, SVOC sample FB2-QC-0519-QC was analyzed and reported at a 1:5 dilution. No SVOC data were rejected for any reason.

Pesticides (Full list): Holding time criteria were acceptable. Surrogate recovery criteria were within control limits. Initial calibrations were acceptable. Continuing calibrations were acceptable for most pesticide analytes with the exception of greater than +/-15% D values for 4,4'-DDD (-20.10%) and methoxychlor (-30.75%). Therefore, based on continuing calibration deviations, positive result for 4,4'-DDD was estimated (J) and non-detect result for methoxychlor was estimated (UJ) in FB2-QC-0519-QC. The pesticides preparation blank was free of contamination and had no impact on the sample data. LCS recoveries were within control limits. MS/MSD did not apply to this sample. Due to matrix interferences, pesticides sample FB2-QC-0519-QC was analyzed and reported at a 1:5 dilution. No data were rejected for any reason.

PCBs: Holding times were met. Initial and continuing calibration criteria were acceptable. Surrogate recovery was acceptable. The PCB soil preparation blank was free of contamination and had no impact on the sample data. All PCB LCS recoveries were within control limits. MS/MSD recoveries and RPD values were within control limits in sample FB2-QC-0519-QC of this SDG. No dilutions or reanalyses were required. No PCB data were estimated or rejected for any reason.

Explosives and Nitroguanidine: Holding time criteria were met. Initial and continuing calibrations were acceptable. Surrogate recoveries were within control limits. The preparation blanks were clean. All explosives/nitroguanidine LCS recoveries were within control limits. MS/MSD did not apply to this sample. No dilution or reanalysis was required for this sample. No data were estimated or rejected.

General Chemistry (Nitrocellulose, pH): Holding times were met for the nitrocellulose analysis. Holding time for pH is not specified for method 9045C, but six hours after sample receipt is generally accepted. Analysis of pH occurred 8 days after collection/laboratory receipt which caused pH to be qualified as estimated (J) for sample FB2-QC-0519-QC. Nitrocellulose initial and continuing calibration criteria were acceptable. The pH measurement apparatus was properly calibrated. The laboratory blank contained 1.4mg/Kg nitrocellulose. Therefore, based on the laboratory blank, result for nitrocellulose in sample FB2-QC-0519-QC was qualified as not detected (U). Blanks do not apply to pH. LCS recoveries were within control limits for both nitrocellulose and pH. MS/MSD did not apply to this sample. Laboratory duplicate RPD for pH of 5.6% was acceptable in FB2-QC-0519-QC of this SDG. No dilution or reanalysis was required for this sample. No data were rejected.

Metals/Hg: Holding times were met. Initial and continuing calibration criteria were acceptable. The metals preparation blank contained manganese (0.18mg/Kg) and nickel (0.20mg/Kg). No qualifications of the sample data were required however, since sample analyte concentrations exceeded the blank action levels. All associated calibration blanks were free of target analyte contamination and had no impact on the sample data. LCS recoveries were within control limits with the exception of slightly low recovery for selenium at 78%. Since this recovery value was within the marginal exceedance limits of 75-120%, no qualification of the sample data was required. Matrix spike, laboratory duplicate, and serial dilution did not apply to this sample. Due to matrix interferences, sample FB2-QC-0519-QC was analyzed and reported at 1:5 dilution for all metals analytes except mercury which was reported undiluted. No data were estimated or rejected for any reason.

C.4.2 Precision

Field duplicate samples were collected to ascertain the contribution to variability (i.e., precision) due to the combination of environmental media, sampling consistency, and analytical precision. The field duplicate samples were collected from the same spatial and temporal conditions as the primary environmental sample.

Field duplicate comparison information in Table D-4 presents the RPD for field duplicate measurements, by analyte. RPD was calculated because both samples were > 5 times the reporting level. When one or both sample values are between the reporting level and 5 times the reporting level, the absolute difference is evaluated. If both samples were not detected for a given analyte, precision is considered acceptable. To review information, this DQA has implemented general criteria for comparison of absolute difference measurements and RPDs. RPD criteria were set at 50 and absolute difference criteria were set at 3 times the reporting level. Note that field duplicates applied only to manganese for this project sample set. Field duplicate comparison is good for manganese in sediment duplicate pair FBQSD-200M-0515-SD/FBQSD-200M-0515-FD at 1.28% RPD. Field duplicate comparison is also good for manganese in sediment duplicate pair FBQSD-200M-0521-SD/FBQSD-200M-0521-FD at 0.22% RPD.

C.4.3 Sensitivity

Determination of minimum detectable values allows the investigation to assess the relative confidence that can be placed in a value relative to the magnitude or level of analyte concentration observed. The closer a measured value comes to the minimum detectable concentration, the less confidence and more variation the measurement will have. Project sensitivity goals were expressed as quantitation level goals in the QAPP. These levels were achieved or exceeded throughout the analytical process. Actual laboratory method detection levels (MDLs) were adequate to support project quantitation level goals. Individual analyte reporting levels varied due to matrix differences and contaminant analyte concentrations. Reporting levels were elevated in TCLP/sediments and soils due to dilution factors, inherent moisture content variability, and results being reported in the standard

dry weight format. Reporting level variations have been considered during data interpretation and statistical applications.

Method blank determinations were performed with each analytical sample batch for each analyte under investigation. These blanks were evaluated during data review to determine their potential impact on individual data points. Review action levels are set at 5 times the reporting level for all analytes, except those designated as common laboratory contaminants (methylene chloride, acetone, toluene, 2-butanone, and phthalate compounds) with action levels set at 10 times reporting levels. During data review, reported sample concentrations are assessed against method blank action levels and the following qualifications are made when reportable quantities of analyte were observed in the associated method blank:

- When the analyte sample concentration is above 5 or 10 times the action level, the data are not qualified and it is considered a positive value.

- When the analyte sample concentration is determined below 5 or 10 times the action level but above the reporting level, the data are considered impacted by the method blank and the value reported is qualified as a non-detect at the analyte value reported. These data are then qualified as "U."

- When the analyte sample concentration is determined below 5 or 10 times the action level and below the reporting level, the data are considered impacted by the method blank and the value reported is qualified as a non-detect at the reporting level. These data are then qualified as "U."

