CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Prudent Technologies, Incorporated (Prudent) has completed the Final Historical Records Review Report for 2010 Preliminary Assessment Compliance Restoration Sites CC RVAAP-78 and CC RVAAP-80 Group 2 Propellant Can Tops. 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.

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April 13, 2011

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Final Historical Records Review Report for 2010 Preliminary Assessment Compliance Restoration Sites CC RVAAP-78 Quarry Pond Surface Dump & CC RVAAP-80 Group 2 Propellant Can Tops

Ravenna Army Ammunition Plant

Ravenna, Ohio

Contract No. W912QR-10-P-0052

Prepared for:



US Army Corps of Engineers®

U.S. Army Corps of Engineers 600 Martin Luther King, Jr. Place Louisville, Kentucky 40202



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April 14, 2011

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EXECUTIVE SUMMARY

A Preliminary Assessment, generally following the U.S. EPA guidance for Abbreviated Preliminary Assessments, was conducted for Compliance Restoration Sites CC RVAAP-78 Quarry Pond Surface Dump and CC RVAAP-80 Group 2 P ropellant Can Tops at the Ravenna Army Ammunition Plant, Ravenna, Ohio. The main components of the Preliminary Assessment included a review of existing published information, interviews of people thought to be knowledgeable about the facility, site reconnaissance, and a review of historical aerial photographs related to the subject sites, CC RVAAP-78 and CC RVAAP-80, discussed herein. A past environmental hazard assessment indicated that there are potential surface soil releases of asbestos and possibly metals at the Quarry Pond Surface Dump and potential surface soil releases of propellants at the Group 2 Propellant Can Tops site. To better characterize potential environmental hazards, Prudent recommends conducting sampling and analyses of surface soils at the two sites.

TABLE OF CONTENTS

LIST	OF FIGURES	II
LIST	OF TABLES	II
LIST	OF APPENDICES	
1.0	INTRODUCTION	1-1
1.1	FACILITY DESCRIPTION	1-1
1.2	PURPOSE AND SCOPE	1-1
2.0	SITE DESCRIPTION	2-1
2.1	LOCATION	
2.2	SITE RECONNAISSANCE	
3.0	OPERATIONAL HISTORY	
3.1	SITE HISTORY SUMMARY	
3.2	PREVIOUS REPORTS AND SAMPLING AREAS	
3.3	PREVIOUS BIOLOGICAL REPORTS FROM THE OHARNG	
3.4	INTERVIEWS	
3.5	AERIAL PHOTOGRAPHIC INTERPRETATION	
4.0	ENVIRONMENTAL HAZARD ASSESSMENT	4-1
4.1	SOIL EXPOSURE AND AIR PATHWAY	4-1
4.2	GROUNDWATER PATHWAY	4-4
4.3	SURFACE WATER PATHWAY	4-5
5.0	CONCLUSIONS AND RECOMMENATIONS	5-1
5.1	CONCLUSIONS	
5.2	RECOMMENDATIONS	
6.0	REFERENCES	6-1

LIST OF FIGURES

Figure 1-1: RVAAP Location and General Facility Map	1-2
Figure 1-2: CC RVAAP-78 and CC RVAAP-80 Location Map	1-3
Figure 2-1: CC RVAAP-78 Quarry Pond Surface Dump Location Map	2-3
Figure 2-2: Quarry Pond Surface Dump Topographic Map	2-4
Figure 2-3: CC RVAAP-80 Group 2 Propellant Can Tops Location Map	2-5
Figure 2-4: Group 2 Propellant Can Tops Topographic Map	2-6
Figure 3-1: Potentially Contaminated Areas	3-3
Figure 3-2: Locations of Surface & Subsurface Samples	3-7
Figure 3-3: Locations of Monitoring Wells and Test Pits	3-8
Figure 3-4: Locations of Sediment Samples	3-9
Figure 3-5: Proposed Sampling Locations at FBQ	3-11
Figure 3-6: Approximate Locations of Propellant Can Tops	3-14
Figure 4-1: Soils Map for RVAAP CC-78	4-2
Figure 4-2: Soils Map for CC RVAAP-80	4-3
Figure 4-3: Geologic Cross-Section of Fuze and Booster Quarry Ponds	4-6

LIST OF TABLES

Table 2-1: Latitude/Longitude from RVAAP CC-78 Site Reconnaissance	2-1
Table 3-1: CC RVAAP-78 Phase I/II RI Groundwater Sampling Results	3-5
Table 3-2: CC RVAAP-78 Facility-Wide Groundwater Monitoring Sampling Results	3-6
Table 3-3: Detections of Explosives & Propellants	3-10
Table 3-4: Summary of Interviews	3-12
Table 3-5: Summary of Project Related Observations from Aerial Photographs	3-15

LIST OF APPENDICES

Appendix A - Site Reconnaissance Report	
Appendix B – Sensitive Habitats and Sensitive Species at CC RVAAP-78 and CC RVAAP-80	
Appendix C – Records of Interviews	
Appendix D – Aerial Photographs	
Appendix E – Comment Response Table	

ACRONYMS AND ABBREVIATIONS

ACM	Asbestos Containing Material		
AMATS	Akron Metropolitan Area Transportation Study		
AOC	Areas of Concern		
APA	Abbreviated Preliminary Assessment		
Camp Ravenna	Camp Ravenna Joint Military Training Center		
CERCLA	Comprehensive Environmental Response, Compensation and		
	Liability Act		
СО	Contracting Officer		
COPC	Chemical of Potential Concern		
COR	Contracting Officer's Representative		
CR	Compliance Restoration		
DOD	U.S. Department of Defense		
DQO	Data Quality Objectives		
EPA	Environmental Protection Agency		
FBQ	Fuze and Booster Quarry		
FS	Feasibility Study		
FSP	Field Sampling Plan		
FW	Facility-Wide		
HTRW	Hazardous Toxic and Radioactive Waste		
IDW	Investigative Derived Waste		
INRMP	Integrated Natural Resources Management Plan		
IRP	Installation Restoration Program		
ITR	Independent Technical Review		
MC	Munitions of Concern		
MEC	Munitions and explosives of concern		
MI	Multi-increment		
MMRP	Military Munitions Response Program		
NGB	National Guard Bureau		
PA	Preliminary Assessment		
PDF	Portable Document Format		
PM	Project Manager		
PMP	Project Management Plan		
OHARNG	Ohio Army National Guard		
РСВ	Polychlorinated Biphenyl		
Prudent	Prudent Technologies. Inc.		
ΟΑ/ΟC	Quality Assurance/Quality Control		
OCP	Quality Control Plan		
RCRA	Resource Conservation and Recovery Act		
RI	Remedial Investigation		
	Payanna Army Ammunition Dlant		
SOW	Statement of Work		
SCHD	Site Safety and Health Plan		
SVOC	Sanci Voletile Organic Compound		
	Trinitrotoluono		
	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		
USACE	U.S. AIMY CORPS OF Engineers		
USACHPPM	U.S. Army Center for Health Promotion & Preventive Medicine		
UXO	Unexploded ordnance		
VOC	Volatile Organic Compound		

1.0 INTRODUCTION

1.1 FACILITY DESCRIPTION

When the Ravenna Army Ammunition Plant (RVAAP) Installation Restoration Program (IRP) began in 1989, the RVAAP was identified as a 21,419-acre installation. The property boundary was resurveyed by the Ohio Army National Guard (OHARNG) over a two-year period (2002 and 2003) and the actual total acreage of the property was found to be 21,8683.289 acres. As of February 2006, a total of 20,403 acres of the former 21,683-acre RVAAP have been transferred to the U.S. Property and Fiscal Officer for Ohio and subsequently licensed to the OHARNG for use as a military training site. The current RVAAP consist of 1,280 acres scattered throughout the OHARNG Camp Ravenna Joint Military Training Center (Camp Ravenna). Camp Ravenna is located in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 kilometers (3 miles) east-northeast of the City of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the City of Newton Falls. The RVAAP portions of the property are solely located within Portage County. The Camp Ravenna/RVAAP is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (3.5 miles) wide. It is 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. Several communities surround Camp Ravenna: Windham on the north; Garrettsville 9.6 kilometers (6 miles) to the northwest; Newton Falls 1.6 kilometers (1 mile) to the southeast; Charlestown to the southwest; and Wayland 4.8 kilometers (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 and therefore references to the RVAAP in this document are considered to be inclusive of the historical extent of the RVAAP, which is inclusive of the combined acreages of the current Camp Ravenna and RVAAP, unless otherwise specifically stated. The property location is depicted in Figure 1-1.

1.2 PURPOSE AND SCOPE

Prudent Technologies Inc., (Prudent) was contracted by the United States Army Corps of Engineers (USACE) Louisville District to complete a Preliminary Assessment of the following Compliance Restoration (CR) sites at the Ravenna Army Ammunition Plant, Ravenna, Ohio, under Contract No. W912QR-10-P-0052:

- CC RVAAP-78, Quarry Pond Surface Dump
- CC RVAAP-80, Group 2 Propellant Can Tops

The objective of this project is to conduct a Preliminary Assessment of these two sites, to include a comprehensive background historical review and an initial intrusive investigation to confirm the presence or absence of contamination. The background historical review is intended to better identify the historic uses and potential environmental concerns at these locations with respect to possible Hazardous Toxic and Radioactive Waste (HTRW) and/or Military Munitions Response Program (MMRP) issues.

This report covers the background historical review and generally follows the guidance and requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Abbreviated Preliminary Assessment, U.S. Environmental Protection Agency (US EPA) Quick Reference Guidance



Figure 1-1: RVAAP Location and General Facility Map

Series - Improving Site Assessment: Abbreviated Preliminary Assessments, October 1999, (Publication 9375.2-09FS), and the US EPA publication, Guidance for Performing Preliminary Assessments Under CERCLA, September 1991, (Publication 9345.0-01A).

Environmental work at RVAAP under the IRP began in earnest in 1995, with 32 environmental areas of concern (AOCs). USACHPPM collected environmental samples at each of the AOCs and performed a Relative Risk Site Evaluation (RRSE), which prioritized each AOC into three groups: low, medium, and high priorities. Environmental restoration work has proceeded primarily by addressing the highest priority sites first. In 1998, the number of environmental AOCs was increased from 32 to 51. Again, relative risk rankings were performed to prioritize those additional environmental AOCs (USACHPPM 1998). Since 1998, new environmental areas of concern have been added. Two of these new sites, CR Sites: CC RVAAP-78 Quarry Pond Surface Dump and CC RVAAP 80 Group 2 Propellant Can Tops are discussed herein (Fig. 1-2). Both sites potentially have munitions and explosives of concern (MEC). The following section provides brief descriptions of the two sites.



2.0 SITE DESCRIPTION

2.1 LOCATION

CC RVAAP-78, Quarry Pond Surface Dump – The Quarry Pond Surface Dump is located in the western part of the Installation, east of the intersection between South Patrol Road and Greenleaf Road. The site consists of areas of former dumping at the bases of steeply inclined rock slopes. The surface dumps, referenced as Debris Piles A, B, and C on Figures 2-1 and 2-2, are located north, northwest and northeast of the northern-most quarry pond within the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) AOC. Initially, CC RVAAP-78 consisted of Debris Pile A, a 55-gallon metal drum (contents unknown) and former burn pile. Debris Pile A was thought to be approximately 8,750 square feet (250 by 35 feet) and to have an average thickness of about five feet. Debris Pile A is suspected to contain asbestos-containing materials (ACM), construction debris, scrap metal, and unidentified materials. The former burn pile is located near the 55-gallon drum, both of which are within Debris Pile B. The former burn pile location is characterized by ground charring and lack of vegetation. Table 2-1 lists GPS (Global Positioning System) Ohio State Plane coordinates of locations where observations were made during site reconnaissance, monitoring wells and 55-gallon drums (Table 2-1 can also be found in Appendix A). Debris Pile C was initially unidentified until site reconnaissance discovered a second 55-gallon drum and debris area.

CC RVAAP-80, Group 2 Propellant Can Tops – This AOC is located south of Smalley Road and north of Remalia Road at the former Group 2 Ammunition Storage Area (Figures 2-3 and 2-4). Propellant can tops were identified on the ground surface at the southern end of the site by members of the OHARNG in the fall of 2008. The propellant can tops were encountered in the vegetated area located immediately south of the ammunition storage magazines in the vicinity of the former railroad spur lines. This area consists of approximately 539,572 square feet (12.4 acres).

