

**Final**

**Proposed Plan  
for Soil and Dry Sediment at  
Fuze and Booster Quarry Landfill/Ponds (RVAAP-16)**

**Ravenna Army Ammunition Plant  
Ravenna, Ohio**

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**Prepared for:**



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**LIST OF ACRONYMS AND  
 ABBREVIATIONS**

AOC	area of concern
ARAR	applicable or relevant and appropriated requirement
BGS	below ground surface
EPA	U. S. Environmental Protection Agency
EPC	exposure point concentration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC	constituent of concern
FBQ	Fuze and Booster Quarry Landfill/Ponds
FS	feasibility study
GRA	general response action
HHRA	human health risk assessment
HI	hazard index
IRP	Installation Restoration Program
MEC	munitions and explosives of concern
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NGB	National Guard Bureau
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
PCB	polychlorinated biphenyl
RAO	remedial action objective
RI	remedial investigation
ROD	Record of Decision
RTLS	Ravenna Training and Logistics Site
RVAAP	Ravenna Army Ammunition Plant
SVOC	semivolatile organic compound
USACE	U. S. Army Corps of Engineers
VOC	volatile organic compound

## 1.0 INTRODUCTION

This Proposed Plan presents remedial alternatives and identifies the preferred alternative for cleanup of contaminated soil and dry sediment within the Fuze and Booster Quarry Landfill/Ponds (FBQ) at the Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio (Figure 1), and provides the rationale for this preference. The US Army, in consultation with the Ohio Environmental Protection Agency (Ohio EPA), issues this Proposed Plan. The Proposed Plan provides the public with information to comment upon the selection of an appropriate response action. The US Army, in consultation with Ohio EPA, will select the remedy for this area of concern (AOC) after reviewing and considering all comments submitted during the 30-day public comment period. Therefore, the public is encouraged to review and comment on all alternatives presented in this Proposed Plan.

The US Army is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 *Code of Federal Regulations* 300). Selection and implementation of the remedy will also satisfy the requirements of the Ohio EPA Director's Final Findings and Orders, June 10, 2004.

The Proposed Plan summarizes information that can be found in greater detail in the Remedial Investigation (RI) Reports [U. S. Army Corps of Engineers (USACE 1998 and 2005a)], the Feasibility Study (FS) (USACE 2006), and other documents contained in the Administrative Record file for FBQ. The US Army encourages the public to review these documents to gain a more comprehensive understanding of the AOC and activities that have been conducted to date.

### **Public Comment Period:**

April 4, 2007 to May 3, 2007

### **Public Meeting:**

The US Army will hold an open house and public meeting to explain the Proposed Plan and the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The open house and public meeting is scheduled for 6:00PM, April 10, 2007, at the Newton Falls Community Center, 52 East Quarry Street, Newton Falls, Ohio 44444.

### **Information Repositories:**

Information used in selecting the preferred alternative is available for public review at the following locations:

#### **Reed Memorial Library**

167 East Main Street  
Ravenna, Ohio 44266  
(330) 296-2827

Hours of operation:

10AM – 8:45PM Monday – Friday

10AM – 5:45PM Saturday

#### **Newton Falls Public Library**

204 South Canal Street  
Newton Falls, Ohio 44444  
(330) 872-1282

Hours of operation:

9AM – 8PM Monday – Thursday

9AM – 5PM Friday and Saturday

12PM – 5PM Sunday

The **Administrative Record File**, containing information used in selecting the preferred alternative, is available for public review at the following location:

#### **RVAAP**

Building 1037  
8451 State Route 5  
Ravenna, Ohio 44266-9297  
(330) 358-7311  
Fax: (330) 358-7314

Note: Access is restricted to Ravenna Army Ammunition Plant (RVAAP), but the file can be obtained or viewed with prior notice to RVAAP.

## **2.0 RVAAP AND AREA OF CONCERN BACKGROUND**

RVAAP is 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. 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 the Ohio Army National Guard (OHARNG) over a 2-year period (2002 and 2003) and the actual total acreage of the property was found to be 21,683 acres. As of February 2006, a total of 20,403 acres of the former RVAAP have been transferred to the National Guard Bureau (NGB) and subsequently licensed to OHARNG for use as a military training site. The current RVAAP consists of 1,280 acres scattered throughout the Ravenna Training and Logistics Site (RTLS). The current RVAAP portions of the property are solely located within Portage County.

The RVAAP IRP includes investigation and cleanup related to past activities over the entire 21,683 acres of the former RVAAP. References to RVAAP in this document include the historical extent of RVAAP, which is the combined acreages of the current RTLS and RVAAP, unless otherwise specifically stated.

RVAAP is 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 1 and 2). RVAAP 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.

RVAAP was constructed in 1940 and 1941 for depot storage and ammunition assembly/loading and placed on standby status in 1950. Production activities were resumed

from 1954 to 1957 and again from 1968 to 1972. Demilitarization activities, including disassembly of munitions and explosives melt-out and recovery, continued until 1992. When RVAAP was operational, the entire 21,683-acre parcel was a government-owned, contractor-operated industrial facility. The only activities still being carried out at RVAAP are environmental restoration, ordnance clearance and infrequent demolition of any unexploded ordnance discovered during investigation and remediation activities, and building decontamination and demolition.

