

Draft

**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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TABLE OF CONTENTS

1.0 INTRODUCTION.....	1
2.0 RVAAP AREA OF CONCERN BACKGROUND.....	2
3.0 AREA OF CONCERN CHARACTERISTICS.....	2
4.0 SCOPE AND ROLE OF RESPONSE ACTION.....	4
5.0 SUMMARY OF HUMAN AND ECOLOGICAL RISKS.....	4
6.0 REMEDIAL ACTION OBJECTIVES.....	6
7.0 SUMMARY OF FEASIBILITY STUDY ALTERNATIVES.....	6
7.1 Feasibility Study Alternative 1 – No Action 6	
7.2 Feasibility Study Alternative 2 – Limited Action.....	6
7.3 Feasibility Study Alternative 3 – Excavation of Soil/Dry Sediment with Off-Site Disposal, National Guard Trainee Land Use.....	7
7.4 Feasibility Study Alternative 4 – Excavation of Soil/Dry Sediment with Off-Site Disposal, Resident Subsistence Farmer Land Use.....	7
8.0 EVALUATION OF FEASIBILITY STUDY ALTERNATIVES.....	7
9.0 PREFERRED FEASIBILITY STUDY ALTERNATIVE.....	9
10.0 COMMUNITY PARTICIPATION.....	10
10.1 Community Participation.....	10
10.2 Public Comment Period.....	10
10.3 Written Comments	10
10.4 Public Meeting.....	10
10.5 US Army Review of Public Comments 10	

LIST OF TABLES

Table 1. COCs and Cleanup Goals for a National Guard Trainee for Soil or Dry Sediment at FBQ.....	6
Table 2. CERCLA Evaluation Criteria	9
Table 3. Summary of Comparative Analysis of Remedial Alternatives for FBQ.....	9

LIST OF FIGURES

Figure 1. General Location and Orientation of RVAAP/RTLS.....	14
Figure 2. RVAAP/RTLS Installation Map ...	15
Figure 3. FBQ Area of Concern Map.....	16

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	contaminant 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
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 **1.0 INTRODUCTION**
2

3 This Proposed Plan presents remedial
4 alternatives and identifies the preferred
5 alternative for cleanup of contaminated soil
6 and dry sediment within the Fuze and Booster
7 Quarry Landfill/Ponds (FBQ) at the Ravenna
8 Army Ammunition Plant (RVAAP), Ravenna,
9 Ohio (Figure 1), and provides the rationale for
10 this preference. The US Army, in consultation
11 with the Ohio Environmental Protection
12 Agency (Ohio EPA), issues this Proposed
13 Plan. The Proposed Plan provides the public
14 with information to comment upon the
15 selection of an appropriate response action.
16 The US Army, in consultation with Ohio EPA,
17 will select the remedy for this area of concern
18 (AOC) after reviewing and considering all
19 comments submitted during the 30-day public
20 comment period. Therefore, the public is
21 encouraged to review and comment on all
22 alternatives presented in this Proposed Plan.
23

24 The US Army is issuing this Proposed Plan as
25 part of its public participation responsibilities
26 under Section 117(a) of the Comprehensive
27 Environmental Response, Compensation, and
28 Liability Act of 1980 (CERCLA), as amended
29 by the Superfund Amendments and
30 Reauthorization Act of 1986 and
31 Section 300.430(f)(2) of the National Oil and
32 Hazardous Substances Pollution Contingency
33 Plan (NCP) (40 *Code of Federal Regulations*
34 300). Selection and implementation of the
35 remedy will also satisfy the requirements of
36 the Ohio EPA Director's Final Findings and
37 Orders, June 10, 2004.
38

39 The Proposed Plan summarizes information
40 that can be found in greater detail in the
41 Remedial Investigation (RI) Reports [United
42 States Corps of Engineers (USACE 1998 and
43 2005a)], the Feasibility Study (FS)
44 (USACE 2006), and other documents
45 contained in the Administrative Record file for
46 FBQ. The US Army encourages the public to
47 review these documents to gain a more
48 comprehensive understanding of the AOC and
49 activities that have been conducted to date.

Public Comment Period:
Month XX, 2007, to Month XX, 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 TIME pm, Month XX, 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, Conference Room
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.

1 **2.0 RVAAP AND AREA OF CONCERN**
2 **BACKGROUND**

3
4 RVAAP is approximately 4.8 km (3 miles)
5 east-northeast of the city of Ravenna and
6 approximately 1.6 km (1 mile) northwest of
7 the city of Newton Falls. When the RVAAP
8 Installation Restoration Program (IRP) began
9 in 1989, RVAAP was identified as a 21,419-
10 acre installation. The property boundary was
11 resurveyed by the Ohio Army National Guard
12 (OHARNG) over a 2-year period (2002 and
13 2003) and the actual total acreage of the
14 property was found to be 21,683 acres. As of
15 February 2006, a total of 20,403 acres of the
16 former RVAAP have been transferred to the
17 National Guard Bureau (NGB) and
18 subsequently licensed to OHARNG for use as
19 a military training site. The current RVAAP
20 consists of 1,280 acres scattered throughout the
21 Ravenna Training and Logistics Site (RTLS).
22 The current RVAAP portions of the property
23 are solely located within Portage County.