All laboratory method/preparation blanks for TCLP/Sediment/Soil VOC, SVOC, Pesticides, PCB, Herbicides, Sulfide, and Cyanide were non-detects for most analytical parameters and had no impact for this sample set. The metals sediment laboratory blank contained manganese and the TCLP Metals laboratory blank contained low levels of barium and selenium. No qualifications of the data were required however, since these analytes were not detected in the associated samples. Volatiles soil laboratory method blanks contained low levels of acetone, 2-hexanone, and methylene chloride. Only one sample was qualified as undetected (U) for methylene chloride due to laboratory blanks. The VOC trip blank was free of target analyte presence. Therefore, overall laboratory sensitivity has been achieved. Note that since the samples collected for this phase of the project were for confirmation only, no field, or rinsate blanks were collected.

Table C-4. Field Duplicate Comparison, Fuze and Booster Quarry Investigation

Analysis	FBQSD-200M-0515-SD/ FBQSD-200M-0515-FD Sediment RPD	FBQSD-200M-0521-SD/ FBQSD-200M-0521-FD Sediment RPD
Manganese	1.28	0.22

RPD = Relative percent difference.

C.4.4 Representativeness and Comparability

Representativeness expresses the degree to which data accurately reflect the analyte or parameter of interest for the environmental site and is the qualitative term most concerned with the proper design of the sampling program. Factors that affect the representativeness of analytical data include proper preservation, holding times, use of standard sampling and analytical methods, and determination of matrix or analyte interferences. Samples were delivered to the laboratory by overnight express courier, were received in good condition, and at appropriate temperature except for sample FB2-QC-0519-QC which was received below $4^{o}C$ +/-$2^{o}C$ at $0.4^{o}C$. This temperature does not compromise preservation or sample integrity. All analyses were performed within the recommended analytical holding times with the exceptions of flashpoint and sulfide for samples FBQSD-200M-0515-SD and FBQSD-201M-0517-SD, and extraction holding time was exceeded for SVOC sample FB2-QC-0519-QC. Sample preservation, analytical methodologies, and sampling methodologies were documented to be adequate and consistently applied.

Comparability, like representativeness, is a qualitative term relative to an individual project data set. These RVAAP AOC confirmation investigations employed appropriate sampling methodologies, site surveillance, use of standard sampling devices, uniform training, documentation of sampling, standard analytical protocols/procedures, QC checks with standard control limits, and universally accepted data reporting units to ensure comparability to other data sets. Through the proper implementation and documentation of these standard practices, the project has established the confidence that the data will be comparable to other project and programmatic information.

C.4.5 Completeness

Usable data are defined as those data that pass individual scrutiny during the verification and validation process and are accepted for unrestricted application to the human health risk assessment evaluation or equivalent type applications. Estimated data are acceptable for project objectives.

Objectives for remedial action confirmation data have been achieved. The project produced usable results for 100% of the sample analyses performed and successfully collected all the samples planned.

C.5 DATA QUALITY ASSESSMENT SUMMARY

The overall quality of information meets or exceeds the established project objectives. Through proper implementation of the project data verification and assessment process, project information has been determined to be acceptable for use.

Data, as presented, have been qualified as usable or estimated "J or UJ." Data that have been estimated provide indications of accuracy, precision, or sensitivity being less than desired but adequate for interpretation. No data points were rejected (R). Qualifiers have been applied to data when necessary.

Overall, data produced for this project demonstrate that they can withstand scientific scrutiny, are appropriate for its intended purpose, are technically defensible, and are of known and acceptable sensitivity, precision, and accuracy. Data integrity has been documented through proper implementation of QA and QC measures. The environmental information presented has an established confidence that allows utilization for the project objectives and provides data for future needs.

Appendix D
Field Change Request Forms

FIELD CHANGE REQUEST (FCR)

FCR NO. FCR-RVAAPFBQ-001 DATE INITIATED 11/10/09
PROJECT Fuze and Booster Quarry Landfill/Ponds Remedial Action
CONTRACT NO. GSA Contract No. GS-10F-0076J Delivery Order No. W912QR-05-F-0033

REQUESTOR IDENTIFICATION
NAME Jed Thomas ORGANIZATION SAIC PHONE 330-405-5802

TITLE SAIC Construction Manager SIGNATURE

BASELINE IDENTIFICATION

BASELINE(S) AFFECTED ☐ Cost ☐ Scope ☐ Milestone ☒ Method of Accomplishment
AFFECTED DOCUMENT (TITLE, NUMBER AND SECTION)
Final Remedial Design for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds
DESCRIPTION OF CHANGE:
1) The design specifies that 4-6 inch limestone (rip-rap) will be placed in the remediated drainage ditch at FBQ. SAIC and our remedial subcontractor would like to use 6-10 inch limestone due to the local availability of this stone. The 4-6 inch rip-rap is not readily available from the quarry providing the material.

2) Additionally, SAIC and our remedial subcontractor would like to extend the stone further to the west of the remediated area in the drainage ditch. Currently, the west end of the drainage ditch intersects with a road that accesses monitoring wells to the north. This road creates water ponding, as it is downstream of the drainage ditch. SAIC will excavate a channel out of this road and backfill it with stone to 1) provide a porous area for the drainage ditch water to drain and 2) still allow vehicular access to the monitoring wells. This has already discussed with and verbally approved by Mark Patterson.

JUSTIFICATION:

1) The 4-6 inch limestone is not readily available at the quarry providing the material.
2) The creation of this channel will eliminate some of the ponded water that is in the western (downstream) portion of the drainage ditch. The water will continue its downstream path towards Greenleaf Road.

IMPACT OF NOT IMPLEMENTING REQUEST:

1) There will be schedule delays associated with not implementing the request for larger stone. The 6-10 inch stone is readily available and can be brought on site immediately. The 4-6 inch rip rap will need to be brought to the quarry via rail.
2) The water will become ponded and stagnant at the western portion of the drainage ditch. The water may overflow the ditch and create standing water and ponding in areas adjacent to the drainage ditch.