FBQ, designated as AOC RVAAP-16, encompasses approximately 45 acres in the south-central part of RVAAP (Figures 2 and 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 AOC was expanded in 1998 to include two debris piles and three shallow settling ponds. Reportedly, the quarry was used for open burning and as a landfill before 1976. The debris resulting from these operations 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 and sand filtration backwash water discharge from one of the RVAAP water plants. The discharge was regulated under a National Pollutant Discharge Elimination System permit and continued until 1993.

FBQ was identified as an AOC at RVAAP in the Preliminary Assessment (USACE 1996). It was the subject of a Phase I RI (USACE 1998), a Phase I/II RI (USACE 2005a), and a Supplemental Phase II RI (included in the FS). The FS was completed in 2006 (USACE 2006).

## **3.0 AREA OF CONCERN CHARACTERISTICS**

The AOC characteristics, nature and extent of contamination, and conceptual site model are based on the RIs conducted from 1998 through

2005 (USACE 1998, 2005a, and 2006). A depiction of FBQ can be seen in Figure 3.

General elevation across FBQ decreases from 1,088 ft at the eastern side to 1,160 ft above mean sea level on the western side. Quarrying operations have resulted in the removal of surface soil in the central portion of the AOC and adjacent to the quarry ponds. Relatively undisturbed areas in the north and west portions of the AOC are covered in hardwood forest. Soil cover at the AOC varies widely due to past disturbance. In the vicinity of the quarry, soil cover is thin or absent. Deeper soil cover consisting of poorly drained silty clay loam exists in the central and west portions of the AOC. Soil is underlain by sandstone bedrock throughout the AOC.

The southern two quarry settling ponds are filled with water year round. Water is typically present in the northern settling pond; however, water levels can vary widely and sometimes no water is present during very dry periods. Surface water flows from the northern quarry pond through gated culverts to the southern pond. Surface water exits the southern pond through a culvert to a ditch at the southwest corner of the pond. This ditch leads west to the 11 shallow settling basins and flow eventually exits the AOC via a culvert located at the southwest corner. Seasonal wetland areas are found in the shallow areas of the quarry ponds, in the vicinity of the 11 shallow settling basins, and in the lower reaches of the ditch draining the AOC.

The general groundwater flow pattern in most of the AOC is from the northeast to the southwest, which mimics the topography and surface water drainage patterns. The quarry ponds intersect the groundwater table and influence the water table elevations in this portion of the AOC.

Contamination identified in soil at FBQ is primarily confined to between 0 and 3 ft below ground surface (BGS). In the central portion of the AOC, soil cover is very thin due to past disturbances. Contaminants identified in soil included explosive and propellant compounds,

metals, and some residual semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs). Most detected contaminants are located northeast of the quarry ponds.

Contaminants detected in sediment included explosive and propellant compounds, metals, SVOCs, VOCs, and pesticides. The greatest numbers of SVOC, VOC, and pesticides were detected in sediment samples collected from the three quarry ponds. The drainage ditch west of the southernmost quarry pond contained some contaminants, primarily metals, but concentrations were generally lower than in the quarry ponds. No polychlorinated biphenyls (PCBs) were detected in any sediment samples.

Contaminants detected in surface water at FBQ were primarily found in samples of intermittent water from the 11 small settling basins located in the southwest portion of the AOC. The contaminants included explosive and propellant compounds, metals, and a few SVOCs and VOCs. No pesticides or PCBs were detected in the surface water samples.

Groundwater samples were collected from monitoring wells in two water-bearing zones (unconsolidated and bedrock zones) at FBQ. Explosive and propellant compounds, inorganics, SVOCs, and VOCs were detected in the groundwater. The monitoring well with the greatest number of contaminants detected was upgradient (northeast) of the AOC. No pesticides or PCBs were detected in groundwater samples collected from either water-bearing unit. Data suggest contaminants have not migrated far from source areas. Groundwater monitoring will be conducted under the Facility-Wide Groundwater Monitoring Program.

Groundwater contaminant migration was modeled as part of the FS. Modeling included evaluation of potential leaching of contaminants from soil to groundwater. Also, the potential for contaminants to migrate from sources to the AOC boundary was evaluated. Six soil contaminants were identified by the modeling to

have the potential to leach from soil to groundwater. None of these contaminants were predicted by the modeling results to migrate beyond the AOC boundary at concentrations above risk-based concentrations or drinking water maximum contaminant levels.

A facility-wide investigation of surface water at FBQ (USACE 2005b) showed that surface water in the quarry ponds is of good quality, although three parameters (pH, lead, and zinc) slightly exceeded the chronic water quality standard criteria. These elevated parameters did not appear to impact the biological community. For example, the fish community results were strongly similar to reference pond conditions. Macroinvertebrate sample results were also similar to reference conditions. The overall physical habitat evaluation was the highest among similar ponds at RVAAP. Sediment samples contained some lead and zinc above probable effects levels. In summary, a few chemical levels in surface water and sediment are above thresholds; however, other biological indicators show a lack of adverse impact to the fish and other aquatic biological communities in quarry ponds at FBQ. Surface water monitoring may be conducted in the future if conditions warrant.

#### **4.0 SCOPE AND ROLE OF RESPONSE ACTION**

The US Army intends to transfer FBQ to NGB once remedial actions are complete. OHARNG plans to use FBQ for military training. Specifically, this area will be used for mounted training, which includes operation of wheeled and tracked vehicles.