24
25 The RVAAP IRP includes investigation and
26 cleanup related to past activities over the entire
27 21,683 acres of the former RVAAP.
28 References to RVAAP in this document
29 include the historical extent of RVAAP, which
30 is the combined acreages of the current RTLS
31 and RVAAP, unless otherwise specifically
32 stated.

33
34 RVAAP is approximately 17.7 km (11 miles)
35 long and 5.6 km (3.5 miles) wide bounded by
36 State Route 5, the Michael J. Kirwan
37 Reservoir, and the CSX System Railroad on
38 the south; Garret, McCormick, and Berry roads
39 on the west; the Norfolk Southern Railroad on
40 the north; and State Route 534 on the east
41 (Figures 1 and 2). RVAAP is surrounded by
42 several communities: Windham on the north;
43 Garrettsville 9.6 km (6 miles) to the northwest;
44 Newton Falls 1.6 km (1 mile) to the southeast;
45 Charlestown to the southwest; and Wayland
46 4.8 km (3 miles) to the south.

47
48 RVAAP was constructed in 1940 and 1941 for
49 depot storage and ammunition
50 assembly/loading and placed on standby status
51 in 1950. Production activities were resumed

52 from 1954 to 1957 and again from 1968 to
53 1972. Demilitarization activities, including
54 disassembly of munitions and explosives
55 melt-out and recovery, continued until 1992.
56 When RVAAP was operational, the entire
57 21,683-acre parcel was a government-owned,
58 contractor-operated industrial facility. The
59 only activities still being carried out at
60 RVAAP are environmental restoration,
61 ordnance clearance and infrequent demolition
62 of any unexploded ordnance discovered during
63 investigation and remediation activities, and
64 building decontamination and demolition.

65
66 FBQ, designated as AOC RVAAP-16,
67 encompasses approximately 45 acres in the
68 south-central part of RVAAP (Figures 2 and
69 3). FBQ operated from 1945 until 1993. The
70 western part of the AOC contains 11 small,
71 shallow settling basins, and an abandoned rock
72 quarry is located in the eastern portion. The
73 AOC was expanded in 1998 to include two
74 debris piles and three shallow settling ponds.
75 Reportedly, the quarry was used for open
76 burning and as a landfill before 1976. The
77 debris resulting from these operations was
78 reportedly removed during construction of
79 three settling ponds (quarry ponds) in 1976.
80 These quarry ponds, up to 20 to 30 ft deep and
81 separated by earthen berms, were constructed
82 to receive spent brine regenerate and sand
83 filtration backwash water discharge from one
84 of the RVAAP water plants. The discharge
85 was regulated under a National Pollutant
86 Discharge Elimination System permit and
87 continued until 1993.

88
89 FBQ was identified as an AOC at RVAAP in
90 the Preliminary Assessment (USACE 1996). It
91 was the subject of a Phase I RI
92 (USACE 1998), a Phase I/II RI
93 (USACE 2005a), and a Supplemental Phase II
94 RI (included in the FS). The FS was completed
95 in 2006 (USACE 2006).

96
97 **3.0 AREA OF CONCERN**
98 **CHARACTERISTICS**
99

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

1 2005 (USACE 1998, 2005a, and 2006). A
2 depiction of FBQ can be seen in Figure 3.

3
4 General elevation across FBQ decreases from
5 353 m at the eastern side to 335 m (1,088 to
6 1,160 ft) above mean sea level on the western
7 side. Quarrying operations have resulted in the
8 removal of surface soil in the central portion of
9 the AOC and adjacent to the quarry ponds.
10 Relatively undisturbed areas in the north and
11 west portions of the AOC are covered in
12 hardwood forest. Soil cover at the AOC varies
13 widely due to past disturbance. In the vicinity
14 of the quarry, soil cover is thin or absent.
15 Deeper soil cover consisting of poorly drained
16 silty clay loam exists in the central and west
17 portions of the AOC. Soil is underlain by
18 sandstone bedrock throughout the AOC.

19
20 The southern two quarry settling ponds are
21 filled with water year round. Water is typically
22 present in the northern settling pond; however,
23 water levels can vary widely and sometimes no
24 water is present during very dry periods.
25 Surface water flows from the northern quarry
26 pond through gated culverts to the southern
27 pond. Surface water exits the southern pond
28 through a culvert to a ditch at the southwest
29 corner of the pond. This ditch leads west to the
30 11 shallow settling basins and flow eventually
31 exits the AOC via a culvert located at the
32 southwest corner. Seasonal wetland areas are
33 found in the shallow areas of the quarry ponds,
34 in the vicinity of the 11 shallow settling basins,
35 and in the lower reaches of the ditch draining
36 the AOC.

37
38 The general groundwater flow pattern in most
39 of the AOC is from the northeast to the
40 southwest, which mimics the topography and
41 surface water drainage patterns. The quarry
42 ponds intersect the groundwater table and
43 influence the water table elevations in this
44 portion of the AOC.