Reference #	Latitude	Longitude			
CC-78 GPS Points					
1	41.1796	-81.1128			
2	41.1794	-80.1128			
3	41.1792	-81.1128			
4	41.1797	-81.1129			
6	41.1799	-81.1131			
8	41.1801	-81.1124			
10	41.1797	-81.1121			
5a	41.1797	-81.1137			
5b	41.1798	-81.1134			
7a	41.1801	-81.1129			
7b	41.1801	-81.1123			
9a	41.1800	-81.1124			
9b	41.1795	-81.1126			
Ground Water M	Monitoring V	Wells FBQ			
171	41.1796	-81.1138			
173	41.1803	-81.1124			
174	41.1793	-81.1130			
175	41.1789	-81.1130			
55-Gallon Drum					
55-Gallon Drum 1	41.1796	-81.1136			
55-Gallon Drum 2	41.1796	-81.1128			

2.2 SITE RECONNAISSANCE

Tomas Hernandez, Jr. and John P. Jent, with Prudent Technologies Inc., along with an unexploded ordinance (UXO) Technician III, Paul Duncan of Pika International, conducted a site reconnaissance on November 11, 2010. Both sites (CC RVAAP-78 and CC RVAAP-80) were visited. Appendix A has a detailed description of the observations and comments noted during the site reconnaissance along with a photo location map detailing the areas observed and a photograph log.

On November 18, 2010, Don Trochhio of Vista Sciences Corporation, John P. Jent and Paul Duncan returned to the Quarry Pond Surface Dump site. Mr. Trochhio used GPS to establish Ohio State Plane Coordinates of locations determined during the November 11, 2010 site reconnaissance (Table 2-1). GPS coordinates were not taken for CC RVAAP-80.

2.2.1 CC RVAAP-78, Quarry Pond Surface Dump

This site consists of former dumping areas at the bases of two steeply inclined rock slopes. These surface dumps are located north, northeast and northwest of the northern-most quarry pond within the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) AOC. Initially, the Quarry Pond Surface Dump was thought to be at the base of one essentially continuous, steeply inclined, rock slope, with a west-east portion and an intersecting north-south portion. This area is denoted as Debris Pile A on Figure 2-1 and 2-2. During the site visit, this area appeared to be approximately 425 feet long and 18 to 68 feet wide, which is greater than the initial estimate. Approximately 80 feet northeast of Debris Pile A is a piece of half-inch diameter metal tie bar embedded into a tree and extending downward into the ground. The tie bar is embedded into the tree approximately two feet above ground surface (See Appendix A, photo 11). A second, smaller debris pile at the base of a steeply inclined rock slope was noted during the site reconnaissance. This area is denoted as Debris Pile B (Figure 2-1 and 2-2) and is approximately 296 feet long by 24 feet wide. The topographic map of this area, Figure 2-2, shows that the south end of the steeply inclined rock slope associated with Debris Pile B blends into the steeply inclined rock slope at the south end of Debris Pile A.

One 55-gallon metal drum and the former burn pile are located within Debris Pile B. The contents of the 55-gallon drum are unknown. In addition, the drum appears to be rusted and the contents solidified with numerous holes on the surface. The former burn pile, along the northeastern portion of the surface dump, is characterized by ground charring with little or no vegetation and with small wire rings on the surface. The UXO Technician, Mr. Duncan, could not determine what the rings were or if the rings were ordnance related. The former burn pile area is approximately circular in shape with a diameter of about seven feet and is 15 feet southwest of the rusted 55-gallon drum.

One additional area, previously unknown, was observed during the site reconnaissance and is indicated as Debris Pile C (Figure 2-1 and 2-2). Debris Pile C was observed along the northwestern corner of the northern-most quarry pond area with the debris area being approximately 120 feet by 45 feet. A rusted 55-gallon drum was observed within this area as well. This area represents an extension of the anticipated AOC boundary.

2.2.2 CC RVAAP-80, Group 2 Propellant Can Tops

On the day of inspection, this area had extremely dense vegetation cover limiting observation of the ground surface. However, one propellant can top was observed. A hardstand area east of the easternmost line of magazines within Group 2 was noted, as mentioned in several of the interviews performed for this project. However, propellant can tops were not observed within the hardstand area. The hardstand area is outside the current project boundary.

Figure 2-1: CC RVAAP-78 Quarry Pond Surface Dump Location Map



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Figure 2-2: Quarry Pond Surface Dump Topographic Map

Figure 2-3: CC RVAAP-80 Group 2 Propellant Can Tops Location Map



Contract No. W912QR-10-P-0052

Figure 2-4: Group 2 Propellant Can Tops Topographic Map



Contract No. W912QR-10-P-0052

3.0 OPERATIONAL HISTORY

3.1 SITE HISTORY SUMMARY

Operational history of CC RVAAP-78 and CC RVAAP-80 was obtained through a variety of sources to include, but not limited to, interviews of former and current RVAAP personnel, review of historical aerial photographs, construction drawings, and reports from contractors obtained from the RVAAP and the OHARNG repositories.

CC RVAAP-78, Quarry Pond Surface Dump – The Quarry Pond Surface Dump consists of former dumping areas at the bases of two steeply inclined rock slopes and another dump area northwest of the northern-most pond. The surface dumps are located north, northwest and northeast of the northern-most quarry pond within the Fuze and Booster Quarry Landfill/Pond (RVAAP-16) AOC. The Fuze and Booster Quarry (FBQ) was used as an explosive contaminated sawdust burning area for Load Lines 6 and 11 from 1945-1949. In 1976, settling ponds were constructed, separated by earthen dams, with flow control gates for treating the spent brine regenerant and sand filtration backwash water from the Water Works 3 treatment plant that treated groundwater from facility production wells (1976-1993). Historical operational information indicated fuze and booster assemblies, projectiles, residual ash, and sanitary wastes were burned or dumped in the quarry prior to pond construction. In 1976, debris was removed from the quarry bottom and transferred to the Ramsdell Quarry Landfill or one of the other burning grounds. In 1998, the RVAAP-16 AOC was expanded to include the quarry vicinity, the 11 former settling ponds/depressions and drainage conveyances, and a debris pile north of the quarry.

An aerial photograph from 1952 shows CC RVAAP-78 being used as a dump and possibly a burning ground. Aerial photographs from 1966, 1979, and 1981 show less vegetation in the area northeast of the northern-most pond than what was observed during the site reconnaissance (see Appendix D Aerial Photos for CC RVAAP-78).

CC RVAAP-80, Group 2 Propellant Can Tops – Six interviewees remembered inert materials being stored outside the magazines within the Group 2 area. One interviewee specifically remembered empty propellant cans being stored in this area (see Appendix C- Records of Interviews). An aerial photograph from 1951 shows outdoor storage of materials on the east side of the west line of magazines, on the east side of the east line of magazines, and adjacent to both sides of the middle railroad track spur at the south end of Group 2 (see Appendix D Aerial Photos for CC RVAAP-80).

3.2 PREVIOUS REPORTS AND SAMPLING AREAS

Excerpts and figures from historical reports and construction documents reviewed during the RVAAP site visit in November 2010 are summarized below. The documents reviewed contain pertinent historical information relating to CC RVAAP-78 and CC RVAAP-80. Direct quotes from documents are italicized. Use of materials from previous reports and sampling areas is limited to their impact on the two new AOCs.

3.2.1 New Water Supply & Treatment Facilities Surface Water Treatment Plant Sludge Disposal Lagoons Site Plan – Sheet SW-52, December 1975

CC RVAAP-78 Quarry Pond Surface Dump - The reference notes from the construction drawing below provide justification for the removal of debris, sludge, and other miscellaneous materials from the bottom of the quarry during the construction of dams for the new water supply and treatment facilities (Water Works #4).

Below are notes from the above referenced site plan.

- *1 ENTIRE SLUDGE DISPOSAL LAGOON AREA IS COVERED WITH BRUSH AND SAPLINGS. LOW AREAS COVERED WITH STANDING WATER.*
- 2 CLEAR OF BRUSH, TREES, AND DEBRIS.
 - a. SLUDGE LAGOON No. 1 TO EL. = 1,127.5
 - b. SLUDGE LAGOON No. 2 TO EL. = 1,132.5
 - c. SLUDGE LAGOON No. 3 TO EL. = 1,135.0
- *3* FOR LEGEND, SEE SHEET No. SW-51.
- 4 EXCAVATE THE EXISTING GROUND BENEATH THE DIKES DOWN TO STABLE SOIL OR ROCK.
- 5 SEE SPECIFICATIONS FOR DRILLING LOGS.
- 6 THE SLUDGE DISPOSAL LAGOON AREA IS AN OLD QUARRY SITE. BEDROCK IS OUTCROPPING ON THE PERIPHERY AND THE SLOPES OF THE SITE.
- 7 THE QUARRY HAS BEEN USED AS A DUMPING AND BURNING AREA AND DEBRIS IS COVERING A MAJORITY OF THE SLUDGE LAGOON AREAS.
- 8 ALL DISTURBED AREAS AND THE TOPS AND SLOPES OF THE DIKES SHALL BE TOPSOILED AND SEEDED.

3.2.2 Installation Assessment of RVAAP, Report No. 132 (U.S. Army November 1978)

The following was excerpted from page 31 of the assessment report. Figure 6 - Potentially Contaminated Areas, was also extracted from the assessment report and is provided as Figure 3-1 herein.

Since 1942, millions of pounds of waste have been destroyed at the burning grounds. There are three areas where wastes could have been burned, and two areas where demolition activities occurred. The first is Track 49, or the Erie Burning Grounds (3), located north of Area 7. It was used during World War II for the destruction of TNT and propellant. Next, north of Load Line 8, are the Fuze and Booster Burning Pits (4), named such because of their proximity to the fuze and booster load lines, and not because they were exclusively used for the destruction of fuzes and boosters. This area was active between 1945–1948. The third and present (sic) burning area is the Winklepeck Burning Grounds (5) dating from about 1948. The first Demolition Area (1) was used between 1945–1949 and was located west of Greenleaf Road and south of South Patrol Road. Since then, the area northwest of Load Line 11 just across Newton Falls Road (2) has been the current demolition grounds. All burning and demolition areas were used extensively not only for production wastes, but also for many demilitarization operations that have occurred at RVAAP. Although specific dates have been given, use of all the disposal areas actually overlaps, especially immediately after World War II when large quantities of returning munitions had to be destroyed. Furthermore, some burning took place at demolition grounds, but no demolition activities occurred at burning areas.

In addition to explosive waste, sanitary wastes from family housing, offices, and the hospital were routinely disposed of by burning. Pit (4) in the northwest part of the burning grounds was used for this purpose. A wire cage to protect the paper and ash from winds surrounded the pit. Since the practice of open burning has not been allowed for the past few years, the installation has taken to landfilling this waste at Ramsdell Quarry (7) in an EPA approved manner.

Note that Pit (4) in Figure 3-1 is the former Fuze and Booster Quarry.

Figure 3-1: Potentially Contaminated Areas

Figure 6 of the Installation Assessment of RVAAP, Report No. 132, November 1978

- 1. Demolition Area (Old)
- 2. Demolition Area (New)
- 3. Burning Grounds (TRK 49)
- 4. Burning Grounds (Fuze & Booster)
- 5. Burning Grounds (Winklepeck)
- 6. Landfill (Old)
- 7. Landfill (New) Ramsdell Q
- 8. Test Sites (40mm)
- 9. Test Sites (Firestone's 4 cubicles)
- 10. Test Sites (Firestone's Demolition Area Range) Test Sites (FBI Demolition Area Range)
- 11. Test Sites (Pistol Range)
- 12. Test Sites (Bldg. F-15)
- 13. Test Sites (Sectionalizing Area 1200)
- 14. Test Sites (14.5mm Range, Nat'l Guard)
- 15. Lead Azide Igloos

Reserve Training Areas A, B, C, D, E, F, G



1 2

3.2.3 Preliminary Assessment for the Characterization of Areas of Contamination, RVAAP, Ravenna, Ohio, February 1996 (SAIC 1996)

Taken from paragraph 4.1.16, "Fuze and Booster Quarry Landfills/Ponds Site Description and History"

This site consists of three elongate ponds situated end to end in an abandoned rock quarry. The ponds are 4.6 to 6 meter (15 to 20 feet) deep and separated by earthen berms. The total combined area of the three ponds is approximately .4 hectares (1 acre). Originally, the quarry site was used as an open burning area for sawdust waste potentially derived from Load Lines 6 and 11 during the period 1945 to 1949. The site was also used as a landfill, where spent brine regenerant and sand filtration backwash from the groundwater treatment plant, fuze and booster assemblies, projectiles, residual ash, and sanitary waste have all been disposed. In 1976, the existing debris was removed from the quarry bottom and transferred to either RVAAP-01 (Ramsdell Quarry) or one of the burning grounds (Jacobs Engineering 1989). Historical records do not indicate the absence or presence of regulatory oversight during the transfer of material. The ponds were originally constructed to receive filter backwash from the potable water system (groundwater pumped from a well and treated at Water Works 3) (sic). Outputs averaged 11,400 to 19,000 liters (3,000 to 5,000 gallons) per day and was permitted by Ohio NPDES Permit #3100000BD (U.S. Army Environmental Hygiene Agency 1988). The ponds were operational from 1987 to 1993 (sic).