Remediation of groundwater, surface water, and underwater (wet) sediment is not included in the scope of this action. These media will be addressed under future actions. However, the selected remedy for soil and dry sediment at FBQ must be protective of these other media.

Because of the variety of basins, ponds, and drainage ditches at FBQ, sediment was evaluated as three separate units: the three

quarry ponds, the main drainage ditch flowing west from the quarry ponds, and the 11 small settling basins. The three quarry ponds contain water all or most of the time; therefore, sediment from the quarry ponds is not included in the scope of this response action. Sediment in the drainage ditch and the 11 small settling basins is frequently dry and is included as soil/dry sediment in this response action.

Groundwater at FBQ may be monitored under the RVAAP Facility-Wide Groundwater Monitoring Program conducted in accordance with the Ohio EPA Director's Final Findings and Orders (Ohio EPA 2004a).

#### **5.0 SUMMARY OF HUMAN AND ECOLOGICAL RISKS**

A human health risk assessment (HHRA) was conducted to evaluate potential risks from current and predicted future exposures to soil and dry sediment contaminants at FBQ (USACE 2005a). Natural resource management activities are currently conducted on the site. No additional activities are currently conducted (i.e., maintenance or security checks). A National Guard Trainee, National Guard Dust/Fire Control Worker, Security Guard/Maintenance Worker, Hunter/Fisher, Resident Subsistence Farmer (adult and child), and Trespasser were evaluated in the RI/FS to cover a range of possible future land uses.

OHARNG plans to use FBQ for military mounted training. Therefore, National Guard training is the most reasonably anticipated land use. The National Guard Trainee was identified as the most sensitive receptor under this future land use. Although not reasonably anticipated, the HHRA also evaluated a residential (unrestricted) land use scenario to provide a full comparative range of risks and remedial alternatives. A Resident Subsistence Farmer (adult and child) was identified as the most sensitive receptor under unrestricted land use. The facility will be retained by the US government (i.e., a federal facility) for use by the OHARNG for military training. Therefore, this HHRA summary focuses on health effects

for National Guard use. Risk information for other receptors is located in the HHRA (USACE 2005a) and FS (USACE 2006).

OHARNG future use could include four National Guard receptors (Trainee, Security Guard/Maintenance Worker, Hunter/Fisher, and Fire/Dust Suppression Worker). The National Guard Trainee is exposed to soil and dry sediment through incidental ingestion, dermal contact, and inhalation of vapors and fugitive dust for 24 hr/day, 39 days/year (for a total of 936 hr/year), over a period of 25 years. The other three National Guard receptors are exposed for much shorter periods of time.

Because the National Guard Trainee is assumed to have the highest levels of exposure to contaminants among the four National Guard receptors, preliminary cleanup goals established for the National Guard Trainee are also protective of other National Guard receptors. The National Guard Trainee; therefore, is the representative receptor for the intended land use. The National Guard Trainee is also protective of a Trespasser, who is assumed to visit the site 2 hr/day, 50 to 100 days/year (100 to 200 hr/year) over a period of 10 to 30 years.

Arsenic and manganese were identified as constituents of concern (COCs) for the National Guard Trainee in FBQ deep surface soil (0 to 3 ft BGS) and dry sediment in the drainage ditch. Manganese was identified as a COC for dry sediment in the 11 small settling basins. Calculated risks from these two metals are primarily associated with the very high dust-loading factor and inhalation rate assumed for the National Guard Trainee.

Total carcinogenic risk to a National Guard Trainee exposed to deep surface soil (0 to 3 ft BGS) at FBQ was calculated as 4.4E-06, which is below the Ohio EPA target risk level of 1E-05 and at the lower end of the U. S. Environmental Protection Agency (EPA) target risk range of 1E-06 to 1E-04. The chemical hazard index (HI) was 2.2, which exceeds the target level of 1.

Total carcinogenic risks to a National Guard Trainee exposed to dry sediment at the drainage ditch and 11 small settling basins at FBQ were calculated as 7.3E-06 and 5.0E-09, respectively. These risks are below the Ohio EPA target risk level and below or at the lower end of the EPA target risk range. The chemical HIs were 12 and 2.4 for the drainage ditch and settling basins, respectively. These HIs exceed the target level of 1.

Exposure point concentrations (EPCs) for these COCs in deep surface soil and in the 11 small settling basins did not exceed their respective background or preliminary cleanup goal concentrations as shown in Table 1. Therefore, these media do not require remediation for a National Guard Trainee land use. Likewise, the arsenic EPC in the drainage sediments did not exceed its preliminary cleanup goal. The manganese EPC in the drainage ditch was 4,100 mg/kg, which exceeded both background and the preliminary cleanup goal for the National Guard Trainee. Based on the risk evaluation, dry sediment within the drainage ditch is considered for remediation.

Habitats at FBQ include old-field communities with vegetation corridors and small and large patches of forest vegetation. The three quarry ponds totaling 2.9 acres are the primary aquatic habitats at FBQ. Two small drainages totaling 0.5 acres are located in the central portion of FBQ. The 11 small settling basins total 1.2 acres. The settling basins are generally dry except during precipitation events. These habitats support a variety of wildlife, including small mammals, birds, fish, and insects. State-threatened, State-endangered, State-listed Species of Concern, and State Special Interest Species have been identified at RVAAP, but none have been documented at FBQ.