45
46 Contamination identified in soil at FBQ is
47 primarily confined to between 0 and 3 ft below
48 ground surface (BGS). In the central portion of
49 the AOC, soil cover is very thin due to past
50 disturbances. Contaminants identified in soil
51 included explosive and propellant compounds,

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

57
58 Contaminants detected in sediment included
59 explosive and propellant compounds, metals,
60 SVOCs, VOCs, and pesticides. The greatest
61 numbers of SVOC, VOC, and pesticides were
62 detected in sediment samples collected from
63 the three quarry ponds. The drainage ditch
64 west of the southernmost quarry pond
65 contained some contaminants, primarily
66 metals, but concentrations were generally
67 lower than in the quarry ponds. No
68 polychlorinated biphenyls (PCBs) were
69 detected in any sediment samples.

70
71 Contaminants detected in surface water at FBQ
72 were primarily found in samples of
73 intermittent water from the 11 small settling
74 basins located in the southwest portion of the
75 AOC. The contaminants included explosive
76 and propellant compounds, metals, and a few
77 SVOCs and VOCs. No pesticides or PCBs
78 were detected in the surface water samples.

79
80 Groundwater samples were collected from
81 monitoring wells in two water-bearing zones
82 (unconsolidated and bedrock zones) at FBQ.
83 Explosive and propellant compounds,
84 inorganics, SVOCs, and VOCs were detected
85 in the groundwater. The monitoring well with
86 the greatest number of contaminants detected
87 was upgradient (northeast) of the AOC. No
88 pesticides or PCBs were detected in
89 groundwater samples collected from either
90 water-bearing unit. Data suggest contaminants
91 have not migrated far from source areas.
92 Groundwater monitoring will be conducted
93 under the Facility-Wide Groundwater
94 Monitoring Program.

95
96 Groundwater contaminant migration was
97 modeled as part of the FS. Modeling included
98 evaluation of potential leaching of contaminants
99 from soil to groundwater. Also, the potential for
100 contaminants to migrate from sources to the
101 AOC boundary was evaluated. Six soil
102 contaminants were identified by the modeling to

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

7
8 A facility-wide investigation of surface water
9 at FBQ (USACE 2005b) showed that surface
10 water in the quarry ponds is of good quality,
11 although three parameters (pH, lead, and zinc)
12 slightly exceeded the chronic water quality
13 standard criteria. These elevated parameters
14 did not appear to impact the biological
15 community. For example, the fish community
16 results were strongly similar to reference pond
17 conditions. Macroinvertebrate sample results
18 were also similar to reference conditions. The
19 overall physical habitat evaluation was the
20 highest among similar ponds at RVAAP.
21 Sediment samples contained some lead and
22 zinc above probable effects levels. In
23 summary, a few chemical levels in surface
24 water and sediment are above thresholds;
25 however, other biological indicators show a
26 lack of adverse impact to the fish and other
27 aquatic biological communities in quarry
28 ponds at FBQ. Surface water monitoring may
29 be conducted in the future if conditions
30 warrant.

31 **4.0 SCOPE AND ROLE OF RESPONSE** 32 **ACTION**

33
34
35 The US Army intends to transfer FBQ to NGB
36 once remedial actions are complete. OHARNG
37 plans to use FBQ for military training.
38 Specifically, this area will be used for mounted
39 training, which includes operation of wheeled
40 and tracked vehicles.

41
42 Remediation of groundwater, surface water,
43 and underwater (wet) sediment is not included
44 in the scope of this action. These media will be
45 addressed under future actions. However, the
46 selected remedy for soil and dry sediment at
47 FBQ must be protective of these other media.

48
49 Because of the variety of basins, ponds, and
50 drainage ditches at FBQ, sediment was
51 evaluated as three separate units: the three

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

61
62 Groundwater at FBQ may be monitored under
63 the RVAAP Facility-Wide Groundwater
64 Monitoring Program conducted in accordance
65 with the Ohio EPA Director's Findings and
66 Orders.

67 **5.0 SUMMARY OF HUMAN AND** 68 **ECOLOGICAL RISKS**

69
70
71 A human health risk assessment (HHRA) was
72 conducted to evaluate potential risks from
73 current and predicted future exposures to soil
74 and dry sediment contaminants at FBQ
75 (USACE 2005a). Natural resource
76 management activities are currently conducted
77 on the site. No additional activities are
78 currently conducted (i.e., maintenance or
79 security checks). A National Guard Trainee,
80 National Guard Dust/Fire Control Worker,
81 Security Guard/Maintenance Worker,
82 Hunter/Fisher, Resident Subsistence Farmer
83 (adult and child), and Trespasser were
84 evaluated in the RI/FS to cover a range of
85 possible future land uses.