3.2.4 Phase I/Phase II RI of the Fuze and Booster Quarry, Landfill/Ponds (RVAAP-16), November 2005 (RI) (SAIC 2005)

A – General Description of the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16): Extracted from Paragraph 1.5 of the Phase I/II RI (SAIC 2005)

The FBQ AOC operated from 1945 through 1993. Prior to 1976, the quarry was reportedly used for open burning and as a landfill. The resultant debris from the burning and from the landfill operation was reported to have been removed during construction of the ponds. From 1976 through 1993, spent brine regenerate and sand filtration backwash water from one of the RVAAP drinking water treatment plants was discharged into the ponds... In 1998, this AOC was expanded to include three other shallow settling ponds and two debris piles bringing the AOC to approximately 45 acres in size. Based on the operational history of FBQ, waste constituents and potential contaminants at this AOC include explosive compounds; propellants; and inorganics.

B – Soils Description and Analytical Results: Extracted from Paragraph 2.3.1.1 of the Phase I/II RI (SAIC 2005)

4th Subparagraph

At depths beginning at about 0.1 m (.33 ft), based on soil sampling, test pit, and boring data, unconsolidated deposits consist primarily of a brown to yellowish-brown silty clay to clayey silt.

Figures 3-2 and 3-3 are SpecPro/SAIC figures provided herein as a reference to the surface and subsurface soil locations and monitoring well and test pit locations.

The boring log for test pit FBQ 182 notes 6 inches of dark olive brown topsoil over 6 inches of light brown silty clay. The boring log for test pit FBQ 183 similarly notes 12 inches of topsoil over dark yellowish brown silty clay. Similarly, the boring logs for most of the borings immediately above the plane at the base of the rock slope note yellowish brown or olive brown clays, some with topsoil or organic materials. Of the boring logs for borings FBQ 037, FBQ 038, FBQ 041, FBQ 042, FBQ 043,

FBQ 045, FBQ 046, FBQ 047 situated at the base of the rock slope, borings FBQ 037, FBQ 045, and FBQ 046 note medium brown clays. Also, glass is noted at boring FBQ 043 indicating possible different materials from those above the rock slope.

Analytical results of surface soil samples from the borings within the flat area just northeast of the northern-most pond and location FBQss-044 adjacent to the northwest side of the northern-most pond show relatively consistent elevated detections of the propellant nitrocellulose and the metals antimony, beryllium, cadmium, lead, magnesium, mercury, and zinc, similar to those of the sediment within the three ponds.

C - Sediment Description: Extracted from Paragraph 4.5 of the Phase I/II RI (SAIC 2005)

See Figure 3-4, Locations of Sediment Samples taken from the above-referenced RI.

Analytical results of surface soil samples from the borings within the flat area just northeast of the northern-most pond and location FBQss-044 adjacent to the northwest side of the northern-most pond show relatively consistent elevated detections of the propellant nitrocellulose and the metals antimony, beryllium, cadmium, lead, magnesium, mercury, and zinc, similar to those of the sediment within the three ponds.

D – Description of Groundwater: Extracted from Paragraph 4.7 of the Phase I/II RI (SAIC 2005)

Analytical results of groundwater from the four groundwater monitoring wells (FBQmw-171, FBQmw-173, FBQmw-174, and FBQmw-175) adjacent to the flat area just northeast of the northern-most showed no detections of metals above background at FBQmw-171 and FBQmw-174. There was a detection of cobalt, above background at FBQmw-175 and seven detections of other metals (aluminum, cobalt, copper, iron, lead, manganese, and nickel) above background at FBQmw-173. Explosives were detected at the four groundwater monitoring wells as detailed in Table 3-1.

Monitoring Wells	Explosive Type	mg/L
FBQmw-171	Nitocellulose	0.31
FBQmw-173	2,4,6-Trinitrotoluene	0.0019
	2-Amino-4, 6-dinitrotoluene	0.0029
	4-Amino-2, 6-dinitrotoluene	0.0027
	Nitrobenzene	0.00017
	Nitrocellulose	0.28
FBQmw-174	2,4,6-Trinitrotoluene	0.018
	2,4-Dinotrotoluene	0.00031
	2-Amino-4, 6-dinitrotoluene	0.028
	4-Amino-2, 6-dinitrotoluene	0.028
	Nitrocellulose	0.18
FBQmw-175	Nitrocellulose	0.32

3.2.5 Facility-Wide Groundwater Monitoring Program

Table 3-2 details the results of groundwater sampling that was conducted at the groundwater monitoring wells near the CC RVAAP-78 Quarry Pond Surface Dump as part of the Facility-Wide Groundwater Monitoring Program.

GW Monitoring Well	*NG Trainee	Nov 2003	Apr 2008	Jul 2008	Oct 2008	Jan 2009
Constituent	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
FBQmw-171	· · ·					
2,4,6-TNT	0.164	U	U	U	U	0.000052 J
2,4-DNT	0.0129	U	U	U	U	U
2,6-DNT	0.0131	NT	0.000052 J	U	U	U
2-Amino-4,6,DNT	0.0655	U	U	U	U	U
4-Amino-2,6-DNT	0.0655	U	U	U	U	U
Nitrobenzene	0.164	U	U	U	U	U
Nitrocellulose	None	0.31	U	U	U	U
HMX		NT	NT	NT	0.00057	U
FBQmw-173						
2,4,6-TNT	0.164	0.0019	0.00009 J	0.00008 J	0.000085 J	U
2,4-DNT	0.0129	U	U	U	U	U
2-Amino-4,6,DNT	0.0655	0.0029	0.00031	0.00013	U	U
4-Amino-2,6-DNT	0.0655	0.0027	0.00039	U	0.00016	U
Nitrobenzene	0.164	0.00017 J	U	U	0.000073 JB	U
Nitrocellulose	None	0.28	U	U	0.0005 UJ	0.0005 UJ
HMX		NT	NT	NT	U	U
FBQmw-174						
2,4,6-TNT	0.164	0.018	0.062	0.012 J	0.027 J	0.049
2,4-DNT	0.0129	0.00031	U	0.0.0004 J	0.00052 UJ	U
2-Amino-4,6,DNT	0.0655	0.028	0.021	0.021 J	0.027 J	0.028
4-Amino-2,6-DNT	0.0655	0.028 J	0.021	0.023 J	0.030 J	0.030
Nitrobenzene	0.164	U	U	U	0.00052 UJ	U
Nitrocellulose	None	0.18	U	U	0.0005 UJ	U
HMX		NT	NT	NT	U	0.00023 J
FBQmw-175						
2,4,6-TNT	0.164	U	U	U	U	U
2,4-DNT	0.0129	U	U	U	U	U
2-Amino-4,6,DNT	0.0655	U	U	U	U	U
4-Amino-2,6-DNT	0.0655	U	U	U	U	U
Nitrobenzene	0.164	U	U	U	U	U
Nitrocellulose	None	0.32	U	U	0.0005 UJ	U
HMX		NT	NT	NT	0.0002 J	U
1,3,5-Trinitrobenzene		NT	NT	NT	NT	0.000056 J

 Table 3-2: CC RVAAP-78 Facility-Wide Groundwater Monitoring Sampling Results

U = Non-detect

J = Estimated

B = Constituent is detected in the blank as well as the sample

NT = Not tested

^{*}Final Facility-Wide Human Health Cleanup Goals for the Ravenna Army Ammunition Plant Ravenna, Ohio, March 23, 2010 SAIC

Figure 3-2: Locations of Surface & Subsurface Samples Figure 3.1 of the Phase I/Phase II RI of the Fuze and Booster Quarry, Landfill/Ponds RVAAP-16, November 2005 (RI)



Figure 3-3: Locations of Monitoring Wells and Test Pits Figure 3.2 of the Phase I/Phase II RI of the Fuze and Booster Quarry, Landfill/Ponds (RVAAP-16), November 2005 (RI)



PRUDENT TECHNOLOGIES, INC.

Figure 3-4: Locations of Sediment Samples Figure 3.3 of the Phase I/Phase II RI of the Fuze and Booster Quarry, Landfill/Ponds RVAAP-16, November 2005 (RI)



	Discrete Sediments and Surface Water Sampling				
	Drawn By: gharris				
	CAD Files: R31718/R31617/R21718/R21617				
	Date: January 22, 2005				

3.2.6 Final SAP Addendum No. 1 for the Supplemental Phase II Remedial Investigations of Open Demolition Area #2 (RVAAP-02), Fuze and Booster Quarry Landfill/Ponds (RVAAP-16), and Central Burn Pits (RVAAP-49), November 2005 (SAIC 2005)

Taken from paragraph 3.2.1.1, "Nature and Extent at FBQ"

The objective of this Supplemental Phase II sampling at FBQ is to define the nature and extent of explosive and inorganic compounds detected during the previous Phase I/Phase II RI in the upper northeast corner and southern portion of FBQ. The detections of explosives that have not been bounded reside in the upper northeast corner or southern end of FBQ.

Field Sampling Plan (FSP) Addendum 4-1 Proposed Sampling Locations at FBQ are provided here for reference as Figure 3-5. Note the high density of boring locations with explosive detections between the northeast side of the northern-most pond and the rock slopes to the north and east. Of the 12 surface soil boring locations in this area with detected explosives, six surface soil borings had detections over 1.0mg/kg.

Phase I/II RI Sample No.	Sample Depth (ft)	Constituent	Detection (mg/kg)
FBQ-032	0 – 1.9	Nitrocellulose	25
FBQ-041	0 - 0.5	2,4,6-Trinitrotoluene	1.6
FBQ-042	0 - 0.8	1,3,5- Trinitrotoluene	1.7
		2,6-Dinitrotoluene	1.3
		2-Amino-4,6-dinitrotoluene	12
		4-Amino-2,6-dinitrotoluene	9.7
FBQ-045	0-0.9	Nitrocellulose	28
FBQ-046	0 - 1.0	2,4,6-Trinitrotoluene	4.4
FBQ-052	0 - 0.7	2,4,6-Trinitrotoluene	2.4

Table 3-3: Detections of Explosives & Propellants >1 mg/kg in Surface Soil Samples in Northeast Portion of FBQ

It is worth noting that the location of boring FBQ-032 was north of the top of slope associated with Debris Pile A.

3.3 PREVIOUS BIOLOGICAL REPORTS FROM THE OHARNG

The reviewed information, including the Final Integrated Natural Resources Management Plan for RTLS (OHARNG 2008), indicates the Group 2 and Quarry Pond Surface Dump Sites do not currently house any federally recognized critical habitats or sensitive species. The following is a summary of findings from the Sensitive Habitat and Sensitive Species report in Appendix B.

There is no doubt that RVAAP is a unique and valuable habitat in both size and level of protection. There are substantial tracts of healthy, intact and sensitive habitats at RVAAP giving the site a heterogeneous mix of valuable and degraded land. It is not surprising that many taxa, including sensitive and listed taxa, can be found both on the site and in the area of RVAAP. This fact leads to the conclusion that RVAAP is a generally ecologically valuable habitat. In relation to the Group 2 and Quarry Pond Surface Dump sites in question in this report, while they bear no specific qualities that make them particularly more valuable than other sites within RVAAP, they do contribute to the overall health of the area. In conclusion, the mere fact that they are part of such a valuable habitat gives them inherent ecological worth. However, due to the lack of direct use by listed species, lack of obvious signs of sensitive or critical habitat features, and past land use practices, Group 2 and the Quarry Pond Surface Dump sites do not merit an extra level of protection than any other site on RVAAP.

Figure 3-5: Proposed Sampling Locations at FBQ Final Sampling and Analysis Plan Addendum No. 1 for the Supplemental Phase II Remedial Investigations November 2005



3.4 INTERVIEWS

People familiar with past and present operations at RVAAP were interviewed. Transcripts of these interviews are provided in Appendix C.