The ecological risk assessment for FBQ evaluated the risk to ecological receptors from contaminants in soil, surface water, and sediment. Contaminants of potential ecological concern identified for these media include metals, explosives, SVOCs, pesticides, and VOCs. The FS (USACE 2006) presents a weight-of-evidence evaluation and recommends

that no quantitative ecological preliminary cleanup goals be developed at FBQ.

**Table 1. COCs Identified in Remedial Investigation Report for FBQ**

Concentration (mg/kg)				Risk/Hazard	
COC	EPC	BKG	PCG	ILCR	HQ
<i>Deep Surface Soil</i>					
Arsenic	13	15	31	4.3E-06	0.0088
Manganese	627	1450	1800	NA	1.8
<i>Dry Sediment in 11 Settling Basins</i>					
Manganese	646	1950	1950	NA	1.8
<i>Dry Sediment in Drainage Ditch</i>					
Arsenic	21	20	31	6.7E-06	0.014
<b>Manganese</b>	<b>4100</b>	<b>1950</b>	<b>1950</b>	<b>NA</b>	<b>12</b>

BKG = background screening level  
 COC = contaminant of concern  
 EPC = exposure point concentration  
 PCG = preliminary cleanup goal

HQ = hazard quotient  
 ILCR = incremental lifetime cancer risk

## 6.0 REMEDIAL ACTION OBJECTIVES

The remedial action objective (RAO) references preliminary cleanup goals and target risk levels that are considered protective of human health under current and reasonably anticipated future use scenarios. The RAO for this remedy is to prevent National Guard Trainee exposure to contaminants in soil and dry sediment that exceed preliminary cleanup goals to a depth of 4 ft BGS.

Soil/dry sediment to be cleaned up under this Proposed Plan extend to a maximum depth of 4 ft BGS because future land use will not require disturbance of soil below that depth. Table 2 presents the preliminary cleanup goals. The cleanup goal for manganese is the background concentration of this metal.

**Table 2. COC and Preliminary Cleanup Goal for a National Guard Trainee for Dry Sediment at FBQ<sup>a</sup>**

COC <sup>b</sup>	Cleanup Goal (mg/kg)
Manganese	1,950

<sup>a</sup>Sediment from the ditch.  
<sup>b</sup>Total carcinogenic risk to a National Guard Trainee from contaminants in the ditch was calculated as 7.3E-06. The chemical hazard index was 12, which exceeds the target value of 1.  
 COC = Contaminant of concern.  
 FBQ = Fuze and Booster Quarry Landfill/Ponds.

## 7.0 SUMMARY OF FEASIBILITY STUDY ALTERNATIVES

The following general response actions (GRAs) were considered in the FS for remediation of contaminated dry sediment in the drainage ditch at FBQ:

- No action,
- Limited action, and
- Excavation and off-site disposal.

The technologies screened under each GRA were selected for their ability to remove or reduce contaminants in dry sediment. Because dry sediment contains chemical contamination above the cleanup goal, the technologies were evaluated for their applicability to remove or reduce contaminants in the shortest timeframe. Technologies selected under these GRAs were combined into the following four alternatives for detailed analysis. Costs are estimated for each alternative.

### 7.1 Feasibility Study Alternative 1 – No Action

*Cost: \$0*

This remedial alternative provides no further remedial action and is required under NCP as a baseline for comparison with other remedial alternatives. Under this alternative, there is no reduction in toxicity, mobility, or volume of contaminated soil and dry sediment. Access restrictions and environmental monitoring would be discontinued. The site would have no legal, physical, or administrative land use controls. Environmental monitoring would not be performed. Five-year reviews would not be conducted in accordance with CERCLA 121(c).

### 7.2 Feasibility Study Alternative 2 – Limited Action

*Estimated Implementation Cost: \$18,392*  
*30-year Operations and Maintenance (O&M) Cost: \$141,669*  
*Estimated Total Cost: \$160,061*



This remedial alternative involves the implementation of land use controls and periodic monitoring (i.e., CERCLA 5-year reviews) to detect any changes in the nature or extent of contamination at the AOC and to deter unauthorized access and protect human receptors. Five-year reviews would be conducted in accordance with CERCLA 121(c). The remedial alternative includes an O&M period to detect any changes in nature and extent of contamination at the AOC.

### **7.3 Feasibility Study Alternative 3 – Excavation of Soil/Dry Sediment with Off-Site Disposal, National Guard Trainee Land Use**

*Estimated Implementation Cost:* \$66,688  
*30-year O&M Cost:* \$0  
*Estimated Total Cost:* \$66,688

This remedial alternative involves the removal and transportation of chemical contaminants in dry sediment above National Guard Trainee land use preliminary cleanup goals and disposal off-site at a licensed disposal facility. Approximately 68 yd<sup>3</sup> of contaminated dry sediment would be excavated from the drainage ditch and transported to an off-site disposal facility licensed and permitted to accept these wastes. Confirmation sampling would be conducted to ensure National Guard Trainee land use preliminary cleanup goals have been achieved. Areas successfully remediated would be backfilled with clean soil as appropriate. Alternative 3 does not include land use controls, CERCLA 5-year reviews, or O&M sampling, as residential land use preliminary cleanup goals are attained through remedial actions conducted under this remedial alternative. However, land use controls to address any issues with respect to munitions and explosives of concern (MEC) may be required and will be implemented by the US Army and OHARNG.