PARTICIPANTS AFFECTED BY IMPLEMENTING REQUEST:
SAIC Construction Manager and Remedial Subcontractor

COST ESTIMATE ($) 0 ESTIMATOR SIGNATURE No cost impact to USACE
PHONE NA DATE NA

PREVIOUS FCR AFFECTED ☐ YES ☒ NO; IF YES, FCR NO. —

USACE COTR F/ NAT PETERS, LRL COR DATE 11 Nov 09

OHIO EPA PROJECT MANAGER DATE 12 Nov 09

SAIC H&S MANGER SIGNATURE (IF APPLICABLE) NA DATE NA

FIELD CHANGE REQUEST (FCR)

FCR NO. FCR-RVAAPFBQ-002 DATE INITIATED 11/10/09
PROJECT Fuze and Booster Quarry Landfill/Ponds Remedial Action
CONTRACT NO. GSA Contract No. GS-10F-0076J Delivery Order No. W912QR-05-F-0033

REQUESTOR IDENTIFICATION
NAME Jed Thomas ORGANIZATION SAIC PHONE 330-405-5802

TITLE SAIC Construction Manager SIGNATURE

BASELINE IDENTIFICATION

BASELINE(S) AFFECTED ☐ Cost ☐ Scope ☐ Milestone ☒ Method of Accomplishment
AFFECTED DOCUMENT (TITLE, NUMBER AND SECTION)
Final Remedial Design for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds
DESCRIPTION OF CHANGE:
SAIC and our remedial subcontractor would like to seed the construction area with a winter rye mixture to provide vegetation coverage during the winter months after the remedial action. SAIC will perform site and stormwater inspections until the seed establishes per the requirements in the RD. In the Spring of 2010, SAIC will re-seed the construction area and drainage ditch in accordance with Section 8.5 of the RD.

JUSTIFICATION:

Given that the winter months are very near, we would like to seed the area with a seed mixture that will grow rapidly and provide vegetation coverage during the winter months. There is a high likelihood that if we put the seed mixture that is specified in Section 8.5 of this RD in place during this time of year, the seeds will die before establishing. Also, the seed provider recommended a winter rye mixture be used instead of a winter wheat, as it is probably too late in the year for winter wheat to establish.

IMPACT OF NOT IMPLEMENTING REQUEST:

The seed in Section 8.5 may die due to upcoming cold temperatures and the construction and removal areas will remain unvegetated throughout the winter months.

PARTICIPANTS AFFECTED BY IMPLEMENTING REQUEST:
SAIC Construction Manager and Remedial Subcontractor

COST ESTIMATE ($) 0 ESTIMATOR SIGNATURE No cost impact to USACE

PHONE NA DATE NA

PREVIOUS FCR AFFECTED ☐ YES ☒ NO; IF YES, FCR NO. —

USACE COTR F/Nat Peters CRL-COR DATE 11 Nov 09

OHIO EPA PROJECT MANAGER DATE 12 Nov 09

SAIC H&S MANGER SIGNATURE (IF APPLICABLE) NA DATE NA

Appendix E
Waste Manifests

US Army Corps of Engineers

RVAAP Fuze and Booster Quarry Landfill/Ponds Remedial Action
Manifest Log

SAIC From Science to Solutions

Disposal Date	Type of Waste	Source/ Location	Date of Generation	Transporter	Truck License No.	Disposal Facility	Waste Profile No.	Manifest Document No.	Facility Quantity (tons)	Copy of manifest leaving site (Y/N)	Signed Manifest Rec'd (Y/N)	Signed Manifest to Regs (Y/N)	Notes
10/22/09	Nonhaz	FBQ	10/22/09	JMW Trucking	PVH3170	American Landfill	107408OH	373013	18.54	Y	Y	Y	None
10/22/09	Nonhaz	FBQ	10/22/09	JMW Trucking	PVH3171	American Landfill	107408OH	373014	22.23	Y	Y	Y	None
10/22/09	Nonhaz	FBQ	10/22/09	JMW Trucking	PVH3176	American Landfill	107408OH	373015	20.06	Y	Y	Y	None
10/22/09	Nonhaz	FBQ	10/22/09	JMW Trucking	PVH3170	American Landfill	107408OH	373016	22.37	Y	Y	Y	None
10/22/09	Nonhaz	FBQ	10/22/09	JMW Trucking	PVH3171	American Landfill	107408OH	373017	22.51	Y	Y	Y	None
10/22/09	Nonhaz	FBQ	10/22/09	JMW Trucking	PVH3176	American Landfill	107408OH	373018	22.66	Y	Y	Y	None
10/23/09	Nonhaz	FBQ	10/23/09	JMW Trucking	PVH3168	American Landfill	107408OH	373019	22.49	Y	Y	Y	None
10/23/09	Nonhaz	FBQ	10/23/09	JMW Trucking	PVH3194	American Landfill	107408OH	373020	21.61	Y	Y	Y	None
10/23/09	Nonhaz	FBQ	10/23/09	JMW Trucking	PVH3169	American Landfill	107408OH	373021	20.99	Y	Y	Y	None
10/23/09	Nonhaz	FBQ	10/23/09	JMW Trucking	PVH3173	American Landfill	107408OH	373022	15.83	Y	Y	Y	None

- Note that the quantities entered on the manifest were weights estimated in the field. Quantities in this table are actual weights, as measured at the receiving facility.

WASTE MANAGEMENT

NON-HAZARDOUS WASTE MANIFEST

Landfill & Industrial Services
www.WMDisposal.com
(800) wmdisposal

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH5210620736
2. Page 1 of: 1
3. Emergency Response Phone: 812-701-4178
4. Waste Tracking Number (MANIFEST): 373013

GENERATOR

5. Generator's Name and Mailing Address:
Ravenna Army Ammunition Plant
8451 State Rte. 5
Ravenna, OH 44266
Generator's Phone: 330-358-7312

Generator's Site Address (if different than mailing address):

6. Transporter 1 Company Name — U.S. EPA ID Number:

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address — U.S. EPA ID Number:
American Landfill
7916 Chapel St
Waynesburg, OH 44688
Facility's Phone: 330-866-3265

9. Waste Shipping Name and Physical Description; Including Color	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	Approval #
Non-Haz Soil					107403OH
Exp.Dt. 10/01/2010					
County : Portage					

13. Special Handling Instructions and Additional Information

14. GENERATOR'S CERTIFICATION: I hereby certify that the above described waste is not hazardous waste as defined by federal, state, or local regulations and does not contain regulated quantities of PCB's, radioactive materials, or free liquids. This waste has been accurately classified, described, packaged, marked, and labeled and is in proper condition for transportation according to applicable international and governmental regulations.