A summary table of significant information obtained from these interviews is provided below.

Table 3-4: Summary of Interviews

Date	Name	Period			
of	of	Worked at	Significant Comments		
Interview	Interviewee	RVAAP			
	Jim McGee	1964 - Present	CC RVAAP-78 Quarry Pond Surface Dump Transite was routinely dumped in the Fuze & Booster (F & B) Quarry for many years Other inert, non-organic materials were also dumped at the F & B Quarry When the dams were built in the 1970's, the materials at the quarry bottom were excavated and the		
8-Nov-2010			Never saw any burning in the F & B Quarry CC RVAAP-80 Group 2 Propellant Can Tops Materials, including brass ingots and propellant cans, were stored outside of the buildings Remembers specifically empty propellant cans being stored outside of the buildings Propellant cans had sides and bottoms of sheet metal, but the tops were made of cast iron Outdoor storage throughout the facility was common		
		Last several			
8-Nov-2010	John Eller	years at DLA Warren, OH	Mr. Eller says there is no information at the DLA Warren Office regarding either of these two new AOCs		
10-Nov-2010	Tom Chanda	1979 - 1993	CC RVAAP-78 Quarry Pond Surface Dump Word of mouth from other employees, the F & B Quarry had been used as a disposal area for the fuze and booster load lines Probably just donnage was taken there; explosive materials were taken to the Winklepeck Brng Grounds CC RVAAP-80 Group 2 Propellant Can Tops No explosive materials were ever stored in Group 2 Personnel who operated the magazines were within the stores and transportation department		
10 Nov 1010	Mark Patterson	1997 - Present	CC RVAAP-78 Quarry Pond Surface Dump Suggest historical aerial photographs will provide much useful information CC RVAAP-80 Group 2 Propellant Can Tops Suggest historical aerial photographs will provide much useful information		
11-Nov-2010	Larry Boggs	1965 - 1998	CC RVAAP-78 Quarry Pond Surface Dump Believes demolition debris from the 1960's renovation of LL-7 to produce 40-mm munitions was taken to the F & B Quarry CC RVAAP-80 Group 2 Propellant Can Tops Believes Class 2 materials were stored in the Group 2 magazines- mostly unfuzed 152mm and 155 mm projectiles Remembers propellant cans and tops being stored inside the Group 2 magazines Remembers propellant cans being made of galvanized steel with locking tops through which propellant materials could be placed into the cans Remembers pallets of 12 propellant cans being unstable, with some cans falling off the pallets		
12-Nov-2010	Gail Harris	2004 - Present	CC RVAAP-78 Quarry Pond Surface Dump Other sources of information are the local historical societies CC RVAAP-80 Group 2 Propellant Can Tops Other sources of information are the local historical societies		
12-Nov-2010	Tim Morgan	1988 - Present	CC RVAAP-78 Quarry Pond Surface Dump		

Date	Name	Period		
of	of	Worked at	Significant Comments	
Interview	Interviewee	RVAAP		
12-Nov-2010	Gary Wolfgang	1968 - 1993	CC RVAAP-78 Quarry Pond Surface Dump There was much written information for the vast majority of activities at the facility, including Standard Practice Manuals (SPM)s and Maintenance Manuals (MM)s There were copies of these materials at several places on the facility & possibly now at Army Materiel Command Does not remember transite being taken to the F & B Quarry Remembers municipal garbage being disposed at the F & B Quarry Does not remember any burning ever taking place at the F & B Quarry CC RVAAP-80 Group 2 Propellant Can Tops Remembers empty propellant cans being stored outside of the magazines in Group 2 Remembers the propellant cans being made of galvanized steel sides and bottom with a more rugged top through which nuggets or grains of propellants could be placed There was much outdoor storage at many areas at the facility	
23-Nov-2010	Susan McCauslin	1989 - 2003	CC RVAAP-78 Quarry Pond Surface Dump Had no significant information regarding the subject AOC CC RVAAP-80 Group 2 Propellant Can Tops Had no significant information regarding the subject AOC	
2-Dec-2010	LTC Tom Tadsen	1994 - 2006	CC_RVAAP-78_Quarry Pond Surface_Dump Has seen transite in the F & B_Quarry Landfill/Ponds AOC CC_RVAAP-80 Group 2 Propellant Can Tops When clearing brush in about 2004 observed propellant can tops around the foundations of buildings Remembers Frank Jackson saying he noted propellant can tops when he was clearing the railroad tracks in Group 2 when the railroad tracks were being removed in the 1990's	
2-Dec-2010	Ray McDaniel	1942 - 1984	CC RVAAP-78 Quarry Pond Surface Dump Doesn't remember transite being taken to the F & B Quarry When the F & B Quarry was cleaned out for the dams in the 1970's, he remembers inert materials at the south end being removed and sold for scrap Doesn't remember garbage ever being taken to the F & B Quarry Didn't do burning in the F & B Quarry but in Area 9 where the 40-mm range is now (Winklepeck) CC RVAAP-80 Group 2 Propellant Can Tops Doesn't remember ever seeing propellant canisters or tops there	
2-Dec-2010	Frank Jackson	1982 - Present	CC RVAAP-78 Quarry Pond Surface Dump Had no significant information regarding the subject AOC CC RVAAP-80 Group 2 Propellant Can Tops Mowed around the railroad tracks at the south end of Group 2 during removal of the tracks in the 1990's remembers seeing metal cannisters	
2-Dec-2010	Sgt 1st Class Rex Hufenbach	2000 - Present	CC RVAAP-78 Quarry Pond Surface Dump Had no significant information regarding the subject AOC CC RVAAP-80 Group 2 Propellant Can Tops In 2008, he and Tom Dougherty found several piles of propellant can tops at the south end of Group 2, he remembers there being a total of about 100 such tops in the piles He reported the tops to Tim Morgan who came to the site and then reviewed aerial photographs from the 1950's which showed outdoor storage of items that might have been propellant can tops	

Table 3-4: Summary of Interviews (Continued)

One of the interviewees mentioned that there were government-provided "Standard Operating Procedures" and "Standard Practice Manuals" developed for operating contractors that prescribed how operations and maintenance functions were to be done. He thought that copies of these manuals might have been forwarded to and maintained by the Rock Island Office of the Army Materiel Command. The current Joint Munitions Command Historian, Ms. Keri Pleasant, indicated that there are no Ravenna government "Standard Operating Procedures" or contractor "Standard Practice Manuals" at the Rock Island office.

Sgt. 1st Class Rex Hufenbach provided a figure showing the approximate locations of the propellant can tops as he remembered them. The locations are shown on Figure 3-6.



Figure 3-6: Approximate Locations of Propellant Can Tops

Extracted from Ohio Army National Guard "Tactical Training Based Site Development Plan"

3.5 AERIAL PHOTOGRAPHIC INTERPRETATION

Selected aerial photographs over many years that portray conditions at the two sites are provided in Appendix D.

A summary table of significant information from the reviewed aerial photography is provided below.

Date Flown	Company	Location of Hardcopy	CD Available	Significant Information
				CC RVAAP-78 Quarry Pond Surface Dump
				Appears to be two large areas within the quarry
			1	Appears to be fence or tree lines perpendicular to each other northeast of the quarry
				Possible West-East and North-South rock slopes that intersect each other northweast of the
			Yes	quarry
E/9/E1	Unknown	RTLS*		Two roads into the quarry, one West-East and one South-North, both pale indicating little
5/0/51				or no vegetation and much activity
				Much bare area directly west of the quarry
				CC RVAAP-80 Group 2 Propellant Can Tops
				Looks like open storage on east side of the east line of buildings
				Looks like open storage on east side of the west line of buildings
				Looks like open storage on west & east side of the middle railroad track at south end of Group 2
			No	CC RVAAP-78 Quarry Pond Surface Dump
				Looks like may have been road down the middle of the quarry in approximate N-S alignment
4/16/52	Unknown	1037		Looks like truck on west side of quarry, just north of the west-east road
.,,				Looks like another truck on road at north end
				Looks like many individual piles down in the quarry
				Limited vegetation northeast of quarry
				CC RVAAP-78 Quarry Pond Surface Dump
				Obvious road along east side of quarry, then turns sharply west just north of the north end
				of the quarry
	56 Unknown	Bldg		Much bare area over north and northeast end of quarry- much less tree cover than now
//1//66			Yes	Looks like one big open quarry, not separated as in 1951
				CC RVAAP-80 Group 2 Propellant Can Tops
				Much bare area on east side of east line of buildings, could be nardstand as some
				Interviewees remembered
				No materials appear to be stored outside of the buildings
				High altitude photograph - less detail than other aerial photographs
			Tif	Still relatively have area north and east of quarry
				West-east road has darker shade and thus looks less used than the south-north road to the
9/17/79	US Dept of Agriculture	RTLS		
				CC RVAAP-80 Group 2 Propellant Can Tons
				No materials appear to be stored outside the buildings
				Do not see any obvious hardstand areas anywhere within Group 2
				CC RVAAP-78 Quarry Pond Surface Dump
		Bidg 1037 & RTLS	No	See three ponds
				North pond has lighter shade- may be more shallow
				Appears to be road or line from east extending to the east side of the middle pond and then
11/10/81	Aerial Surveys, Inc			turning north along the east side of the north pond
				More vegetation northeast of north pond, but still not as dense as present
				CC RVAAP-80 Group 2 Propellant Can Tops
				Looks like hardstand areas east of the east line of buildings
				May be something stored on the east side of the middle track at the south end
	5 AMATS**	* RTLS*	Tif	CC RVAAP-78 Quarry Pond Surface Dump
				Three ponds all have similar darkness, although north pond looks slightly lighter
				Area northeast of north pond looks more vegetated than in past, but still less than current
3/26/85				CC RVAAP-80 Group 2 Propellant Can Tops
				Looks like hardstand area east of the east line of buildings
				Looks like the dark spots shown on the 11/10/81 photo east side of middle tract at south end
				may just be trees or large bushes.

Table 3-5: Summary of Project Related Observations from Aerial Photographs

*Ravenna Training and Logistics Site

**Akron Metropolitan Area Transportation Study

4.0 ENVIRONMENTAL HAZARD ASSESSMENT

4.1 SOIL EXPOSURE AND AIR PATHWAY

4.1.1 Physical Conditions

CC RVAAP-78 – The previous environmental work at the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) AOC provides much information about the soils adjacent to the debris pile areas. A soils map is provided as a reference from the U.S. Department of Agriculture Portage County Soil Survey (Figure 4-1). According to this figure, the soil within CC RVAAP-78 is defined as "pit, quarries" with possibly Mitiwanga Silt Loom in the eastern portion of Debris Pile A. At the very least, there are fill materials, including apparent transite, at the base of the steeply inclined rock slope, in Debris Pile A. Debris Piles B and C did not show evidence of transite materials. Based on the information developed for this assessment, it is possible that fill materials consisting of excavated materials from the former quarry bottom overlain by dredged sediment will be present between Debris Piles A and B. These excavated and dredged materials could have been placed there during construction of the two small dams used to create the three ponds. According to the historical information gathered in Section 3.2, shallow surface soil borings within the area of possible fill deposited during construction of the dams provides limited information on those materials.

CC RVAAP-80 – Preliminary information obtained from the U.S Department of Agriculture Portage County Soil Survey indicates that this area has surface soils comprised of three soil series: Mahoning Series, Chili Series, and Trumbull Series (Figure 4-2).

- Mahoning Series (MgB) consists of deep, poorly drained soils formed in till on till plains.
- Chili Series (CpB) consists of very deep, well drained soils on outwash plains, terraces, kames, and beach ridges.
- Trumbull Series (TrA) consists of deep, poorly drained soils formed in low-lime glacial till. These soils have slow to very slow permeability.