### **7.4 Feasibility Study Alternative 4 – Excavation of Soil/Dry Sediment with Off-Site Disposal, Resident Subsistence Farmer Land Use**

*Estimated Implementation Cost:* \$61,650  
*Environmental Monitoring Cost:* \$0  
*Estimated Total Cost:* \$61,650

This remedial alternative involves the removal and transportation of chemical contaminants in dry sediment above Resident Subsistence Farmer land use preliminary cleanup goals and disposal off-site at a licensed disposal facility. Approximately 37 yd<sup>3</sup> of contaminated dry sediment would be excavated from the drainage ditch and transported to an off-site disposal facility licensed and permitted to accept these wastes. Confirmation sampling would be conducted to ensure Resident Subsistence Farmer land use preliminary cleanup goals have been achieved. Areas successfully remediated would be backfilled with clean soil/dry sediment, as appropriate. Alternative 4 does not include land use controls, CERCLA 5-year reviews, or O&M sampling, as residential land use preliminary cleanup goals are attained through remedial actions conducted under this remedial alternative. However, land use controls to address any issues with respect to MEC may be required and will be implemented by the US Army and OHARNG.

## **8.0 EVALUATION OF FEASIBILITY STUDY ALTERNATIVES**

The alternatives were evaluated with respect to the nine comparative analysis criteria, as outlined by CERCLA (Table 3). The nine criteria are categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. These criteria are as follows:

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

1. Overall protection of human health and the environment.

2. Compliance with applicable or relevant and appropriate requirements (ARARs).

Primary Balancing Criteria – used to weigh major trade-offs among alternatives.

3. Long-term effectiveness and permanence.
4. Reduction of toxicity, mobility, or volume through treatment.
5. Short-term effectiveness.
6. Implementability.
7. Cost.

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

8. State acceptance.
9. Community acceptance.

The comparative analysis evaluates the relative performance of Alternatives 1 through 4 with respect to each of the nine criteria. Identifying the advantages and disadvantages of each alternative, relative to one another, helps identify the relative strengths of the preferred alternative. These strengths, combined with risk management decisions made by the US Army and Ohio EPA, as well as input from the community, will serve as the basis for selecting the remedy.

Table 4 presents a summary for the comparative analysis of remedial alternatives for FBQ from the FS. Criterion 1, Overall Protectiveness, is rated as either “protective” or “not protective.” Criterion 2, Compliance with ARARs, is rated as either “compliant” or “not compliant.” The remaining five criteria shown on this table are rated as high, medium, or low,

**Table 3. CERCLA Evaluation Criteria**

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

**Compliance with Applicable or Relevant and Appropriate Requirements** – considers how a remedy will meet all the applicable or relevant and appropriate requirements of other federal and state environmental statutes and/or provide grounds for invoking a waiver

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

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

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

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

**Cost** – considers capital costs and operation and maintenance costs associated with the implementation of the alternative

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

**Community Acceptance** – will be addressed in the Record of Decision following a review of the public comments received on the remedial investigation report, focused feasibility study report, and the Proposed Plan

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

**Table 4. Summary of Comparative Analysis of Remedial Alternatives for FBQ**

<b>NCP Evaluation Criteria</b>	<b>Alternative 1: No Action</b>	<b>Alternative 2: Limited Action</b>	<b>Alternative 3: Excavation of Soil/Dry Sediment and Off-Site Disposal, National Guard Trainee Land Use</b>	<b>Alternative 4: Excavation of Soil/Dry Sediment and Off-Site Disposal, Resident Subsistence Farmer Land Use</b>
1. Overall Protectiveness	Not protective	Protective	Protective	Protective
2. Compliance with ARARs	Compliant	Compliant	Compliant	Compliant
3. Long-Term Effectiveness and Permanence	Low	Medium	High	High
4. Reduction of Toxicity, Mobility, or Volume through Treatment	Low	Low	Low	Low
5. Short-Term Effectiveness	High	High	Medium	Medium
6. Implementability	High	High	Medium	Medium
7. Cost	High \$0	Low \$160,061	Medium \$66,688	Medium \$61,650

Criterion 1, Overall Protectiveness, is rated as either “protective” or “not protective.” Criterion 2, Compliance with ARARs, is rated as either “compliant” or “not compliant.” The remaining five criteria are rated as High [alternative(s) that performs the best], Medium (moderate alternative performance), or Low [alternative(s) that performs the worst].

ARAR = Applicable or relevant and appropriate requirement.

FBQ = Fuze and Booster Quarry Landfill/Ponds.

NCP = National Oil and Hazardous Substances Pollution Contingency Plan.

with a rating of high indicating an alternative(s) that performs the best and a rating of low indicating an alternative(s) that performs the worst (e.g., an alternative with a high cost will be scored “low” for Criterion 7, Cost).

Alternative 1, no action, will provide no protection of human health or the environment from the AOC contaminants beyond current conditions. No effort will be taken to prevent or minimize human or ecological exposure to contaminated soil/dry sediment.

Concentrations of contaminants could pose future risk to both the National Guard Trainee and/or the Resident Subsistence Farmer.

For the remaining alternatives, the evaluation shows Alternative 2 does not offer substantial long-term effectiveness and permanence for a National Guard training land use because of its reliance entirely on land use controls. In addition, it has a higher relative cost due to O&M long-term requirements.