86
87 OHARNG plans to use FBQ for military
88 mounted training. Therefore, National Guard
89 training is the most reasonably anticipated land
90 use. The National Guard Trainee was
91 identified as the most sensitive receptor under
92 this future land use. Although not reasonably
93 anticipated, the HHRA also evaluated a
94 residential (unrestricted) land use scenario to
95 provide a full comparative range of risks and
96 remedial alternatives. A Resident Subsistence
97 Farmer (adult and child) was identified as the
98 most sensitive receptor under unrestricted land
99 use. The facility will be retained by the US
100 government (i.e., a federal facility) for use by
101 the OHARNG for military training. Therefore,
102 this HHRA summary focuses on health effects

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

4
5 OHARNG future use could include four
6 National Guard receptors (Trainee, Security
7 Guard/Maintenance Worker, Hunter/Fisher,
8 and Fire/Dust Suppression Worker). The
9 National Guard Trainee is exposed to soil and
10 dry sediment through incidental ingestion,
11 dermal contact, and inhalation of vapors and
12 fugitive dust for 24 hr/day, 39 days/year (for a
13 total of 936 hr/year), over a period of 25 years.
14 The other two National Guard receptors are
15 exposed for much shorter periods of time.

16
17 Because the National Guard Trainee is
18 assumed to have the highest levels of exposure
19 to contaminants among the three National
20 Guard receptors, risk-based cleanup goals
21 established for the National Guard Trainee are
22 also protective of other National Guard
23 receptors. The National Guard Trainee;
24 therefore, is the representative receptor for the
25 intended land use. The National Guard Trainee
26 is also protective of a Trespasser, who is
27 assumed to visit the site 2 hr/day, 50 to
28 100 days/year (100 to 200 hr/year) over a
29 period of 10 to 30 years.

30
31 Arsenic and manganese were identified as
32 contaminants of concern (COCs) for the
33 National Guard Trainee in FBQ deep surface
34 soil (0 to 3 ft BGS) and dry sediment in the
35 drainage ditch. Manganese was identified as a
36 COC for dry sediment in the 11 small settling
37 basins. Calculated risks from these two metals
38 are primarily associated with the very high dust-
39 loading factor and inhalation rate assumed for
40 the National Guard Trainee.

41
42 Total carcinogenic risk to a National Guard
43 Trainee exposed to deep surface soil (0 to 3 ft
44 BGS) at FBQ was calculated as 4.4E-06,
45 which is below the Ohio EPA target risk level
46 of 1E-05 and at the lower end of the U. S.
47 Environmental Protection Agency (EPA)
48 target risk range of 1E-06 to 1E-04. The
49 chemical hazard index (HI) was 2.2, which
50 exceeds the target level of 1.

51

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

62
63 Exposure point concentrations (EPCs) for these
64 COCs in deep surface soil and in the 11 small
65 settling basins did not exceed their respective
66 background or preliminary cleanup goal
67 concentrations as shown in Table 1. Therefore,
68 these media do not require remediation for a
69 National Guard Trainee land use. Likewise, the
70 arsenic EPC in the drainage sediments did not
71 exceed its preliminary cleanup goal. The
72 manganese EPC in the drainage ditch was 4,100
73 mg/kg, which exceeded both background and the
74 preliminary cleanup goal for the National Guard
75 Trainee. Based on the risk evaluation, dry
76 sediment within the drainage ditch is considered
77 for remediation.

78
79 Habitats at FBQ include old-field communities
80 with vegetation corridors and small and large
81 patches of forest vegetation. The three quarry
82 ponds totaling 2.9 acres are the primary aquatic
83 habitats at FBQ. Two small drainages totaling
84 0.5 acres are located in the central portion of
85 FBQ. The 11 small settling basins total
86 1.2 acres. The settling basins are generally dry
87 except during precipitation events. These
88 habitats support a variety of wildlife, including
89 small mammals, birds, fish, and insects. State-
90 threatened, State-endangered, State-listed
91 Species of Concern, and State Special Interest
92 Species have been identified at RVAAP, but
93 none have been documented at FBQ.

94
95 The ecological risk assessment for FBQ
96 evaluated the risk to ecological receptors from
97 contaminants in soil, surface water, and
98 sediment. Contaminants of potential ecological
99 concern identified for these media include
100 metals, explosives, SVOCs, pesticides, and
101 VOCs. The FS (USACE 2006) presents a
102 weight-of-evidence evaluation and recommends

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

3
 4 **Table 1. COCs Identified in Remedial**
 5 **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
Manganese	4100	1950	1950	NA	12

BKG = background screening level HQ = hazard quotient
 COC = contaminant of concern ILCR = incremental lifetime
 EPC = exposure point concentration cancer risk

6
 7 **6.0 REMEDIAL ACTION OBJECTIVES**

8
 9 The remedial action objective (RAO)
 10 references risk-based cleanup goals and target
 11 risk levels that are considered protective of
 12 human health under current and reasonably
 13 anticipated future use scenarios. The RAO for
 14 this remedy is to prevent National Guard
 15 Trainee exposure to contaminants in soil and
 16 dry sediment that exceed risk-based cleanup
 17 goals to a depth of 4 ft BGS.