Generator's/Offeror's Printed/Typed Name — Signature — Month Day Year

INTL

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name — Signature — Month Day Year
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) — U.S. EPA ID Number:
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) — Month Day Year
Weight Ticket # — Disposal Grid:
Net Weight:
18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name — Signature — Month Day Year

33086637/09 American Landfill 09:51:54 23-12-2009 20/20

WASTE MANAGEMENT

NON-HAZARDOUS WASTE MANIFEST

Landfill & Industrial Services
www.WMDisposal.com
(800) wmdisposal

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH5210020736
2. Page 1 of: 1
3. Emergency Response Phone: 812-701-4198
4. Waste Tracking Number (MANIFEST): 373014

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
8451 State Rte. 5
Ravenna, OH 44266
Generator's Phone: 330-358-7312

Generator's Site Address (if different than mailing address): SAME

6. Transporter 1 Company Name: JMW Trucking Services
U.S. EPA ID Number: NA

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
American Landfill
7916 Chapel St
Waynesburg, OH 44688
Facility's Phone: 330-866-3265
U.S. EPA ID Number

9. Waste Shipping Name and Physical Description; Including Color	10. Containers No	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	Approval #
Non-Haz Soil	1	semi	20	ton	107408CH
Exp.Dt.: 10/01/2010					
County : Portage					

13. Special Handling Instructions and Additional Information
None

14. GENERATOR'S CERTIFICATION: I hereby certify that the above described waste is not hazardous waste as defined by federal, state, or local regulations and does not contain regulated quantities of PCB's, radioactive materials, or free liquids. This waste has been accurately classified, described, packaged, marked, and labeled and is in proper condition for transportation according to applicable international and governmental regulations.
Generator's/Offeror's Printed/Typed Name: Mark Patterson
Signature: Mark Patterson
Month Day Year: 10 22 09

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date Leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: SKINNER
Month Day Year: 10 29
Transporter 2 Printed/Typed Name
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

Weight Ticket #
Disposal Grid
Net Weight

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name
Signature
Month Day Year: 11 02 09

GENERATOR
TRANSPORTER INTL
DESIGNATED FACILITY

WASTE MANAGEMENT

NON-HAZARDOUS WASTE MANIFEST

Landfill & Industrial Services
www.WMDisposal.com
(800) wmdisposal

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH5210020736
2. Page 1 of: 1
3. Emergency Response Phone: 812-701-4198
4. Waste Tracking Number (MANIFEST): 373015

5. Generator's Name and Mailing Address:
Ravenna Army Ammunition Plant
2451 State Rte. 5
Ravenna, OH 44266
Generator's Phone: 330-358-7312

Generator's Site Address (if different than mailing address): same

6. Transporter 1 Company Name: JMW Trucking Services
U.S. EPA ID Number: NA

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address:
American Landfill
7916 Chapel St
Waynesburg, OH 44688
Facility's Phone: 330-866-3265

U.S. EPA ID Number:

9. Waste Shipping Name and Physical Description; Including Color	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	Approval #
Non-Haz Soil	1	semi	20	ton	107483 OH
Exp.Dt.: 10/01/2010					
County : Portage					

13. Special Handling Instructions and Additional Information

None

14. GENERATOR'S CERTIFICATION: I hereby certify that the above described waste is not hazardous waste as defined by federal, state, or local regulations and does not contain regulated quantities of PCB's, radioactive materials, or free liquids. This waste has been accurately classified, described, packaged, marked, and labeled and is in proper condition for transportation according to applicable international and governmental regulations.

Generator's/Offeror's Printed/Typed Name: Mark Patterson
Signature: Mark Patterson
Month Day Year: 10 22 09

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: D.L. MALOTT Sr.
Signature: D.L. Malott
Month Day Year: 10 22 09

Transporter 2 Printed/Typed Name:
Signature:
Month Day Year:

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:

Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year:

Weight Ticket #
Disposal Grid

Net Weight

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as note in Item 17a

Printed/Typed Name:
Signature:
Month Day Year: 10 2009

GENERATOR
INT'L
TRANSPORTER
DESIGNATED FACILITY

3308663709 American Landfill 09:50:08 23-12-2009 16/20

WASTE MANAGEMENT

NON-HAZARDOUS WASTE MANIFEST

Landfill & Industrial Services
www.WMDisposal.com
(800) wmdisposal

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH5210020736
2. Page 1 of: 1
3. Emergency Response Phone: 812-701-4198
4. Waste Tracking Number (MANIFEST): 373016

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
8451 State Rte. 5
Ravenna, OH 44266
Generator's Phone: 330-358-7312

Generator's Site Address (if different than mailing address): Same

6. Transporter 1 Company Name: JMW Trucking Services
U.S. EPA ID Number: NA

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
American Landfill
7916 Chapel St
Waynesburg, OH 44688
Facility's Phone: 330-866-3205
U.S. EPA ID Number

9. Waste Shipping Name and Physical Description; Including Color	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	Approval #
Non-Haz Soil	1	semi	20	ton	107466 OH
Exp.Dt. 10/01/2010					
County . Portage					

13. Special Handling Instructions and Additional Information
None

14. GENERATOR'S CERTIFICATION: I hereby certify that the above described waste is not hazardous waste as defined by federal, state, or local regulations and does not contain regulated quantities of PCB's, radioactive materials, or free liquids. This waste has been accurately classified, described, packaged, marked, and labeled and is in proper condition for transportation according to applicable international and governmental regulations.