Alternatives 3 and 4 provide an equal degree of overall protectiveness and long-term effectiveness and permanence by removing contaminated soil. Both alternatives can be

readily and quickly implemented at a comparatively low cost. Because of unique HHRA assumptions for the National Guard Trainee (higher assumed inhalation rate and increased dust generation compared to a Resident Subsistence Farmer), more soil must be remediated to ensure protectiveness for the National Guard Trainee. Therefore, Alternative 3 would also be protective for the Resident Subsistence Farmer. Alternative 4 would not be protective for the National Guard Trainee.

## **9.0 PREFERRED FEASIBILITY STUDY ALTERNATIVE**

The US Army, in consultation with Ohio EPA, is recommending that Alternative 3 (Excavation of Soil/Dry Sediment and Off-site Disposal, National Guard Trainee Land Use) be implemented as the remedial action at FBQ. This recommendation is not a final decision. The US Army, in consultation with Ohio EPA, will select the remedy for this AOC after reviewing and considering all comments submitted during the 30-day public comment period.

This alternative includes the removal of contaminated dry sediment from the main

drainage ditch at FBQ that exceeds preliminary cleanup goals for the National Guard Trainee. This alternative is protective for the anticipated future land use, is cost effective, and can be performed in a timely manner. Based on the available risk assessment information, the preferred alternative will achieve the RAO, which is to prevent National Guard Trainee exposure to contaminants in soil and dry sediment that exceed preliminary cleanup goals to a depth of 4 ft BGS. In addition, low risks to ecological receptors will be further reduced.

Engineering controls, personal protective equipment, erosion and sediment controls, proper waste-handling practices, and monitoring will be used to mitigate short-term effects during construction. CERCLA 5-year reviews or an O&M period will not be required because this alternative is also protective for unrestricted land use. However, land use controls to address any issues with respect to MEC may be required and will be implemented by the US Army and OHARNG.

## **10.0 COMMUNITY PARTICIPATION**

### **10.1 Community Participation**

Public participation is an important component of remedy selection. The US Army and Ohio EPA are soliciting input from the community on the preferred alternative. The comment period extends from April 4, 2007 to May 3, 2007. This period includes a public meeting at which the US Army will present the Proposed Plan as agreed to by Ohio EPA. The US Army will accept both oral and written comments at this meeting.

### **10.2 Public Comment Period**

The 30-day comment period is from April 4, 2007 to May 3, 2007, and provides an opportunity for public involvement in the decision-making process for the proposed action. All public comments will be considered by the US Army and Ohio EPA before selecting the final remedy. The public is encouraged to review and comment on this

Proposed Plan. During the comment period, the public is encouraged to review documents pertinent to FBQ. This information is available at the Information Repository and online at [www.rvaap.org](http://www.rvaap.org). To obtain further information, contact the RVAAP Facility Manager.

### **10.3 Written Comments**

If the public would like to comment in writing on the Proposed Plan or other relevant issues, please deliver comments to the US Army at the public meeting or mail written comments (postmarked no later than May 3,).

#### **POINT OF CONTACT FOR WRITTEN COMMENTS**

**Facility Manager**  
**Ravenna Army Ammunition Plant**  
Building 1037  
8451 State Route 5  
Ravenna, Ohio 44266-9297  
Office: (330) 358-7311  
Fax: (330) 358-7314

### **10.4 Public Meeting**

The US Army will hold an open house and public meeting on this Proposed Plan on April 10, 2007, at 6:00PM, in the Newton Falls Community Center, 52 East Quarry Street, Newton Falls, Ohio, 44444 to accept comments. This meeting will provide an opportunity for the public to comment on the proposed action. Comments made at the meeting will be transcribed.

#### **ADMINISTRATIVE RECORD FILE**

**RVAAP**  
Building 1037  
8451 State Route 5  
Ravenna, Ohio 44266-9297  
(330) 358-7311  
Fax: (330) 358-7314

Note: Access is restricted to RVAAP, but the file can be obtained or viewed with prior notice to RVAAP.

## INFORMATION REPOSITORIES

### **Reed Memorial Library**

167 East Main Street  
Ravenna, Ohio 44266  
(330) 296-2827

Hours of operation:

10AM – 8:45PM Monday – Friday  
10AM – 5:45PM Saturday

### **Newton Falls Public Library**

204 South Canal Street  
Newton Falls, Ohio 44444  
(330) 872-1282

Hours of operation:

9AM – 8PM Monday – Thursday  
9AM – 5PM Friday and Saturday  
12PM – 5PM Sunday

## 10.5 US Army Review of Public Comments

The US Army will review the public's comments as part of the process in reaching a final decision on the most appropriate action to be taken. A Responsiveness Summary, a document that summarizes the US Army's responses to comments received during the public comment period, will be included in the Record of Decision (ROD). The US Army's final choice of action will be documented in the ROD. The ROD will be added to the RVAAP Administrative Record and Information Repositories.

## GLOSSARY OF TERMS

**Administrative Record:** a collection of documents, typically reports and correspondence, generated during site investigation and remedial activities. Information in the Administrative Record represents the information used to select the preferred alternative. It is available for public review at RVAAP, Building 1037; call (330) 358-7311 for an appointment.