18
 19 Soil/dry sediment to be cleaned up under this
 20 Proposed Plan extend to a maximum depth of
 21 4 ft BGS because future land use will not
 22 require disturbance of soil below that depth.
 23 Table 2 presents the cleanup goals. The
 24 cleanup goal for manganese is the background
 25 concentration of this metal.

26
 27 **Table 2. COCs and Cleanup Goals for a National**
 28 **Guard Trainee for Soil or Dry Sediment at FBQ^a**

COC ^b	Cleanup Goal (mg/kg)
Manganese	1,950

^aSediment from the ditch.
^bTotal 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.

29 **7.0 SUMMARY OF FEASIBILITY**
 30 **STUDY ALTERNATIVES**

31
 32 The following general response actions
 33 (GRAs) were considered in the FS for
 34 remediation of contaminated dry sediment in
 35 the drainage ditch at FBQ:

- 36
 37 • No action,
 38 • Limited action, and
 39 • Excavation and off-site disposal.

40
 41 The technologies screened under each GRA
 42 were selected for their ability to remove or
 43 reduce contaminants in dry sediment. Because
 44 dry sediment contains chemical contamination
 45 above the cleanup goals, the technologies were
 46 evaluated for their applicability to remove or
 47 reduce contaminants in the shortest timeframe.
 48 Technologies selected under these GRAs were
 49 combined into the following four alternatives
 50 for detailed analysis. Costs are estimated for
 51 each alternative.

52
 53 **7.1 Feasibility Study Alternative 1 – No**
 54 **Action**

55
 56 *Cost: \$0*

57
 58 This remedial alternative provides no further
 59 remedial action and is required under NCP as a
 60 baseline for comparison with other remedial
 61 alternatives. Under this alternative, there is no
 62 reduction in toxicity, mobility, or volume of
 63 contaminated soil and dry sediment. Access
 64 restrictions and environmental monitoring
 65 would be discontinued. The site would have no
 66 legal, physical, or administrative land use
 67 controls. Environmental monitoring would not
 68 be performed. Five-year reviews would not be
 69 conducted in accordance with CERCLA 121(c).

70
 71 **7.2 Feasibility Study Alternative 2 –**
 72 **Limited Action**

73
 74 *Estimated Implementation Cost: \$18,392*
 75 *30-year O&M Cost: \$141,669*
 76 *Total Cost: \$160,061*

77
 78 This remedial alternative involves the
 79 implementation of land use controls and

1 periodic monitoring (i.e., CERCLA 5-year
2 reviews) to detect any changes in the nature or
3 extent of contamination at the AOC and to
4 deter unauthorized access and protect human
5 receptors. Five-year reviews would be
6 conducted in accordance with CERCLA
7 121(c). The remedial alternative includes an
8 operations and maintenance (O&M) period to
9 detect any changes in nature and extent of
10 contamination at the AOC.

11
12 **7.3 Feasibility Study Alternative 3 –**
13 **Excavation of Soil/Dry Sediment with**
14 **Off-Site Disposal, National Guard Trainee**
15 **Land Use**

16
17 *Estimated Implementation Cost:* \$66,688
18 *30-year O&M Cost:* \$0
19 *Total Cost:* \$66,688

20
21 This remedial alternative involves the removal
22 and transportation of chemical contaminants in
23 dry sediment above National Guard Trainee
24 land use preliminary cleanup goals and
25 disposal off-site at a licensed disposal facility.
26 Approximately 68 yd³ of contaminated dry
27 sediment would be excavated from the
28 drainage ditch and transported to an off-site
29 disposal facility licensed and permitted to
30 accept these wastes. Confirmation sampling
31 would be conducted to ensure National Guard
32 Trainee land use preliminary cleanup goals
33 have been achieved. Areas successfully
34 remediated would be backfilled with clean soil
35 as appropriate. Alternative 3 does not include
36 land use controls, CERCLA 5-year reviews, or
37 O&M sampling, as residential land use
38 preliminary cleanup goals are attained through
39 remedial actions conducted under this remedial
40 alternative. However, land use controls to
41 address any issues with respect to munitions
42 and explosives of concern (MEC) may be
43 required and will be implemented by the
44 US Army and OHARNG.

45
46 **7.4 Feasibility Study Alternative 4 –**
47 **Excavation of Soil/Dry Sediment with**
48 **Off-Site Disposal, Resident Subsistence**
49 **Farmer Land Use**

50
51 *Estimated Implementation Cost:* \$61,650

52 *Environmental Monitoring Cost:* \$0
53 *Total Cost:* \$61,650

54
55 This remedial alternative involves the removal
56 and transportation of chemical contaminants in
57 dry sediment above Resident Subsistence
58 Farmer land use preliminary cleanup goals and
59 disposal off-site at a licensed disposal facility.
60 Approximately 37 yd³ of contaminated dry
61 sediment would be excavated from the
62 drainage ditch and transported to an off-site
63 disposal facility licensed and permitted to
64 accept these wastes. Confirmation sampling
65 would be conducted to ensure Resident
66 Subsistence Farmer land use preliminary
67 cleanup goals have been achieved. Areas
68 successfully remediated would be backfilled
69 with clean soil/dry sediment, as appropriate.
70 Alternative 4 does not include land use
71 controls, CERCLA 5-year reviews, or O&M
72 sampling, as residential land use preliminary
73 cleanup goals are attained through remedial
74 actions conducted under this remedial
75 alternative. However, land use controls to
76 address any issues with respect to MEC may
77 be required and will be implemented by the
78 US Army and OHARNG.