4.1.2 Potential Soil and Air Pathways

CC RVAAP-78 – Currently, soil and air targets, as described in the Abbreviated Preliminary Assessment Guidance, at CC RVAAP-78 are limited due to low activity levels. The OHARNG, however, plans for dismounted/multipurpose military training within and adjacent to the area of CC RVAAP-78. A Feasibility Study, Record of Decision, Remedial Design, and Remedial Action for the Fuze and Booster Quarry Landfill/Ponds addressed the larger area surrounding and in the vicinity of CC RVAAP-78. These studies, however, did not specifically address the dumping and potential asbestos at CC-RVAAP-78. Use of the data from previous reports and sampling areas is limited to their impact on the two new AOCs. Although the Feasibility Study, Record of Decision, Remedial Design and Remedial Action for the Fuze and Booster Quarry Landfill/Ponds addressed the large areas surrounding the area of CC RVAAP-78, they did not specifically address any potential transite problems. Due to the heterogeneous nature of the materials disposed at the quarry, the chemicals of potential concern (COPC) consist of ACMs, Polychlorinated Biphenyls (PCBs), Semi-Volatile Organic Compounds (SVOCs), Volatile Organic Compounds (VOCs), metals, propellants, and explosives. Primary pathways for the COPCs include airborne inhalation, incidental ingestion, and dermal contact. During the site reconnaissance, transite





material (possibly containing asbestos fibers) was observed in a broken condition and may be friable. Disturbance of this material may cause the asbestos fibers to be airborne and thus create an inhalation hazard.

CC RVAPP-80 – The Ohio Army National Guard plans for dismounted/multipurpose military training within and adjacent to the area of CC RVAAP-80. Currently, no soil surface/subsurface data is available. However, if propellants are the primary contaminants, the most critical pathways would be incidental ingestion and inhalation.

4.1.3 Soil Exposure and Air Pathway Conclusions

CC RVAAP-78 – Potential exposure to asbestos fibers from the transite material could occur during disturbance of site soil at CC RVAAP-78 from training activities in the future. The likelihood of asbestos fibers being released into the air will be high if ACM material is disturbed. If some of the fill materials in and adjacent to the debris piles are excavated materials from the ponds, there is the potential for dermal and inhalation exposures to antimony, beryllium, cadmium, lead, magnesium, mercury and zinc noted in paragraph 3.2.4 C Sediment. In the Feasibility Study for the FBQ there were no sediment chemicals of concern in the Quarry Ponds exposure unit that required evaluation of remedial alternatives. However, while the sediment exposure point concentration for hexavalent chromium was 20 mg/kg and the preliminary cleanup goal was 16 mg/kg, it was noted that the cleanup goal for hexavalent chromium was based on a very high dust loading factor, which is not realistic for wet sediment. Should there be materials excavated from the quarry ponds in potential fill areas west of Debris Piles A and B, there is the potential that elevated levels of hexavalent chromium might pose greater risk as so ils, due to dust inhalation, than as wet sediment.

CC RVAAP-80 – Due to lack of data for CC RVAAP-80, it is unknown if there has been a release of materials in the surface/subsurface soils from the propellant can tops. The nature of a release would imply that the empty propellant can tops contained sufficient residue and that there were sufficient quantities of propellant can tops to have a significant release of materials. Currently, there is no evidence to suggest that significant quantities of propellant can tops with sufficient residue exist or have existed, and the ability to determine whether a significant material release has occurred is inconclusive.

4.2 GROUNDWATER PATHWAY

4.2.1 Hydrogeologic Setting

CC RVAAP-78 – CC RVAAP-78 is within the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) AOC. The hydrogeologic setting for RVAP-16 is contained in Section 2 of the *Phase I/Phase II Remedial Investigation of the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16)*, dated November 2005:

Groundwater flow is toward the south and west.

A figure entitled, "Geologic Cross-Section of Fuze and Booster Quarry Ponds (RVAAP-16)" from the above-referenced investigation is included herein as Figure 4-3 for reference.

CC RVAAP-80 – During the historical review, reasonably ascertainable information on site-specific hydrogeologic information was not identified.
4.2.2 Ground Water Pathways

CC RVAAP-78 – Groundwater beneath CC RVAAP-78, and below the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) AOC, is not currently utilized for domestic drinking or irrigation purposes, nor is it projected to be used in the future. N earby groundwater monitoring wells FBWmw-171, FBQmw-174, and FBQmw-175 indicate minor impacts.

CC RVAAP-80 – Groundwater beneath CC-RVAAP-80 is not utilized for domestic drinking or irrigation purposes. However, a municipal water line from the Village of Windham is being installed along Paris-Windham Road north of RVAAP. The OHARNG may utilize this water for soldiers.

4.2.3 Ground Water Pathway Conclusions

CC RVAAP-78 – Based on Prudent's historical research in Section 3.2, sample results from groundwater monitoring wells near CC RVAAP-78 indicate minor adverse impacts. Based on these results and the site's location relative to groundwater bearing units and geologic setting, there is a low likelihood of a release to groundwater from the migration of contaminants through soil and the underlying rock.

CC RVAAP-80 – Due to lack of data found during the historic review for CC RVAAP-80, it is unknown if there has been a release of materials into the surface/subsurface soils from the propellant can tops to impact ground water below the site. The nature of a release would imply that the empty propellant can tops contained sufficient residue and that there were sufficient quantities of propellant can tops to have a significant release of materials.

Based on the historical data reviewed in Section 3.2, there is no evidence to suggest a significant number of propellant can tops with sufficient residue resided on the site to have had a significant material release into ground water and the likelihood of a future release is low.

4.3 SURFACE WATER PATHWAY

4.3.1 Hydrologic Setting

CC RVAAP-78 The hydrologic setting for CC RVAAP-78, which is within the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) AOC is taken from Section 2 of the *Phase I/Phase II Remedial Investigation* of the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16), (SAIC 2005):

On the northern, western, and northeastern portions of the AOC, surface water generally drains from east to west towards the unnamed creek in the western portion of the AOC. Surface water generally flows to the south from the southeastern section of the AOC. The three larger ponds in the eastern part of the AOC intersect surface water flow from the east and northeast. Based on the groundwater elevations in surrounding monitoring wells, the ponds are hydraulically connected to the groundwater table. An outlet pipe discharges overflow water from the southern pond towards the west, where it eventually flows to the unnamed creek.

Note: The Unnamed Creek is shown on Figures 3-2 through 3-5.

CC RVAAP-80 was an aboveground ammunition storage area. The site stormwater runoff consists of sheet flow across the site and discharges southeastward to Sand Creek.

Phase I/Phase II RI of the Fuze and Booster Quarry, Landfill/Ponds (RVAAP-16), November 2005 (RI)



PRUDENT TECHNOLOGIES, INC.

<u>1170</u>
<u>1160</u>
<u>1150</u>
<u>1140</u>
<u>1130</u>
<u>1120</u>
<u>1110</u>
<u>1100</u>
<u>1090</u>

Silt

4.3.2 Surface Water Pathways

CC RVAAP-78 Unless there are high levels of antimony, beryllium, cadmium, lead, magnesium, mercury, and zinc in the possibly excavated materials from the quarry pond bottoms, soil disturbance at CC RVAAP-78 would not result in a significant potential migration of contaminants from the site into the northern-most pond or, ultimately, into the unnamed tributary adjacent to the west side of the sedimentation basins of the FBQ.

CC RVAAP-80 Unless there are high levels of contaminants from the propellant can tops, soil disturbance at CC RVAAP-80 would likely not result in a significant potential migration of contaminants from the site into Sand Creek. However, there is not sufficient data to make a conclusive statement.

4.3.3 Surface Water Pathway Conclusion

In the Feasibility Study for the FBQ, there were no surface water chemicals of concern identified. Additionally, in the Feasibility Study for the FBQ there were no sediment chemicals of concern in the Quarry Ponds exposure unit that required evaluation of remedial alternatives. However, while the wet sediment exposure point concentration for hexavalent chromium was 20 m g/kg and the preliminary cleanup goal was 16 mg/kg, it was noted that the cleanup goal for hexavalent chromium was based on a very high dust loading factor, which is not realistic for wet sediment. Should there be materials excavated from the quarry ponds in potential fill areas west of Debris Piles A, B, or C there is the potential that leaching of water through the fill materials might lead to a low risk of elevated levels of metals, including hexavalent chromium in surface water. Until additional sampling is performed, there is not sufficient data to make a conclusive statement.

5.0 CONCLUSIONS AND RECOMMENATIONS

5.1 CONCLUSIONS

The historical data collected from the review of prior reports, interviews, aerial interpretations, and the site reconnaissance suggest the following:

CC RVAAP-78, Quarry Pond Surface Dump

- The Quarry Pond Surface Dump encompasses the following areas:
 - Two separate debris dumps, Debris Piles A and B comprise the Quarry Pond Surface Dump. Both of the dumps are at the bases of steeply inclined rock slopes.
 - Debris Pile A contains transite materials, which may contain asbestos. No transite or other possible asbestos containing materials was observed in Debris Pile B or C.
 - A rusted 55-gallon drum with unknown contents and a former burn pile are situated within Debris Pile B.
 - One additional debris pile, Debris Pile C, was found at the northwest end of the northernmost pond. A second rusted 55-gallon drum with unknown contents is present in this pile also.
- It is possible a larger amount of construction debris and material excavated from the quarry is located between Debris Piles A and B and may extend westward to the road along the east side of the northern-most pond. This supposition is based on:
 - The widespread extent of explosive and metal contamination noted in the surface soil samples from this area in the Phase I/Phase II RI of the Fuze and Booster Quarry Landfill/Ponds (SAIC 2005).
 - The soils in the borings located between Debris Piles A and B differ in color from the soils in borings in adjacent undisturbed areas.
 - The presence of a tie bar in the tree noted during the site reconnaissance. This indicates the possibility that one end of the tie bar (possibly contained in construction fill previously placed in the Fuze and Booster Quarry) was embedded in a young tree and raised up as the tree grew.
 - The piles of bricks and other items noted during the site reconnaissance away from the base of the steeply inclined rock slopes, along with the lack of large vegetation noted in the aerial photographs of this area from the 1970's and 1980's suggests additional minor amounts of fill, probably from trucks, was dumped in this area after the dams had been constructed, but before the trees grew large enough to block truck passage.
 - Aerial photographs from 1952 show vehicle activity and debris piles within and adjacent to the quarry.
 - Interviews indicate that construction debris from building maintenance was disposed of at the quarry for many years.

CC RVAAP-80, Group 2 Propellant Can Tops

- Based on the interview of Sgt 1st Class Hufenbach, approximately 100 propellant can tops in several piles were observed in 2008. Based on one of the interviewee's recollection that the propellant cans had a tendency to fall off pallets, it is indeed very likely that isolated propellant cans (those not picked up a fter they had fallen) are present. It is unlikely that the empty propellant can tops have contributed to significant material release at the site. This is due to the propellant can tops being unlikely to have substantial amounts of residue. Aerial photographs from 1951 clearly depict the outdoor storage of materials as indicated by several interviewees. A geophysical survey is scheduled for Spring 2011 to determine if there are geophysical anomalies below the surface.
- Based on the presence of propellant can tops, there is the possibility of MEC at the site of the Group 2 Propellant Can Tops.

5.2 **RECOMMENDATIONS**

To better evaluate the potential risk to human health and the environment, Prudent recommends:

CC RVAAP-78, Quarry Pond Surface Dump

Debris Pile A

- Collect and analyze (full suite) a representative surface soil multi-increment sample immediately adjacent to the debris pile.
- Determine whether Debris Pile A contains ACMs.

Debris Pile B

- Collect and analyze (full suite) a representative surface soil multi-increment sample across Debris Pile B.
- Collect and analyze (full suite) a sample from the 55-gallon drum.
- Collect and analyze (full suite) a representative surface soil multi-increment sample from the area of black, unvegetated soil.
- Collect and analyze (full suite) a sample from the 55-gallon drum.
- Properly dispose of the 55-gallon drum.
- Determine whether Debris Pile B contains ACMs.

Area Between Debris Pile A and B

Working with the facility stakeholders, determine if a small number of test pits within the area between Debris Piles A and B could be created to better assess the presence of ACMs and other construction related debris.

Debris Pile C

- Collect and analyze (full suite) a representative surface soil multi-increment sample across Debris Pile C.
- Working with the facility stakeholders, determine if a small number of test pits could be constructed to better characterize the fill material in this area.

- Collect and analyze (full suite) a sample from the 55-gallon drum.
- Properly dispose of the 55-gallon drum.
- Determine whether Debris Pile C contains ACMs.

CC RVAAP-80, Group 2 Propellant Can Tops

Prudent recommends collecting representative surface soil multi-increment samples based on S gt. Hufenbach's figure and the results of the Spring 2011 geophysical study.

6.0 **REFERENCES**

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EPA Quick Reference Guidance Series 1999. *Improving Site Assessment: Abbreviated Preliminary* Assessments, Publication 9375.2-09FS

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OHARNG (Ohio Army National Guard) 2008, Integrated Natural Resources Management Plan and Environmental Assessment for the Ravenna Training and Logistics Site and the Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio, Prepared by AMEC Earth & Environmental, Louisville, Kentucky.