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):** a federal law passed in 1980, commonly referred to as the Superfund

Program. It provides liability, compensation, cleanup, and emergency response in connection with the cleanup of inactive hazardous substance release sites that endanger public health or the environment.

**Contaminant of concern (COC):** site-specific chemical substance that potentially poses significant human health or ecological risks. COCs are typically further evaluated for remedial action.

**Ecological receptor:** a plant, animal, or ecosystem that may be exposed to an adverse condition.

**Exposure point concentration (EPC):** The EPC is used in the human health and ecological risk assessments to quantify exposures for all or part of an area of concern (exposure unit). The EPC is the smaller value between the maximum detected concentration and the calculated 95% upper confidence limit (UCL<sub>95</sub>) of the average concentration for the area.

**Feasibility study (FS):** a CERCLA document that reviews and evaluates multiple remedial technologies under consideration at a site. It also identifies the preferred remedial action alternative.

**Human receptor:** a hypothetical person, based on current or potential future land use, who may be exposed to an adverse condition. For example, a National Guard Trainee is considered the human receptor in this Proposed Plan.

**National Oil and Hazardous Substances Pollution Contingency Plan (NCP):** abbreviation for the National Oil and Hazardous Substances Pollution Contingency Plan. It is the set of regulations that implement CERCLA and address responses to hazardous substances and pollutants or contaminants.

**National Pollutant Discharge Elimination System (NPDES):** this permit program controls water pollution by regulating point sources that discharge pollutants into water of the United States.

**Record of Decision (ROD):** legal record signed by the US Army and Ohio EPA. It describes the cleanup action or remedy selected for a site, the basis for selecting that remedy, public comments, responses to comments, and the estimated cost of the remedy.

**Remedial Action Objective (RAO):** these specific goals, developed from the evaluation of ARARs, are to be protective of human health and the environment.

**Remedial investigation (RI):** CERCLA investigation that involves sampling environmental media, such as air, soil, and water, to determine the nature and extent of contamination and to calculate human health and environmental risks that result from the contamination.

**Responsiveness summary:** a section of the ROD where the US Army documents and responds to written and oral comments received from the public about the Proposed Plan.

**Risk assessment:** an evaluation that determines potential harmful effects, or lack thereof, posed to human health and the environment due to exposure to chemicals found at a CERCLA site.

**Target risk:** the Ohio EPA (2004b) identifies 1E-05 as a target for cancer risk for carcinogens and an acceptable target hazard index of 1 for non-carcinogens.

**Weight-of-evidence:** a logical procedure for identifying, organizing, and evaluating or weighing various types, quantities, and qualities of information about natural resources, ecological risk from chemicals, and likely consequences of any remediation on those plants, animals, and ecological systems.

Ohio EPA, Division of Emergency and Remedial Response (DERR), 2004b. *Technical Decision Compendium: Human Health Cumulative Carcinogenic Risk and Non-Carcinogenic Hazard Goals for DERR Remedial Response and Office of Federal Facility Oversight*. April 28, 2004.

USACE (U. S. Army Corps of Engineers) 1996. *Preliminary Assessment for the Ravenna Army Ammunition Plant, Ravenna, Ohio*, DACA62-94-D-0029, Delivery Order 0009, February.

USACE 1998. *Phase I Remedial Investigation Report for the Phase I Remedial Investigation of High Priority Areas of Concern at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, DACA-62-94-D-0029, Delivery Order Nos. 0010 and 0022, Final, February.

USACE 2005a. *Phase I/Phase II Remedial Investigation Report of the Fuze and Booster Quarry Landfill/Pond (RVAAP-16) at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, GS-10F-0076J, Delivery Order W912QR-05-F-0033, Final, November.

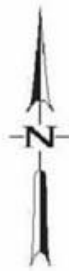
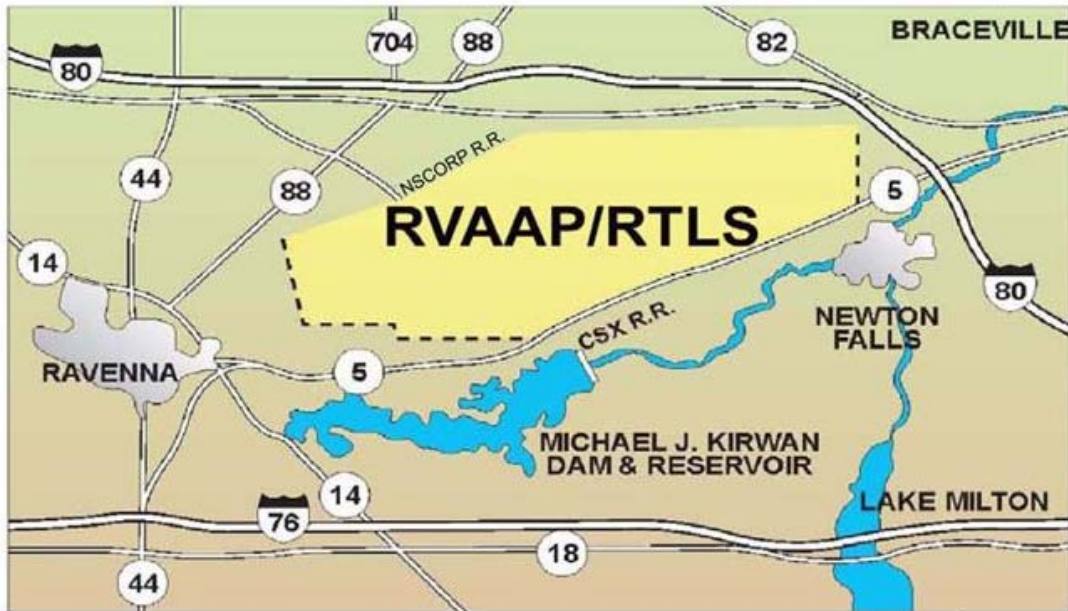
USACE 2005b. *Facility-wide Biological and Water Quality Study 2003, Ravenna Army Ammunition Plant. Part 1 - Streams and Part 2 - Ponds*, USACE, Louisville District, with the Ohio Environmental Protection Agency, Division of Surface Water.