79
80 **8.0 EVALUATION OF FEASIBILITY**
81 **STUDY ALTERNATIVES**

82
83 The alternatives were evaluated with respect to
84 the nine comparative analysis criteria, as
85 outlined by CERCLA (Table 3). The nine
86 criteria are categorized into three groups:
87 threshold criteria, primary balancing criteria, and
88 modifying criteria. These criteria are as follows:

89
90 Threshold Criteria – must be met for the
91 alternative to be eligible for selection as a
92 remedial option.

- 93
94 1. Overall protection of human health
95 and the environment.
96 2. Compliance with applicable or
97 relevant and appropriate
98 requirements (ARARs).
99

100 Primary Balancing Criteria – used to
101 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, 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.

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

NCP Evaluation Criteria	Alternative 1: No Action	Alternative 2: Limited Action	Alternative 3: Excavation of Soil/Dry Sediment and Off-Site Disposal, National Guard Trainee Land Use	Alternative 4: Excavation of Soil/Dry Sediment and Off-Site Disposal, Resident Subsistence Farmer Land Use
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.

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 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 risk-based 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

1 reviews or an O&M period will not be required
2 because this alternative is also protective for
3 unrestricted land use. However, land use
4 controls to address any issues with respect to
5 MEC may be required and will be
6 implemented by the US Army and OHARNG.

8 10.0 COMMUNITY PARTICIPATION

10 10.1 Community Participation

11
12 Public participation is an important component
13 of remedy selection. The US Army and
14 Ohio EPA are soliciting input from the
15 community on the preferred alternative. The
16 comment period extends from **Month XX,**
17 **2006, to Month XX, 2007.** This period
18 includes a public meeting at which the
19 US Army will present the Proposed Plan as
20 agreed to by Ohio EPA. The US Army will
21 accept both oral and written comments at this
22 meeting.

24 10.2 Public Comment Period

25
26 The 30-day comment period is from
27 **Month XX, 2007 to Month XX, 2007,** and
28 provides an opportunity for public involvement
29 in the decision-making process for the
30 proposed action. All public comments will be
31 considered by the US Army and Ohio EPA
32 before selecting the final remedy. The public is
33 encouraged to review and comment on this
34 Proposed Plan. During the comment period,
35 the public is encouraged to review documents
36 pertinent to FBQ. This information is available
37 at the Information Repository and online at
38 www.rvaap.org. To obtain further information,
39 contact the RVAAP Facility Manager.

POINT OF CONTACT FOR WRITTEN COMMENTS

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

40 10.3 Written Comments

41
42 If the public would like to comment in writing
43 on the Proposed Plan or other relevant issues,
44 please deliver comments to the US Army at the
45 public meeting or mail written comments
46 (postmarked no later than **Month XX, 2007**).

48 10.4 Public Meeting

49
50 The US Army will hold an open house and
51 public meeting on this Proposed Plan on
52 **Month XX, 2007,** at **TIME,** in the
53 Newton Falls Community Center, 52 East
54 Quarry Street, Newton Falls, Ohio, 44444 to
55 accept comments. This meeting will provide an
56 opportunity for the public to comment on the
57 proposed action. Comments made at the
58 meeting will be transcribed.

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

59 10.5 US Army Review of Public Comments

60
61
62 The US Army will review the public's
63 comments as part of the process in reaching a
64 final decision on the most appropriate action to
65 be taken. A Responsiveness Summary, a
66 document that summarizes the US Army's
67 responses to comments received during the
68 public comment period, will be included in the
69 Record of Decision (ROD). The US Army's

1 final choice of action will be documented in
2 the ROD. The ROD will be added to the
3 RVAAP Administrative Record and
4 Information Repositories.

ADMINISTRATIVE RECORD FILE

RVAAP

Building 1037, Conference Room
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.

GLOSSARY OF TERMS

5
6
7
8 **Administrative Record:** a collection of
9 documents, typically reports and
10 correspondence, generated during site
11 investigation and remedial activities.
12 Information in the Administrative Record
13 represents the information used to select the
14 preferred alternative. It is available for public
15 review at RVAAP, Building 1037; call (330)
16 358-7311 for an appointment.

17
18 **Comprehensive Environmental Response,
19 Compensation, and Liability Act
20 (CERCLA):** a federal law passed in 1980,
21 commonly referred to as the Superfund
22 Program. It provides liability, compensation,
23 cleanup, and emergency response in
24 connection with the cleanup of inactive
25 hazardous substance release sites that endanger
26 public health or the environment.

27
28 **Contaminant of concern (COC):**
29 site-specific chemical substance that
30 potentially poses significant human health or
31 ecological risks. COCs are typically further
32 evaluated for remedial action.