SAIC (Science Applications International Corporation) 1996. *Preliminary Assessment for The Characterization of Areas of Contamination Ravenna Army Ammunition Plant, Ravenna, Ohio*, prepared for the U.S. Army Corps of Engineers Nashville District

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USACHPPM 1997. U.S. Army Center for Health Promotion and Preventive Medicine, 1997, Hazardous and Medical Waste Study No. 37-EF-5360-97, Relative Risk Site Evaluation, Ravenna Army Ammunition Plant, Ravenna, Ohio

USACHPPM 1998. U.S. Army Center for Health Promotion and Preventive Medicine, 1998, Hazardous and Medical Waste Study No. 37-EF-5360-99, Relative Risk Site Evaluation for Newly Added Sites at the, Ravenna Army Ammunition Plant, Ravenna, Ohio

U.S. Army Toxic and Hazardous Materials Agency 1978. Installation Assessment of Ravenna Army Ammunition Plant, Report No. 132

U.S. Department of Agriculture 1978 Portage County Soil Survey

Appendix A - Site Reconnaissance Report

Site Reconnaissance

On November 11, 2010, Tomas Hernandez and John Jent, both from Prudent Technologies, Inc, and Paul Duncan of Pika International, conducted a site reconnaissance at the two sites. Mr. Duncan provided UXO avoidance support as prescribed in the site safety and health plan (SSHP) for the subject project.

Weather conditions were mostly clear and sunny with temperatures between 35 to 40 degrees Fahrenheit. Field conditions were mixed. The CC RVAAP-78 ground surface was littered with leaf cover and the CC RVAAP-80 ground surface was covered with dense and high grass/weeds significantly impairing ground observations. A photograph log is provided to depict the conditions and items noted.

CC RVAAP-78, Quarry Pond Surface Dump

Only one dump area was identified in the SOW along with one 55-gallon drum and a small burn area. However, during the site reconnaissance, the one dump area was subdivided into two areas, Debris Pile A and Debris Pile B, and one additional dump area, Debris Pile C was located. To account for these additional or modified dump areas or piles, it was planned to note and stake the additional piles during the site reconnaissance. On November 18, 2010, John Jent of Prudent and Don Trocchio of Vista Sciences, returned to the site, accompanied by a UXO Technician III, to determine GPS Ohio State Plane Coordinates of all the debris piles, areas, and any other materials of interest observed and noted during the site reconnaissance (See Table 1). Figures 2-1 and 2-2 show the locations of the areas and items of interest noted during the site reconnaissance of the Quarry Pond Surface Dump site.

The methodology of the site reconnaissance consisted of walking the perimeters of the debris piles and the perimeter of the northern pond transects.

The following observations were made.

A A rusted 55-gallon drum with approximately 30, ¹/₄- inch diameter holes on the side and several approximately 1-inch diameter holes at one end (Photograph 1) was observed at the base of a steep rock slope adjacent to a tree (Photograph 2). T his is the drum described in the SOW for this project. Immediately adjacent to the drum was a steel rod about three feet long with a plate about three square inches at one end (Photograph 2 directly above the bung). It was thought this rod might be a tie bar from an ammunition box.

B An area of no vegetation (Photograph 3), was observed about 15 feet southwest of the rusted drum (Photograph 4). This area was approximately circular with a diameter of about 7 feet and was marked with orange flagging around a tree as Location #1 (Photograph 4) for subsequent GPS determination. Black dirt was observed on the surface of the zone of no vegetation. Similar black dirt was observed adjacent to this area with vegetation present. Numerous black wire rings (Photograph 5) approximately 5/8-inch in diameter and a few pieces of glass were noted on the surface.

C A bent piece of approximately 1" wide rusted metal banding was observed about 40 feet south of the black spot with no vegetation, Location #1. It was thought this banding is similar to that used on ammunition boxes. A tie bar and plate similar to that described in section A, above, was also noted. This banding was located approximately 6 feet west of the base of the rock slope.

D A roughly 6-foot square piece of extremely deteriorated concrete slab with wire mesh was observed about 70 feet south of the black dirt area (Location #1) and marked with orange flagging around a tree as Location #2. This material was located at the base of the rock slope.

E An old crushed galvanized bucket (Photograph 6) was observed about 10 feet west of the base of the rock slope and about 40-ft east of the dirt road along the east side of the northernmost pond. This area was noted as Location #3. It was speculated that this material might have been dumped there from the road to the west when there were few or no tress, as opposed to being dumped over the slope.

F A small somewhat round mound with much vegetation, but with red bricks noted within the pile (Photograph 7) was observed north of the black dirt area with no vegetation. This area was noted as Location #4. This pile was about 20 feet west of the base of the slope again raising the possibility that it was placed there from the road to the east.

G An approximately 30-foot wide area of miscellaneous piles (Photograph 8-19) was observed near the northwest top of the bank of the northernmost pond. An approximately 8-foot long piece of about 12-inch diameter rusted corrugated metal pipe (Photograph 9) and a rusted degraded 55-gallon drum with holes in it (Photograph 10) were present in this area. The west end of this area was noted as Location #5A and the east end as Location #5B.

H Northeast from the approximately 30-foot wide area and north of the dirt road around the northern-most pond, a piece of half-inch diameter metal tie bar was embedded into a tree and extended down into the ground (Photograph 11). The tree is noted as Location #6.

I Proceeding northwest from this tree to the base of a larger steeply inclined rock slope, the approximate west end of the debris pile described in the SOW was determined. This area was noted as Location #7A. Concrete blocks, clay roof pieces, shale roof pieces, pieces of apparent transite, and pieces of clay pipe are present within these piles (Photographs 12, 13, and 14). The intermittent piles appear to be about 5 feet high. These materials are at the base of the rock slope and appear to have been dumped from the top of the slope, which extends in an approximate west to east alignment.

J The east end of the debris pile described in the SOW is where the rock slope changes direction and extends southward. The end of this pile is noted as Location #7B.

K There are railroad ties about 25 feet from Location #7B (Photograph 15). The area of the railroad ties is noted as Location #8.

L The north end of a zone of apparent dumping over the north-south aligned rock slope is noted as Location #9A. Materials appear to have been dumped over the slope. There are, however, lesser amounts of materials present than those associated with the west-east aligned dumped piles. No apparent transite was observed along the north-south aligned rock slope. Materials observed included slate roofing pieces, concrete blocks, bricks, metal debris (Photograph 16) and a few metal ties (Photograph 17). A few railroad ties were observed at the top of the slope about midway from Location #9A to #9B (Photograph 18).

M Similar materials, as in section L, are present along the entire base of the north-south aligned rock slope until that slope ends where it abuts a larger natural rock formation. The south end of this rock slope is noted as Location #9B.

N The areas at the tops of the west-east and north-south aligned rock slopes were walked and only the railroad ties already noted were observed.

O There appears to be an old roadway about 40 to 50 feet east of the north-south aligned rock slope.

Note - This roadway appears in the 1966 aerial photograph.

P There are a few pieces of old fence posts extending in an approximate west-east alignment near FBQmw-173 (Photograph 19).

Q No manmade materials were observed along the tops of both rock slopes, other than the railroad ties already discussed.

As discussed above, the locations were taken using a GPS in the Ohio State Plane coordinate system.

CC RVAAP-80, Group 2 Propellant Can Tops

A Due to the high and dense grass/weed cover the area where the propellant can tops were previously located was extremely difficult to view and no new observations were made (Photograph 20). One propellant top was observed and photographs of the top and bottom of the top were taken, respectively (Photographs 21 and 22).

B The hardstand (gravel covered) area east of the eastern-most line of buildings in Group 2 was observed, as indicated by one of the interviewees. A portion of this area was walked, but no propellant tops were observed. Mr. Duncan, the UXO Technician III, did note many anomalies. The OHARNG appears to be using this area currently, and it is speculated that this area has been reworked many times.

Reference #	Latitude	Longitude	
CC-78 GPS Points			
1	41.1796	-81.1128	
2	41.1794	-80.1128	
3	41.1792	-81.1128	
4	41.1797	-81.1129	
6	41.1799	-81.1131	
8	41.1801	-81.1124	
10	41.1797	-81.1121	
5a	41.1797	-81.1137	
5b	41.1798	-81.1134	
7a	41.1801	-81.1129	
7b	41.1801	-81.1123	
9a	41.1800	-81.1124	
9b	41.1795	-81.1126	
Ground Water Monitoring Wells FBQ			
171	41.1796	-81.1138	
173	41.1803	-81.1124	
174	41.1793	-81.1130	
175	41.1789	-81.1130	
55-Gallon Drum			
55-Gallon Drum 1	41.1796	-81.1136	
55-Gallon Drum 2	41.1796	-81.1128	

Table 1: Latitude/Longitude from RVAAP CC-78 Site Reconnaissance













Rusted 55-Gallon Drum at Base of N-S Rock Slope About 10 Feet NW of Location #1



Rusted 55-Gallon Drum at Base of N-S Rock Slope, Adjacent to Tree with Three Parts About 10 Feet NW of Location #1 Note steel tie bar just above bung



Area of Black Dirt with No Vegetation, Location #1 Area is about 7-ft in diameter



Proximity of Area of No Vegetation (Where White Paper is on the Ground) to Rusted 55-Gallon Drum (at Left End of Schonstedt at Base of Tree with Three Parts) Location #1 is where pink flagging is wrapped around tree)



Black Wire Rings within Area of No Vegetation



Crushed Galvanized Bucket West of N-S Aligned Rock Slope



Small Mound of Bricks with Vegetation Covering It Location #4



Approximate 30-ft Wide Area of Debris Piles Northwest of Northern Most Pond Flag around tree is Location 5A



About 8-Ft Long Length of Corrugated Metal Pile Within 30-Ft Wide Area of Miscellaneous Debris



Rusted Degrade 55-Gallon Drum Within 30-Ft Wide Area of Miscellaneous Debris



Photograph 11

Tie Bar Embedded in Tree About 2-1/2 Ft Above the Ground and Extending Down into the Ground



Pieces of Clay Pipe, Concrete Block and Apparent Transite at Base of E-W Rock Slope



Pieces of Slate Roofing at Base of E-W Rock Slope



Pieces of Transite at Base of E-W Rock Slope



Railroad Ties Near East End of Debris Piles Along E-W Rock Slope



Metal Debris at Base of N-S Rock Slope



Tie Bar at Base of N-S Rock Slope Flagging Around Tree Denotes Location #9B



Railroad Ties at Top of Slope Midway Along N-S Rock Slope



Bottom, Rusted Portion of Old Fence Posts Near FBQmw-173 Line of posts is in approximate E-W alignment



Group 2 Propellant Can Tops Location Map







Area South of Group 2 Magazines Where Propellant Can Tops Were Found Note high and dense grass/weed cover



Top View of Propellant Can Top



Bottom View of Propellant Can Top
Appendix B – Sensitive Habitats and Sensitive Species at CC RVAAP-78 and CC RVAAP-80

Sensitive Habitats and Sensitive Species at the Group 2 Propellant Can Tops and Quarry Pond Surface Dump Sites of Ravenna Army Ammunition Plant, Ravenna, Ohio

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Site: Ravenna Army Ammunition Plant (RVAAP) Ravenna, Ohio

11 February 2011

Drinkard 2010 Pg. 1

Section	Page
I. Introduction	3
A. Purpose	
B. Definitions	
II. Methods	3
III. Results	5
A. Sensitive Habitats and Species at RVAAP	5
1. Sensitive Habitats	
2. Sensitive Species	
B. Sensitive Habitats and Species at Group 2 Site	7
1. Sensitive Habitats	
2. Sensitive Species	
3. Notable Findings	
C. Sensitive Habitats and Species at Quarry Pond Surface Dump Site	8
1. Sensitive Habitats	
2. Sensitive Species	
3. Notable Findings	
IV. Summary	9
V. Appendix	
A. Select Maps, Figures, Tables	A 1-1
B. Select Pages of INRMP Appendices	B 1-6

Table of Contents

Sensitive Habitats and Sensitive Species at the Group 2 Propellant Can Tops and Quarry Pond Surface Dump Sites of Ravenna Army Ammunition Plant, Ohio

Drinkard, M.K.

I. INTRODUCTION

A) Purpose

The purpose of this project is to report if sensitive habitats and/or species are present in the Group 2 Propellant Can Tops (Group 2) site and the Quarry Pond Surface Dump Site of RVAAP using provided current and historical data.