USACE 2006. *Feasibility Study for Fuze and Booster Quarry Landfill/Ponds (RVAAP-16), Ravenna Army Ammunition Plant, Ravenna, Ohio*, Preliminary Draft, GS-10F-0076J, Delivery Order W912QR-05-F-0033, September.

## REFERENCES

Ohio EPA 2004a. *Director's Final Findings and Orders in the matter of US Army, Ravenna Army Ammunition Plant*. June.

## **FIGURES**



SCALE IN MILES  
LOCATION MAP



(NOT TO SCALE)

Figure 1. General Location and Orientation of RVAAP/RTLS





Figure 2. RVAAP/RTLS Installation Map

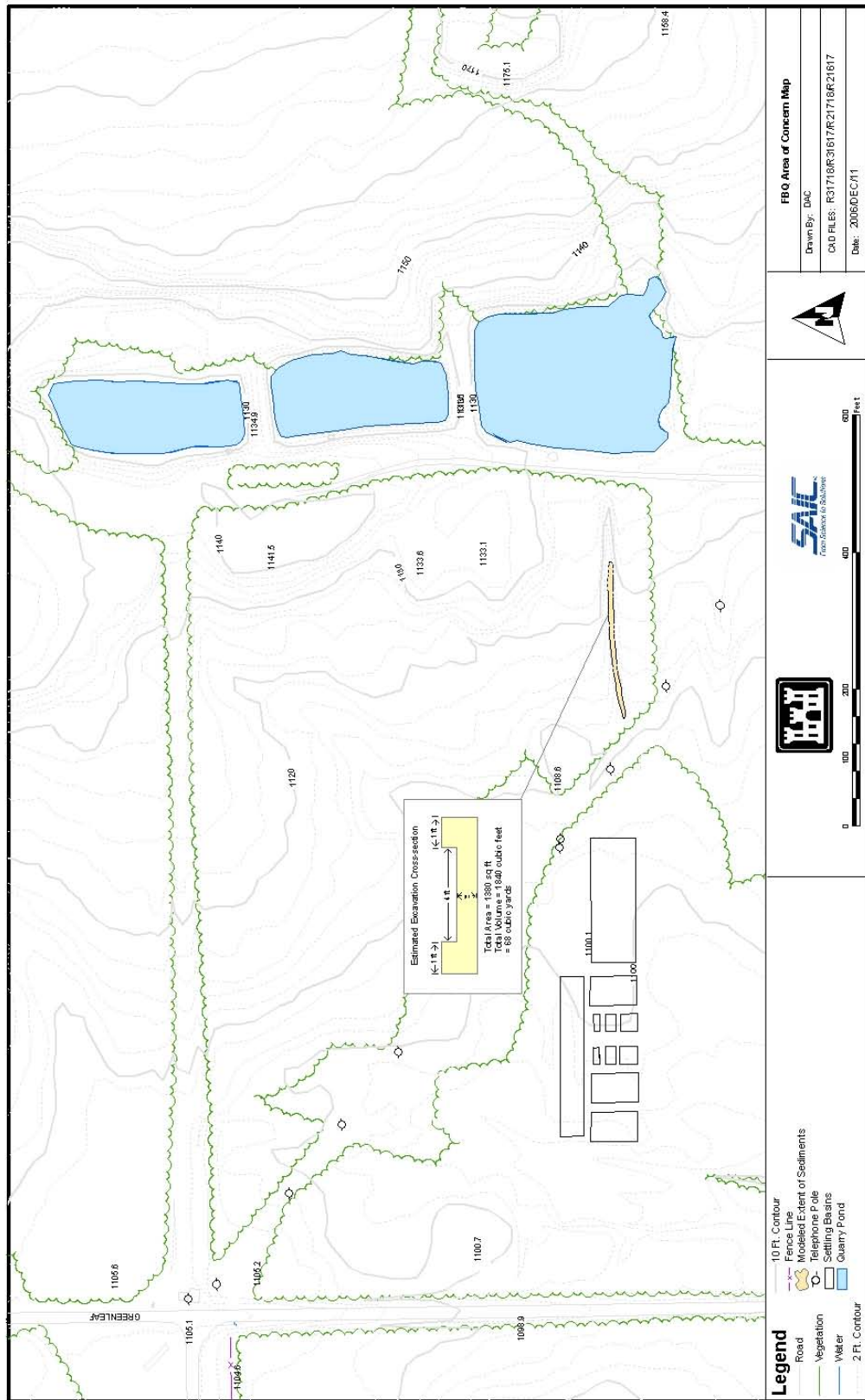


Figure 3. FBQ Area of Concern Map