33
34 **Ecological receptor:** a plant, animal, or
35 ecosystem that may be exposed to an adverse
36 condition.

37 **Exposure point concentration (EPC):** The
38 EPC is used in the human health and ecological
39 risk assessments to quantify exposures for all or
40 part of an area of concern (exposure unit). The
41 EPC is the smaller value between the maximum
42 detected concentration and the calculated 95%
43 upper confidence limit (UCL₉₅) of the average
44 concentration for the area.

45
46 **Feasibility study (FS):** a CERCLA document
47 that reviews and evaluates multiple remedial
48 technologies under consideration at a site. It
49 also identifies the preferred remedial action
50 alternative.

51
52 **Human receptor:** a hypothetical person, based
53 on current or potential future land use, who may
54 be exposed to an adverse condition. For
55 example, a National Guard Trainee is considered
56 the human receptor in this Proposed Plan.

57
58 **National Oil and Hazardous Substances
59 Pollution Contingency Plan (NCP):**
60 abbreviation for the National Oil and
61 Hazardous Substances Pollution Contingency
62 Plan. It is the set of regulations that implement
63 CERCLA and address responses to hazardous
64 substances and pollutants or contaminants.

65
66 **Record of Decision (ROD):** legal record
67 signed by the US Army and Ohio EPA. It
68 describes the cleanup action or remedy selected
69 for a site, the basis for selecting that remedy,
70 public comments, responses to comments, and
71 the estimated cost of the remedy.

72
73 **Remedial investigation (RI):** CERCLA
74 investigation that involves sampling
75 environmental media, such as air, soil, and water,
76 to determine the nature and extent of
77 contamination and to calculate human health and
78 environmental risks that result from the
79 contamination.

80
81 **Responsiveness summary:** a section of the
82 ROD where the US Army documents and
83 responds to written and oral comments received
84 from the public about the Proposed Plan.

85
86 **Risk assessment:** an evaluation that
87 determines potential harmful effects, or lack

1 thereof, posed to human health and the
2 environment due to exposure to chemicals
3 found at a CERCLA site.

4
5 **Weight-of-evidence:** a logical procedure for
6 identifying, organizing, and evaluating or
7 weighing various types, quantities, and
8 qualities of information about natural
9 resources, ecological risk from chemicals, and
10 likely consequences of any remediation on
11 those plants, animals, and ecological systems.

12 13 **REFERENCES**

14
15 Ohio EPA 2004. *Director's Final Findings*
16 *and Orders in the matter of US Army, Ravenna*
17 *Army Ammunition Plant*. June.

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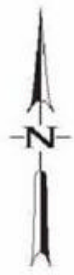
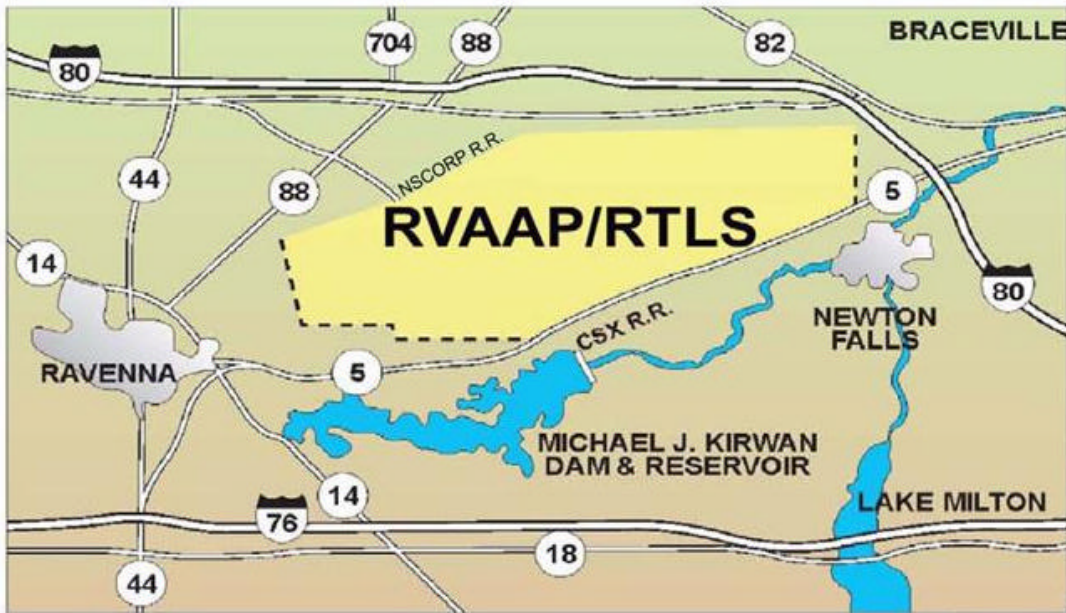
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25 USACE 1998. *Phase I Remedial Investigation*
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29 *Ohio, DACA-62-94-D-0029, Delivery Order*
30 *Nos. 0010 and 0022, Final, February.*