Generator's/Offeror's Printed/Typed Name: Mark Patterson
Signature: Mark Patterson
Month Day Year: 10 22 09

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Greg Johns
Signature:
Month Day Year: 10 22 09
Transporter 2 Printed/Typed Name
Signature
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year
Weight Ticket #
Disposal Grid
Net Weight

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in item 17a
Printed/Typed Name
Signature: BF 10/23/09
Month Day Year

GENERATOR
TRANSPORTER INT'L
DESIGNATED FACILITY

WASTE MANAGEMENT

NON-HAZARDOUS WASTE MANIFEST

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(800) wmdisposal

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH5210020736
2. Page 1 of: 1
3. Emergency Response Phone: 812-201-4198
4. Waste Tracking Number (MANIFEST): 373017

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
8451 State Rte. 5
Ravenna, OH 44266
330-353-7312

Generator's Site Address (if different than mailing address): Same

Generator's Phone:

6. Transporter 1 Company Name: JMW Trucking Services
U.S. EPA ID Number: NA

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
American Landfill
7916 Chapel St
Waynesburg, OH 44688
330-866-3265
Facility's Phone:
U.S. EPA ID Number

9. Waste Shipping Name and Physical Description; Including Color	10. Containers No	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	Approval #
Non-Haz Soil	1	semi	20	ton	107438OH
Exp.Dt.: 10/01/2010					
County : Portage					

13. Special Handling Instructions and Additional Information
None

14. GENERATOR'S CERTIFICATION: I hereby certify that the above described waste is not hazardous waste as defined by federal, state, or local regulations and does not contain regulated quantities of PCB's, radioactive materials, or free liquids. This waste has been accurately classified, described, packaged, marked, and labeled and is in proper condition for transportation according to applicable international and governmental regulations.
Generator's/Offeror's Printed/Typed Name: Mark Patterson
Signature: Mark Patterson
Month Day Year: 10 22 09

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only):

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: SKINNER
Signature
Month Day Year: 10 22 09

Transporter 2 Printed/Typed Name
Signature
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:
U.S. EPA ID Number

17b. Alternate Facility (or Generator)
Facility's Phone:
Month Day Year
17c. Signature of Alternate Facility (or Generator)

Disposal Cell
Weight Ticket #
Net Weight

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name
Signature
Month Day Year: 10 23 09

GENERATOR | TRANSPORTER | INT'L | DESIGNATED FACILITY

WASTE MANAGEMENT

NON-HAZARDOUS WASTE MANIFEST

Landfill & Industrial Services
www.WMDisposal.com
(800) wmdisposal

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH5210020736
2. Page 1 of: 1
3. Emergency Response Phone: 812-701-4198
4. Waste Tracking Number (MANIFEST): 373018

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
8451 State Rte. 5
Ravenna, OH 44266
Generator's Phone: 330-358-7312

Generator's Site Address (if different than mailing address): Same

6. Transporter 1 Company Name: JMW Trucking Services
U.S. EPA ID Number: NA

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
American Landfill
7916 Chapel St
Waynesburg, OH 44688
Facility's Phone: 330-866-3265
U.S. EPA ID Number

9. Waste Shipping Name and Physical Description, Including Color	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	Approval #
Non-Haz Soil	1	semi	20	ton	1074SOH
Exp.Dt. 10/01/2010					
County: Portage					

13. Special Handling Instructions and Additional Information
None

14. GENERATOR'S CERTIFICATION: I hereby certify that the above described waste is not hazardous waste as defined by federal, state, or local regulations and does not contain regulated quantities of PCB's, radioactive materials, or free liquids. This waste has been accurately classified, described, packaged, marked, and labeled and is in proper condition for transportation according to applicable international and governmental regulations.
Generator's/Offeror's Printed/Typed Name: Mark Patterson
Signature: Mark Patterson for
Month Day Year: 10 22 09

15. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit: Date leaving U.S.:

Transporter Signature (for exports only):

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: D. L. MALOTTA
Signature: D. L. Malotta
Month Day Year: 10 22 09

Transporter 2 Printed/Typed Name
Signature
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
U.S. EPA ID Number

17b. Alternate Facility (or Generator)
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

Weight Ticket #
Disposal Grid
Net Weight

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as note in Item 17a
Printed/Typed Name
Signature
Month Day Year: 10 23 09

GENERATOR
INTL
TRANSPORTER
DESIGNATED FACILITY

12/20 23-12-2009 09:48:15 American Landfill 3308663709

WASTE MANAGEMENT

NON-HAZARDOUS WASTE MANIFEST

Landfill & Industrial Services
www.WMDisposal.com
(800) wmdisposal

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH5210020736
2. Page 1 of: 1
3. Emergency Response Phone: 812-701-4198
4. Waste Tracking Number (MANIFEST): 373019

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
3451 State Rte. 5
Ravenna, OH 44266
Generator's Phone: 330-358-7312

Generator's Site Address (if different than mailing address): Same

6. Transporter 1 Company Name: JMW Trucking Services
U.S. EPA ID Number: NA

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
American Landfill
7916 Chapel St
Waynesburg, OH 44688
Facility's Phone: 330-866-3265

U.S. EPA ID Number

9. Waste Shipping Name and Physical Description; Including Color	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	Approval #
Non-Haz Soil	1	semi	20	ton	107490 OH
Exp.Dt.: 10/01/2010					
County : Portage					

GENERATOR

13. Special Handling Instructions and Additional Information
None

14. GENERATOR'S CERTIFICATION: I hereby certify that the above described waste is not hazardous waste as defined by federal, state, or local regulations and does not contain regulated quantities of PCB's, radioactive materials, or free liquids. This waste has been accurately classified, described, packaged, marked, and labeled and is in proper condition for transportation according to applicable international and governmental regulations.

Generator's/Offeror's Printed/Typed Name: Mark Pattersen
Signature: Mark Patterson for
Month Day Year: 10 23 09

INTL

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: DANIEL R. GOFFUS
Signature: Daniel R Goffus
Month Day Year: 10 23 09
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year
Weight Ticket #
Gross/Tare/Net
Net Weight
18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name
Signature
Month Day Year: 10 30

WASTE MANAGEMENT

NON-HAZARDOUS WASTE MANIFEST

Landfill & Industrial Services
www.WMDisposal.com
(800) wmdisposal

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH5210020736
2. Page 1 of: 1
3. Emergency Response Phone: 812-701-4988
4. Waste Tracking Number (MANIFEST): 373020

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
8451 State Rte. 5
Ravenna, OH 44266
Generator's Phone: 330-358-7312

Generator's Site Address (if different than mailing address): Same

6. Transporter 1 Company Name: JMW Trucking Services
U.S. EPA ID Number: NA

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
American Landfill
7916 Chapel St
Waynesburg, OH 44688
Facility's Phone: 330-866-3265
U.S. EPA ID Number

9. Waste Shipping Name and Physical Description; Including Color	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	Approval #
Non-Haz Soil	1	semi	20	ton	1074080H
Exp.Dt.: 10/01/2010					
County: Portage					