B) Definitions

Sensitive habitat is defined as any area in which plant or animal life or their habitats are either rare or especially valuable <u>and</u> any area which meets one of the following criteria: habitats containing or supporting "rare and endangered" species as defined by the State of Ohio or Federal Standards, all perennial and intermittent streams and their tributaries, areas used for scientific study and research concerning fish and wildlife, and lakes and ponds and adjacent shore habitat.

Sensitive species are defined as any species which is at risk of extinction due to low numbers or threats by changing environmental characteristics and are listed as a sensitive species as published by the State of Ohio or Federal agencies.

II. METHODS:

Two sites have been identified for analysis. The Group 2 site is northeastern/centrally located and the Quarry Pond Surface Dump Site is the central south western area of RVAAP (Appendix A: Figure 1). In addition to a cursory site survey, historical and current records were searched and copies of pertinent materials were provided by Katie Tait (Ohio Army National Guard), Gail Harris (Vista Sciences Corporation), and John Jent (Prudent Technologies, Inc.). The following reports were analyzed for this project:

Ohio Army National Guard Final Integrated Natural Resources Management Plan for RTLS (now known as Camp Ravenna) AMEC March 2008

Ohio Army National Guard RTLS Final Integrated Natural Resources Management Plan (INRMP) Updated Wetland Map with GIS Data March 2008 Ohio Army National Guard Camp Ravenna Group 2 Wetland Delineation GIS Files

Prudent Technologies, Inc. Draft Project Management Plan for 2010 Phase I Remedial Design Services Compliance Restoration Site CC-78 & CC-80 Contract No. W912QR-10-P-0052 5 August 2010

Prudent Technologies, Inc. Draft Site Safety & Health Plan for 2010 Phase I Remedial Design Services Compliance Restoration Site CC-78 & CC-80 Contract No. W912QR-10-P-0052 5 August 2010

SAIC and SpecPro, Inc. Prepared for the Army Corps of Engineers Phase I/Phase II Remedial Investigation of the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) Volume One: Main Report Ravenna Army Ammunition Plant, Ravenna, Ohio November 2005 Contract No. GS-10F-0076J

III. RESULTS:

There have been several comprehensive biotic surveys and environmental habitat assessments for RVAAP. The reports that were investigated for this project focused on recent surveys (1999 -2008) included the INRMP, based largely on research by AMEC for the Ohio Army National Guard and a Phase I/Phase II analysis by SpecPro, Inc. for the US Army Corps of Engineers. The INRMP and the Phase I/Phase II show that there are many listed species that can be found at RVAAP and many sensitive habitats of ecological concern.

A) Sensitive species and habitats at RVAAP

1) Sensitive Habitats

The materials provided referenced known environmentally sensitive habitat at RVAAP. Several sources note that floodplain and wetland habitats can be found within RVAAP (Appendix A: Figures 2 and 3). Of these sensitive habitats, wetlands of both jurisdictional and planning level designation have been noted (Appendix A: Figure 2). Furthermore, several streams traverse RVAAP and their FEMA 100 year floodplains are marked for this location (Appendix A: Figure 3). Beaver activity is also noted for 1999 and 2006 and beavers can be found across the RVAAP (Appendix A: Figure 3). There are several "Special Interest Areas" described which are noteworthy resources without legal designation (INRMP Pg. 59). However, it is stated that no federally recognized critical habitat occurs within RVAAP (INRMP Pgs. 56 and 76).

2) Sensitive Species

The materials provided referenced acknowledgement of listed species occurrence at RVAAP (Appendix B: Selection 1). "Flora and Fauna Species" is a comprehensive list of all species found at RVAAP noting their species status and can be found in its entirety in the INRMP. Species statuses at RVAAP included non-listed, non-native, migrant species and 74 species categorized as endangered, threatened, potentially threatened, species of concern, special interest, and candidate by Federal and/or State guidelines. This portion of the INRMP did not include information by site (e.g. Group 2 or Quarry Pond Surface Dump Sites) within RVAAP. Many of the rare species locations were mapped in conjunction with "Special Interest Areas" (denoting important habitat) and are shown in Appendix A: Figure 4. The INRMP report states that there are "no federally listed species known to reside" at RVAAP (INRMP Pg. 56 and 76). However, there are many state-listed species.

In addition to known state-listed sensitive species occurrences, the materials provided referenced many listed species that could potentially be found at RVAAP as the sites are within the known range of these organisms. These include the Sand Hill Crane (*Grus canadensis*), Indiana Bat (*Myotis sodalis*), Mitchell's Satyr Butterfly (*Neonympha mitchellii*), and Eastern Massasauga Rattlesnake (*Sistrurus catenatus catenatus*) (Appendix B: Selection 2).

3) Notable Findings

Management at RVAAP includes various herbicide treatments (Appendix A: Figure 5), selective mowing in some areas (Appendix A: Figure 6), hunting and timber forestry. These practices can impact sensitive habitats and species in many ways.

B) Sensitive species and habitats at Group 2 Site

1) Sensitive Habitats

In the Group 2 site, there are some small areas of jurisdictionally designated wetlands at the northern end of the Group 2 site (Appendix A: Figure 7). Map notations show that the southern portion of Group 2 was not included in the jurisdictional survey for wetlands (2007). However, planning level wetland data was collected and there were no wetlands noted in the southern portion of the site in the planning survey.

Sand Creek runs along the southeastern portion of the Group 2 site but no part of the FEMA 100 year floodplain overlaps with this site (Appendix A: Figure 8). A small tributary of Sand Creek runs though the southern portion of Group 2. Beaver activity was noted along this tributary in 1996 but recent (2006) activity monitoring did not show beaver presence (Appendix A: Figure 8).

The INRMP also notes "Special Interest Areas" and while none of these areas are noted within Group 2, the Northern border is categorized as "Mixed Valuable Communities" and the Eastern border is categorized as "Mixed Mature Woods" (Appendix A: Figure 9).

It was also noted that this site has been impacted through agricultural use (through the 1940's), railways and roadways that have traversed this site and its use as a storage area for the munitions operations. While this type of land use can negatively affect the habitat none of the aforementioned factors are believed to impact the habitat to an extent that would significantly deter wildlife.

2) Sensitive Species

INRMP did not note any state-listed sensitive species detected within the Group 2. However, several species are noted in the immediate vicinity: Bobolink, Least Flycatcher, Woodland Jumping Mouse, Mountain Brook Lamprey and numerous others nearby (Appendix A: Figure 9). Table 1 lists the nearby taxa including their distance from the Group 2 site.

3) Notable Findings

The current vegetation management protocol may impact the state-listed species that were found at Group 2 as the buildings in this area are treated with herbicide and have an unrestricted mowing regime (Appendix A. Figure 5 and 6).

C) Sensitive species and habitats at Quarry Pond Surface Dump Site

1) Sensitive Habitats

There are three ponds directly southwest from the Quarry Pond Surface Dump Site. Planning level wetlands have been noted on the northeast edge of all ponds (Appendix A: Figure10). This site was not included in the larger survey for jurisdictional wetlands. There are no streams or portions of FEMA 100 year floodplains that overlap with this site. Beaver activity was not noted during any of the prior surveys. (Appendix A: Figure 11).

During surveys around 2005, no sensitive habitats were detected in or near the Quarry Pond Surface Dump Site (Phase I/II Pg. 7-7). Furthermore, there are no "Special Interest Areas" noted within the Quarry Pond Surface Dump Site (Appendix A: Figure 12). This site has been subjected to a particularly high level of disturbance (including being used as a landfill). This habitat is highly impacted and of low quality. Given this information, it is unlikely that this site would be a primary habitat choice for most sensitive species.

2) Sensitive species

INRMP surveys did not show any sensitive species detected within the Quarry Pond Surface Dump Site. However, the INRMP did show state-listed sensitive species that have been identified within a one-mile radius of the site including the Northern Harrier, Lurking Leskea, Yellow-bellied Sapsucker, and the Sandhill Crane (Appendix A: Figure 12). Investigations for the Phase I/II did not detect any sensitive species within this site (Phase I/II Pg. 7-8). Table 1 lists the nearby taxa including their distance from the site.

3) Notable findings

There are no mowing or herbicide regimes at this site as a part of regular management procedures. (Appendix A: Figure 5 and 6). Finally, as the Quarry Pond Surface Dump Site is adjacent to a former quarry and landfill, there are substantial amounts of debris and residual, low level, pollutants in the soils (Phase I/II).

IV. SUMMARY:

The reviewed information indicates that the Group 2 or Quarry Pond Surface Dump Sites do not directly house any federally recognized critical habitats or sensitive species. While there were many state-listed sensitive species found at RVAAP, data for individual sites was often not available. There is also evidence that there are state-listed sensitive species outside the immediate areas of both sites and that these organisms are at least indirectly utilizing these habitats. Mobile species can utilize the habitats even if not detected in the sites during sampling efforts.

There is no doubt that RVAAP is a unique and valuable habitat in both size and level of protection. There are substantial tracts of healthy, intact and sensitive habitats at RVAAP giving the site a heterogeneous mix of valuable and degraded land. It is not surprising that many taxa, including sensitive and listed taxa, can be found both on the site and in the area of RVAAP. This fact leads to the conclusion that RVAAP is a generally ecologically valuable habitat. In relation to the Group 2 and Quarry Pond Surface Dump sites in question in this report, while they bear no specific qualities that make them particularly more valuable than other sites within RVAAP, they do contribute to the overall health of the area. In conclusion, the mere fact that they are part of such a valuable habitat gives them inherent ecological worth. However, due to the lack of direct use by listed species, lack of obvious signs of sensitive or critical habitat features, and past land use practices, Group 2 and the Quarry Pond Surface Dump sites do not merit an extra level of protection than any other site on RVAAP.

Sensitive Habitats and Sensitive Species at the Group 2 and Quarry Pond Surface Dump Site of Ravenna Army Ammunition Plant, Ohio

Date Report Submitted: 6 December 2010

Report Author:

Maureen Drinkard 131 Columbus St Kent, Ohio 44240 (330) 309-6308

Appendix A. Select Maps and Figures provided by AMEC for INRMP



Figure 2. Surveyed Wetlands at RVAAP

Ravenna Training & Logistics Site - Surveyed Wetlands



Ravenna Training & Logistics Site - Surface Waters



Ravenna Training & Logistics Site - Rare Species Locations



Figure 5. Herbicide Vegetation Management at RVAAP



Figure 6. Mowing Vegetation Management at RVAAP



Figure 7. Excerpt of Figure 2 (above) showing surveyed wetlands at Group 2 site. See Figure 2 for additional figure information.



Figure 8. Excerpt of Figure 3 (above) showing surface waters and beaver activity at Group 2 site. See Figure 3 for additional figure information.





Figure 9. Excerpt of Figure 4 (above) showing sensitive species at Group 2 site. See Figure 4 for additional figure information.

Figure 10. Excerpt of Figure 2 (above) showing surveyed wetlands at the Quarry site. See Figure 2 for additional figure information.





Figure 11. Excerpt of Figure 3 (above) showing surface waters and beaver activity at the Quarry site. See Figure 3 for additional figure information.

Figure 12. Excerpt of Figure 4 (above) showing sensitive species at the Quarry site. See Figure 4 for additional figure information.



Table 1. Species of interest identified in the vicinity of the Quarry Surface Dump site and the Group 2 site.