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33 *Investigation Report of the Fuze and Booster*
34 *Quarry Landfill/Pond (RVAAP-16) at the*
35 *Ravenna Army Ammunition Plant, Ravenna,*
36 *Ohio, GS-10F-0076J, Delivery Order*
37 *W912QR-05-F-0033, Final, November 2005.*

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40 *Water Quality Study 2003, Ravenna Army*
41 *Ammunition Plant. Part 1 - Streams and Part 2*
42 *- Ponds, USACE, Louisville District, with the*
43 *Ohio Environmental Protection Agency,*
44 *Division of Surface Water.*

45
46 USACE 2006. *Feasibility Study for Fuze and*
47 *Booster Quarry Landfill/Ponds (RVAAP-16),*
48 *Ravenna Army Ammunition Plant, Ravenna,*
49 *Ohio, Preliminary Draft, GS-10F-0076J,*
50 *Delivery Order W912QR-05-F-0033,*
51 *September.*

FIGURES



SCALE IN MILES
LOCATION MAP



(NOT TO SCALE)

Figure 1. General Location and Orientation of RVAAP/RTLS



Figure 2. RVAAP/RTLS Installation Map

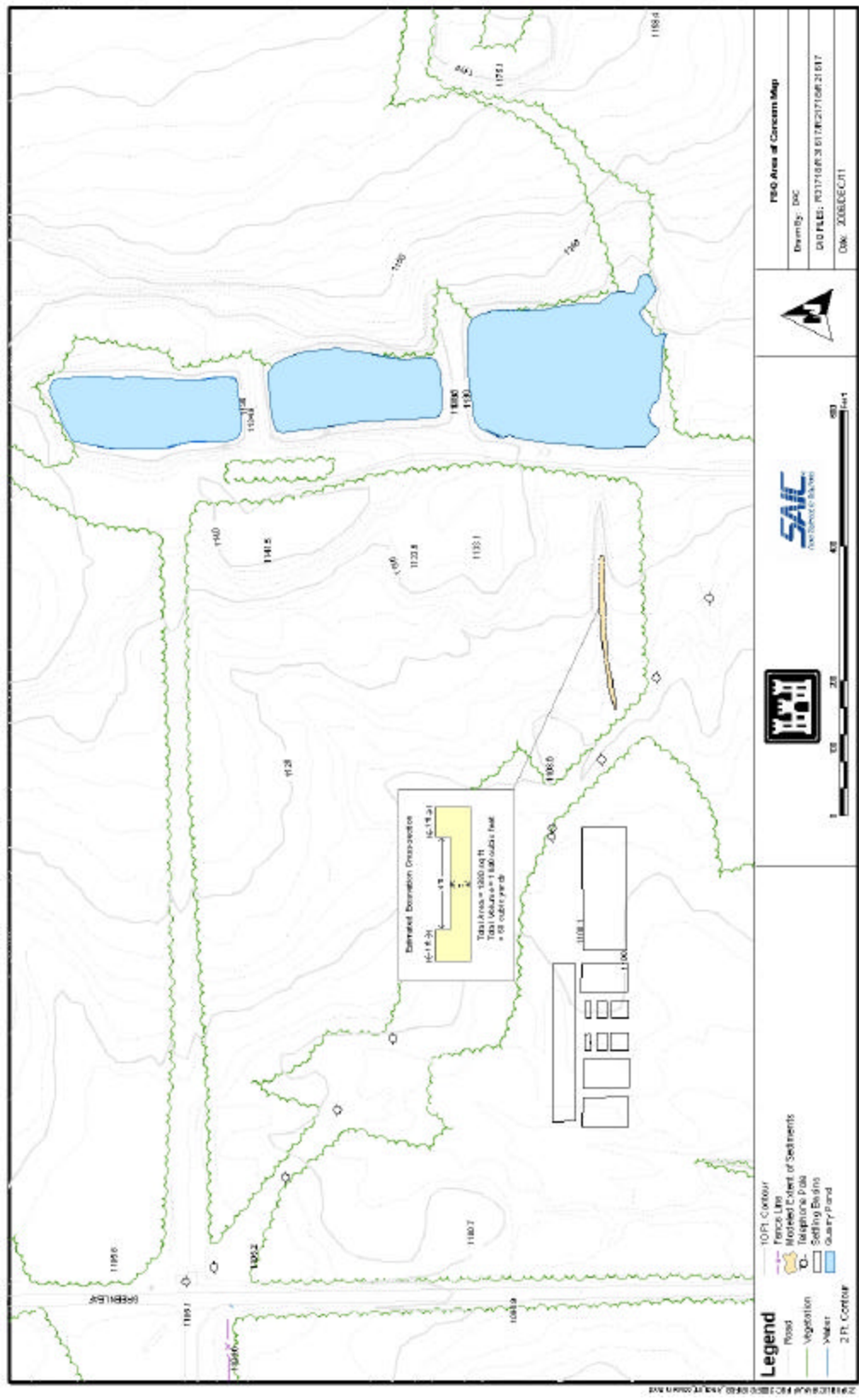


Figure 3. FBQ Area of Concern Map