13. Special Handling Instructions and Additional Information
None

14. GENERATOR'S CERTIFICATION: I hereby certify that the above described waste is not hazardous waste as defined by federal, state, or local regulations and does not contain regulated quantities of PCB's, radioactive materials, or free liquids. This waste has been accurately classified, described, packaged, marked, and labeled and is in proper condition for transportation according to applicable international and governmental regulations.
Generator's/Offeror's Printed/Typed Name: Mark Patterson
Signature: Mark Patterson
Month Day Year: 10 23 09

15. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Ted Williamson
Signature:
Month Day Year: 10 23 09
Transporter 2 Printed/Typed Name
Signature
Month Day Year

17. Discrepancy
17a. Discrepancy Indication: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year
Weight Ticket #
Gross Net Tare
Net Weight

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: D Hyer
Signature:
Month Day Year: 10 23 09

GENERATOR
TRANSPORTER / INT'L
DESIGNATED FACILITY

WASTE MANAGEMENT

NON-HAZARDOUS WASTE MANIFEST

Landfill & Industrial Services
www.WMDisposal.com
(800) wmdisposal

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH5210020736 | 2. Page 1 of 1 | 3. Emergency Response Phone: 812-701-4198 | 4. Waste Tracking Number (MANIFEST): 373021

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
3451 State Rte 5
Ravenna, OH 44266
Generator's Phone: 330/358-7311

Generator's Site Address (if different than mailing address): SAME

6. Transporter 1 Company Name: JMW Trucking Services — U.S. EPA ID Number

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
American Landfill
7916 Chapel St
Waynesburg, OH 44688
Facility's Phone: 330-866-3265 — U.S. EPA ID Number

9. Waste Shipping Name and Physical Description, Including Color	10. Containers No	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	Approval #
Non-Haz Soil	1	Simi	20	ton	107408OH
Exp. Dt. 10/01/2010					
County: Portage					

13. Special Handling Instructions and Additional Information
None

14. GENERATOR'S CERTIFICATION: I hereby certify that the above described waste is not hazardous waste as defined by federal, state, or local regulations and does not contain regulated quantities of PCB's, radioactive materials, or free liquids. This waste has been accurately classified, described, packaged, marked, and labeled and is in proper condition for transportation according to applicable international and governmental regulations.
Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson for — Month 10 Day 23 Year 09

15. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit: — Date leaving U.S.:

TRANSPORTER INTL

Transporter Signature (for exports only):
16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: MARIC WALTERS — Signature: Maric Walters — Month 10 Day 23 Year 09
Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number: — U.S. EPA ID Number
17b. Alternate Facility (or Generator)
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) — Month Day Year
Weight Ticket # — Disposal Grid
Net Weight

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name — Signature — Month 10 Day 23 Year 09

WASTE MANAGEMENT

NON-HAZARDOUS WASTE MANIFEST

Landfill & Industrial Services
www.WMDisposal.com
(800) wmdisposal

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: OH5210020736
2. Page 1 of: 1
3. Emergency Response Phone: 812-701-4178
4. Waste Tracking Number (MANIFEST): 373022

5. Generator's Name and Mailing Address
Ravenna Army Ammunition Plant
8451 State Rte. 5
Ravenna, OH 44266
Generator's Phone: 330-358-7312

Generator's Site Address (if different than mailing address): SAME

6. Transporter 1 Company Name: JMW Trucking Service — U.S. EPA ID Number:

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
American Landfill
7816 Chapel St
Waynesburg, OH 44688
Facility's Phone: 330-866-3265 — U.S. EPA ID Number:

9. Waste Shipping Name and Physical Description; Including Color	10. Containers: No.	10. Containers: Type	11. Total Quantity	12. Unit Wt./Vol.	Approval #
Non-Haz Soil	1	Semi	20	tons	1074080H
Exp DL 10/01/2010					
County : Portage					

13. Special Handling Instructions and Additional Information

14. GENERATOR'S CERTIFICATION: I hereby certify that the above described waste is not hazardous waste as defined by federal, state, or local regulations and does not contain regulated quantities of PCB's, radioactive materials, or free liquids. This waste has been accurately classified, described, packaged, marked, and labeled and is in proper condition for transportation according to applicable international and governmental regulations.

Generator's/Offeror's Printed/Typed Name: Mark Patterson — Signature: Mark Patterson — Month: 10 Day: 23 Year: 09

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Carl Garmany — Signature: Carl Garmany — Month: 10 Day: 23 Year: 09

Transporter 2 Printed/Typed Name — Signature — Month Day Year

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

Weight Ticket # — Disposal Date:
Net Weight

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name — Signature — Month Day Year: 10 23 09

GENERATOR — TRANSPORTER — DESIGNATED FACILITY

PRELIMINARY DRAFT REMEDIAL ACTION REPORT FOR THE RVAAP-16 FUZE AND BOOSTER QUARRY LANDFILL PONDS AT THE RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO
COMMENT RESPONSE TABLE
February 17, 2010

Comment Number	Page or Sheet & Line No.	New Page or Sheet	Comment	Recommendation	Response
Ohio EPA (Todd R. Fisher)					
O-1	Document Distribution Pg.	Document Distribution Pg.	The Southwest District office (SWDO) is no longer providing review support on RVAAP documents.	Please remove "Ohio EPA-SWDO – Ohio Environmental Protection Agency – Southwest District Office" from the footnote of the distribution table.	Agree. Ohio EPA-SWDO is removed from the distribution table as recommended.
O-2	Page 5-3 Lines 5-7	Page 5-3	The text states that samples were "dried, sieved, and ground finely by the fixed-base laboratory and were analyzed for total manganese. The results were compared against the remedial action CUG for FBQ (1,950 mg/kg)." The name of the laboratory has been omitted and it is unclear what CUG is being referenced (National Guard Trainee vs. Residential Farmer, etc.).	Please include the name of the fixed-base laboratory. In addition, please indicate which CUG is being used.	Agree. Text revised as follows: "Samples FBQsd-201M-0520-SD, FBQsd-200M-0521-SD, and FBQsd-200M-0521-FD (field duplicate) were dried, sieved, and ground finely by TestAmerica Laboratories, Inc. (located in North Canton, Ohio) and were analyzed for total manganese. The results were compared against the National Guard Trainee CUG for FBQ (1,950 mg/kg). The confirmation soil sample results are presented in Table 5-1 and in Appendix B.
O-3	Page 5-5 Figure 5-1	Figure 5-1	This figure shows cross-sections with vertical exaggerations of 5x.	Please add "VERTICAL EXAGGERATION = 5X" to the bottom of the figure.	Agree. The phrase "VERTICAL EXAGGERATION = 5X" will be added under scales in Figure 5-1.
O-4	Page 5-5 Figure 5-1	Figure 5-1	The legend shows the Munitions Response Site (MRS) Boundary as a solid black line. No apparent MRS boundary is shown on the figure.	Please remove "Munitions Response Site Boundary" from the legend.	Agree. The view of the figure does not include the MRS Boundary. The "Munitions Response Site Boundary" will be removed from the legend.

PRELIMINARY DRAFT REMEDIAL ACTION REPORT FOR THE RVAAP-16 FUZE AND BOOSTER QUARRY LANDFILL PONDS AT THE RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO
COMMENT RESPONSE TABLE
February 17, 2010

Comment Number	Page or Sheet & Line No.	New Page or Sheet	Comment	Recommendation	Response
O-5	Page 6-1 Lines 18-20	Appendix A.3	The text states that "Ohio EPA provided e-mail correspondence approving the use of this borrow source for the remedial action restoration activities. " A copy of this e-mail is not included in the report.	Please provide a copy of Ohio EPA's e-mail approving the backfill source material.	Agree. A new appendix will be created and named "Ohio EPA Approval of Backfill Source". A copy of an e-mail approving the use of the material will be included in this new appendix.
O-6	Page 7-1 Lines 8-10	Page 7-1	The text states that remedy "exceeded clean-up goals for the Resident Subsistence Farmer; as the manganese CUG for the National Guard Trainee is more stringent than the Residential Farmer." The CUG value for Residential Subsistence Farmer has been omitted.	Please add the CUG value for the Resident Subsistence Farmer to the text.	Agree. Text revised as follows: "However, this selected remedy also removed chemical contaminants in soil that exceeded clean-up goals for the Resident Subsistence Farmer; as the manganese CUG for the National Guard Trainee is more stringent than the Resident Subsistence Farmer (2,900 mg/kg)."
O-7	Appendix A-3	N/A	The letter from the USACE Pittsburg Branch Chief Scott A. Hans is unsigned.	Please provide a signature copy.	Agree. However, in response to comment A-10, SAIC proposes to remove Appendix A-3 from the Remedial Action Report. When the requirements of the permit are met and the Compliance Certification Form is signed, SAIC will ensure that a signed version of the letter is submitted to the Admin Record.
O-8	Appendix B Laboratory Analytical Results	Appendix B	This appendix contains no SAIC Chain of Custodies or Laboratory summary of analytical results.	Please provide Laboratory Chain of Custodies and the Laboratory summary of analytical results.	Agree. The Chains of Custody will be put in Appendix B. Clarification. A summary of the laboratory results are included in Appendix C: Data Quality Control Summary Report.

Comment Number	Page or Sheet & Line No.	New Page or Sheet	Comment	Recommendation	Response
USACE (Thomas Chanda)					
A-1	Page i. TOC	TOC	Sections 4.3.2.1 thru 4.3.2.6 (Pages 4.2 thru 4.5) not listed in TOC. This comment of absence within the TOC of the four-digit numbered section has been referenced a number of times in past document reviews. The document preparer needs to correctly autolink (or by manual entry) between TOC and the main document's 4-numbered section.	Following Format Guidelines please insert the missing sections	Agree. A check will be performed to ensure that all section headers are included in the table of contents.
A-2	Page iii TOC	List of Figures	Missing Fig. 2-3 – Page 2-9		Agree. Figure 2-3 will be added to the table of contents.
A-3	Page 1-1	Page 1-1		To be consistent with TOC and Page 7-1, use plural form, "Conclusions" versus what is listed Line 40	Agree. Line 40 on Page 1-1 will replace "Conclusion" with "Conclusions".
A-4	Page 2-9	TOC	Reference Comment 2.		Agree. Figure 2-3 will be added to the table of contents.
A-5	Page 4-2	Page 4-2	"Both MI sample areas had concentrations exceeding the CUGs and……."	For the benefit of the reader, it would be prudent to annotate what specific chemical concentrations are exceeding the CUGs	Agree. Text revised as follows: "1) Both MI sample areas had concentrations exceeding the CUG (FBQ-200M=23,600 mg/kg and FBQ-201M=30,500 mg/kg) and the estimated volume for sediment removal was assumed to be accurate;"

PRELIMINARY DRAFT REMEDIAL ACTION REPORT FOR THE RVAAP-16 FUZE AND BOOSTER QUARRY LANDFILL PONDS AT THE RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO
COMMENT RESPONSE TABLE
February 17, 2010

Comment Number	Page or Sheet & Line No.	New Page or Sheet	Comment	Recommendation	Response
A-6	Page 5-1	Page 5-1	There is no mention of the sawdust/absorbent material originating from the project site	For better clarification and not mislead readers, it should be noted the sawdust/absorbent originated from on-site tree and brush clearing.	Clarification. The sawdust was obtained from an off-site source. Text revised as follows: "Consequently, 25 tons of inert absorbent material (sawdust generated from untreated lumber) was obtained from an off-site source and used to mix with the dry sediment to ensure excavated material would not release liquid while in transport and would pass the disposal facilities' paint filter test."
A-7	Page 5-2	Page 5-3	It's just seems with the redundancy of "remedial" the sentence projects an off-kilter train of thought.	Personal preference; it would seem better to say "…..the remedial activities discussed in the following sections achieved the prescribed CUGs".	Agree. Text revised as follows: "The confirmation sample results provided data to confirm the remedial activities discussed in the following sections attained the ~~remedial action~~ CUG~~s~~."
A-8	Page 5-1	Fig. 5-1		In future drawings/figures/illustrations, it would be more beneficial to the reader as a matter of convenience, pertinent to folded sheets the Figure Number were listed on the left side within the Legend/Title Block Area	Clarification. The Legend/Title Block is on the right side of the figure. This is consistent with SAIC documents that the legend is either on the bottom or the right of the figure (dependent upon the space and orientation needed to present a given figure). We generally do not put the document title in the title block, as this can create issues with document production efficiency. If the figure needs to be re-named or re-numbered at the last minute during document production, the change can be quickly made in MS Word. If it is in the title block, a change will need to be made in CAD. No text change proposed.

Comment Number	Page or Sheet & Line No.	New Page or Sheet	Comment	Recommendation	Response
A-9	Appendix A	N/A	There is no signature (Scott A. Hans) on the USACE Letter. Did SAIC receive a signed letter?	For reasons to preclude outside questioning in the validity of authorization documents within the Administrative Record; it would be more official if this were a signed Notification Letter. Is it possible, SAIC can obtain a signed document?	Agree. However, in response to comment A-10, SAIC proposes to remove Appendix A-3 from the Remedial Action Report. When the requirements of the permit are met and the Compliance Certification Form is signed, SAIC will ensure that a signed version of the letter is submitted to the Admin Record.
A-10	Appendix A	N/A	The enclosure titled: – "Compliance Certification Form" is not signed. At the time this form is officially entered into the Administrative Record will it contain the necessary signature (plus, the appropriate dated cover-letter by the respective signee.	The reviewer acknowledges there may be some reluctance from the author being that final seeding is not complete but, if so, then there needs to be some note of justification as for no signature on the form. It would seem feasible to speak with the USACE Pitts. POC to see if the signed form submittal would be acceptable in advance of final seeding. If not, then the official RA Closure Report will not be placed in Admin Record until such time the form is signed.	Agree. To rectify, SAIC proposes to remove the USACE-Pittsburgh letter in Appendix A-3 from this Remedial Action Report. Once the requirements of the permit are met, SAIC will ensure that the Compliance Certification Form is signed, submitted to USACE-Pittsburgh, and submitted to the Admin Record under a different cover.
A-11	Appendix B Table B-3	Appendix B Table B-3	There are several lab qualifier codes listed that are not identified within Appendix C (Data QC Summary Report – FBQ 2009) – Page C-5. Missing codes: B; BJ; UG; JG; Further, there is no legend at the end of the lab report to explain any of the codes	Please respond and correct accordingly	Agree. A footnote will be added to the end of the tables defining the lab qualifiers.

Comment Number	Page or Sheet & Line No.	New Page or Sheet	Comment	Recommendation	Response
A-12	Appendix C Page C-5	Appendix C		Reference Comment #11 above	Comment noted. These definitions will be used to define the lab qualifiers, as specified in response to Comment A-11.
A-13	Appendix E	NA	NHW Manifest: Columns 10, 11, 12 & Blocks 14, 15, 16 are illegible.	Please replace with legible copy	Clarification. These manifests are written on multi-ply paper, given to the truck driver, signed at the landfill, and scanned and re-sent to SAIC. This string of events reduces the quality of some of the manifests. Unfortunately, this is the best quality we can re-produce for this manifest. No text change proposed.
A-14	Appendix E	NA	Presuming the illegible manifest #373013 is reporting disposal of 20 tons at the landfill facility – All 10 manifests cumulatively report 200 tons of material transported off-site. Within the main RA closure report on Page 5-1 Line 8 it reports that "…..209 Tons was transported and disposed……."	Please address the discrepancy; there needs to be an accounting of the missing 9 Tons (18,000 lbs.) of disposed material. Is there a disposal manifest missing?	Clarification. The tonnages presented on the waste manifests were field estimates. The actual weights reported by the landfill scales are presented on the Manifest Log at the beginning of Appendix E. Please note the footnote at the bottom of the Manifest Log stating "Note that the quantities entered on the manifest were weights estimated in the field. Quantities in this table are actual weights, as measured at the receiving facility." No text change proposed.

Comment Number	Page or Sheet & Line No.	New Page or Sheet	Comment	Recommendation	Response
Camp Ravenna (Katie Elgin)					
CR-1	Pg 1-2, Line 3 and 4	Pg 1-2	"USFWS Approval" and "OHPO Approval". Please change 'Approval' to 'Concurrence Letter'. USFWS and OHPO do not actually provide an 'approval' of the project. We consult with them on projects and they provide their concurrence. Please also change this throughout the report where applicable.		Agree. "Approval" is changed to "Concurrence Letter" when referencing the USFWS and OHPO letters.
CR-2	Pg 4-2, Line 33	Pg 4-2	"The drainage ditch requiring removal under this RD was not included in the FBQ Proposed New MRS Footprint Boundary in the Site Inspection Report for Munitions Response Sites under the MMRP." The MRS footprint in not proposed. The footprint was established in the SI.	Suggested text revision: "The drainage ditch requiring removal under this RD is not within the FBQ MRS footprint. The FBQ MRS is located east of the site."	Agree. Text revised as follows: "The drainage ditch requiring removal under this RD is not within the FBQ MRS Footprint Boundary in the Site Inspection Report for Munitions Response Sites under the Military Munitions Response Program (E2M 2008). The FBQ MRS is located east of the site."

Comment Number	Page or Sheet & Line No.	New Page or Sheet	Comment	Recommendation	Response
CR-3	Pg 7-1, Line 25	Pg 7-1	"The US Army intends to transfer FBQ to the NGB once remedial actions are complete. The NGB will subsequently license the land to the OHARNG for military training use. OHARNG has established future land use (mounted training, no digging) for FBQ based on anticipated training mission and utilization of Camp Ravenna. This land use includes operation of wheeled and tracked vehicles." The area where the RD was completed is OHARNG property. The property east of the access road is still BRAC property. Additionally, future use at FBQ will include both dismounted and mounted training (especially now that the site was cleaned up to residential use). Recommend deleting this statement overall as it is incorrect and is really not needed in the conclusions section.		Agree. The sentences starting on Page 7-1, line 25 thru 29 will be deleted.

Comment Number	Page or Sheet & Line No.	New Page or Sheet	Comment	Recommendation	Response
CR-4	Pg 7-1	Pg 7-1	"Land use controls to address any other media (surface water, wet sediment, and groundwater) or regarding MEC may be required and will be implemented by the US Army and OHARNG under the Military Munitions Response Program (MMRP)." Here, you are indicating that LUCs will be used to address other media (surface water, wet sediment, and groundwater) at this site. This is not correct. This statement needs revised. Suggested revised text: "Other media (surface water, wet sediment, and groundwater) and MEC will be addressed as part of future actions."		Agree. Text revised as recommended.