	Common Name	Scientific Name	Species State Status	Approximate Distance from Site
Quarry Surface Dump Sites	Northern Harrier	Circus cyaneus	Endangered	0.5 Miles
	Lurking Leskea	Plagiothecium latebricola	Endangered	0.6 Miles
	Pale sedge	Carex pallescens	Potentially Threatened	0.7 Miles
	Yellow-Bellied Sapsucker	Sphyrapicus varius	Endangered	0.7 Miles
	Eastern Box Turtle	Terrapene c. carolina	Species of Concern	0.9 Miles
	Four-toed Salamander	Hemidactylium scutatum	Species of Concern	0.9 Miles
	Psilotreta indecisa	Psilotreta indecisa	Threatened	0.9 Miles
	Northern Harrier	Circus cyaneus	Endangered	1.0 Miles
	Woodland Jumping Mouse	Napaeozapus insignis	Species of Concern	1.0 Miles
	Eastern Box Turtle	Terrapene c. carolina	Species of Concern	1.1 Miles
	Northern Bobwhite	Colinus virginianus	Species of Concern	1.1 Miles
	Sandhill Crane	Grus canadensis	Endangered	1.1 Miles
	Psilotreta indecisa	Psilotreta indecisa	Threatened	1.2 Miles
	Purple Finch	Carpodacus purpureous	Special Interest	1.2 Miles
Group 2	Woodland Jumping Mouse	Napaeozapus insignis	Species of Concern	0.1 Miles
	Mountain Brook Lamprey	lchthyomyzon greeleyi	Endangered	0.4 Miles
	Bobolink	Dolichonyx oryzivorus	Species of Concern	0.5 Miles
	Butternut	Juglans cinerea	Potentially Threatened	0.5 Miles
	Least Flycatcher	Empidonax minimus	Threatened	0.5 Miles
	Henslow's Sparrow	Ammodramus henslowii	Species of Concern	0.6 Miles
	Mountain Brook Lamprey	lchthyomyzon greeleyi	Endangered	0.6 Miles
	Lurking Leskea	Plagiothecium latebricola	Endangered	0.7 Miles
	Yellow-Bellied Sapsucker	Sphyrapicus varius	Endangered	0.7 Miles

Butternut	Juglans cinerea	Potentially Threatened	0.8 Miles
Butternut	Juglans cinerea	Potentially Threatened	0.8 Miles
Yellow-Bellied Sapsucker	Sphyrapicus varius	Endangered	0.8 Miles
Butternut	Juglans cinerea	Potentially Threatened	0.9 Miles
Mountain Brook Lamprey	lchthyomyzon greeleyi	Endangered	0.9 Miles
Barn Owl	Tyto alba	Threatened	1.0 Miles
Butternut	Juglans cinerea	Potentially Threatened	1.0 Miles
Mountain Brook Lamprey	lchthyomyzon greeleyi	Endangered	1.0 Miles
Mourning Warbler	Oporornis philadelphia	Threatened	1.1 Miles
Yellow-Bellied Sapsucker	Sphyrapicus varius	Endangered	1.1 Miles
Butternut	Juglans cinerea	Potentially Threatened	1.2 Miles
Northern Rose Azalea	Rhododendron nudiflorum	Potentially Threatened	1.2 Miles
Northern Waterthrush	Seiurus motacilla	Special Interest	1.2 Miles

Sensitive Habitats and Sensitive Species at the Group 2 and Quarry Surface Dump sites of Ravenna Army Ammunition Plant, Ohio

Date Report Submitted: 6 December 2010

Date Revision Submitted: 4 February 2011

Report Author:

Maureen Drinkard 131 Columbus St Kent, Ohio 44240 (330) 309-6308

Appendix B. Select pages of INRMP

Selection 1. From INRMP Appendix C. Record of Environmental Consideration Page 5-6.

:. Will the proposed action use a			During proposed action	1	The second		
inimproved readed	c. Will the proposed action use and/or construct		During proposed action During normal operations after		I YES	NO	
unimproved roads?		proposed action is completed		YES	NO		
Explain any YES answers and/o applicable). Vost of the roads at the RTLS a nanagement activities. The acti	or planned mitigation h are unimproved and ar ion will not construct a	ere. Include a e used for ev ny roads. Mit	aircraft types, number of a ery activity at the training igation measures are not	sorties, ar site inclu needed.	nd flight sch ding natura	nedules (if al resources	
3. NOISE							
	2023 12 12 12 12	1	During proposed action	1	YES	✓ NO	
a. Will the proposed action result in an increase in noise levels?			During normal operations after proposed action is completed YES VI				
 Is the proposed action close to opulation (add any not listed in 	to any civilian activity v a the spaces provided)	where noise r ? Include dis	night affect the tances for all types:		YES	✓ NO	
TYPE	Distance	Unit	TYPE	Dis	stance	Unit	
1) Residence/Home	0.5	miles	(5) Library		0.8	miles	
2) Church	1.0	miles	(6) Wilderness Area		NA	8.11	
3) School	0.6	miles					
4) Hospital	12.0	miles					
. Will the proposed action invol	ve aircraft?				✓ YES	NO	
The Ohio Division of Wildlife wil small airplane to conduct aerial	I use a helicopter to su defoliation surveys.	irvey the RTL	S deer population. The U	JS Forest	Services v	vill use a	
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e. Will the	proposed action deteriorate, alter,	or destroy existing fish or wildlife	habitat?		YES	1	NO
f. Will the proposed action deplete any non-renewable natural resources?				YES	1	NO	
g. Will the	proposed action alter, destroy, or s	ignificantly impact environmental	ly sensitive areas		VEC	E7	NO
(wetlands,	coastal zones, etc.)?	er han in the source of the	~		165	Ē	NO
Explain an	y YES answers.	ed threatened or candidate she	cies at the RTLS. The I	nroni	e haze	ction	will
positively i	mpact state listed species by mana	ging for diversity and conservation	on of habitats.	лор	JSEU di	cuon	VV 111
6. LAND	USE						
a. Will the	proposed action alter the present la	and use of the site?			YES	1	NO
b. Who ow	rns the 🗹 Federal/DOD	State City/Town/County	Private				
property?	Other (Explain):						
c. Does th	e proposed action involve a real es	tate action (e.g., purchase, lease	, permit, or license)?		YES	1	NO
	(1) Has an EBS been completed?	If YES, attach the EBS.			YES		NO
Answer the	Answer the (2) Require an increase of acreage/amendment to an existing lease or license?		e or license?		YES		NO
you	(3) Require new purchase of addit	ional acres using federal, state, o	or other funds?		YES		NO
answered	(4) Require a new lease license	and/or land use permit?		П	YES		NO
TES above.	(F) Doplace of dispess of evicting	facilitian					
E 1 .	(5) Replace of dispose of existing	Tacilities?			YES	Ц	NO
7. SOLI	DWASTE						5207913
a. Will the	proposed action generate solid was	stes that must be disposed of on	or off site?	1	YES		NO
Explain a	res answer.	nerated No hazardous waste is	expected to be genera	ted	Pestic	ide	
(herbicide)	containers will be generated but th	ey are triple rinsed and puncture	d and disposed of as n	on-h	azardo	ous w	aste.
8. HAZA	RDOUS WASTE				1282227		15:25
a. Will the	proposed action generate hazardo	us waste?	encode action		YES	1	NO
b. Will the	proposed action store and/or prepa	are for the During pr	oposed actions after	Ц	YES	4	NO
disposal o	f hazardous waste or materials?	proposed	action is completed		VEC		NO
		During pr	ronosed action		TES		NO
c. Does the proposed action require a permit to		to During pr	ormal operations after		YES	2	NO
accumulat	e hazardous waste or materials at t	he site? proposed	action is completed		YES	1	NO
d Doos th	a proposed action have an increase	ad risk for During pr	oposed action		YES	1	NO
explosion,	spill, or the release of hazardous w	vaste or				1	
materials (including but not limited to pesticid	es, During no	ormal operations after				
chemicals,	, or radiation)?	proposed	action is completed		YES	1	NO
e. Will the proposed action require the presence of During proposed action		oposed action		YES	\checkmark	NO	
trained pe	rsonnel to handle and dispose of ha	azardous During no	ormal operations after				
and/or tox	ic waste/materials?	proposed	action is completed		YES		- 10
5.14		piopoood	action is completed		125		NO

Selection 2. INRMP Appendix A pages 9, 12-13. Lists of sensitive species with potential occurrence at RVAAP

> Mr. Tim Morgan 3 October 2005 Page 3

Non-forested areas: New Mark-19 range to be built. Will manage it as grassland because trees can not be allowed to grow. Planning the first burn of this area in October. Burning and mowing of shrub and grassland habitat is hard to keep up with due to a lack of resources and time. These areas are reverting from shrub to forest habitat.

Wildlife Management: No major wildlife management actions are planned. Feral cats are the biggest nuisance species on site because they reduce bird populations. However, coyotes on site have been keeping feral cat levels down. Beaver control is done only when they flood roads, buildings or training areas. When this occurs, a local trapper (Keith Landes) is contracted to trap beavers in the localized problem areas. Groundhogs are no longer a problem. The deer herd is probably the biggest wildlife management issue at the RTLS. Fortunately the deer herd is currently at a healthy level. It is currently at a 1:1 or 1:2 ratio. Browse line tree destruction is not an issue at RTLS. In the past, the ratio has been as great as 1:7, thus this situation needs to be monitored regularly. A turkey hurt is conducted for local children.

Water Quality Management: At present, OHARNG does not have resources to manage the surface waters at the RTLS. Two of the streams have reference quality warm water stream habitats. The OHARNG will be working with the NRCS to protect the three major streams, which include I linkley Creek, South Fork Eagle Creek, and Sand Creek. Riparian buffers are maintained in accordance with best management practices. Surface water quality has not been a big problem because only a small portion of the RTLS is unpaved and minimal off-road training activities have occurred. However, maintaining headwaters and water quality will be something to focus on in future years.

Some of the ponds need work done on them. Dams have been blown out. They plan to fix some of the major problems associated with the breached dams, but very little aquatic management occurs at the RTLS because of a lack of resources.

EPA wants more ground water monitoring.

Potable water comes from Newton Falls. On-site wells are not used for potable water.

The RTLS is within the U.S. Army Corps of Engineers Pittsburgh District.

Planning level surveys:

- · Breeding bird surveys conducted annually (potential nesting pair of sandhill crane spotted this year)
- Indicator species every five years (includes herptiles, Lepidoptera and Indiana bat)
- Plants, mollusks every ten years

Environmental remediation: Siting of buildings always gets environmental review Public access always an issue with respect to training

The Installation Restoration Program (Army and BRAC) is working on 1300 acres with areas of concern. Environmental restoration is based on risk assessment that considers end use.

Appendix A

Page A-9



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services 6950 Americana Parkway, Suite H Reynoldsburg, Ohio 43068-4127

(614) 469-6923/Fax: (614) 469-6919

August 25, 2005

Ms. Jennifer Pyzoha AMEC Earth and Environmental, Inc. 559 High Steer, Suite 201 Worthington, Ohio 43085

Re: INRMP Revision for Ravenna Training and Logistics Site

Dear Ms. Pyzoha:

This is in response to your August 3, 2005 letter requesting information we may have regarding the occurrence or possible occurrence of Federally-listed threatened or endangered species within the vicinity of the 21,419 acres of the Ravenna Training and Logistics Site (RTLS) located in Portage and Trumbull Counties, Ohio. This information will be used as part of the revision process for the Integrated Natural Resource Management Plan (INRMP). Although our office has no new records of listed species, the Service is providing general guidelines regarding species potentially present in the project area. There are no Federal wildlife refuges, wilderness areas, or Critical Habitat within the vicinity of this site.

ENDANGERED SPECIES COMMENTS: The proposed project lies within the range of the **Indiana** bat (*Myotis sodalis*), a Federally-listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. Summer habitat requirements for the species are not well defined but the following are considered important:

 Dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas.

2. Live trees (such as shaghark hickory and oaks) which have exfoliating bark.

3. Stream corridors, riparian areas, and upland woodlots which provide forage sites.

Should the proposed site contain trees or associated habitats exhibiting any of the characteristics listed above, we recommend that the habitat and surrounding trees be saved wherever possible. If the trees must be cut, further coordination with this office is requested to determine if surveys are warranted. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office.

The proposed project lies within the range of the Mitchell's satyr butterfly (Neonympha mitchelli), a federal endangered species. The favored habitat for this species is sedge-dominated fens with low shrubs and tamaracks. If appropriate habitat is found on the site, we recommend surveying for the butterfly between June and August, during its most active period.

Appendix A

Page A-12

The project lies within the range of the eastern massasauga (Sistrurus catenatus catenatus), a docile rattlesnake that is declining throughout its national range and is currently a Federal Candidate species. The snake is currently listed as endangered by the State of Ohio. Your proactive efforts to conserve this species now may help avoid the need to list the species under the Endangered Species Act in the future. Due to their reclusive nature, we encourage early project coordination to avoid potential impacts to massasauga and their habitat. At a minimum, project evaluations should contain delineations of whether or not massasauga habitat occurs within project boundaries.

The massasauga is often found in or near wet areas, including wetlands, wet prairie, or nearby woodland or shrub edge habitat. This often includes dry goldenrod meadows with a mosaic of early successional woody species such as dogwood or multiflora ose. Wet habitat and nearby dry edges are utilized by the snakes, especially during the spring and fall. Dry upland areas up to 1.5 miles away are utilized during the summer, if available. For additional information on the eastern massasauga, including project management ideas, please visit the following website: http://www.fws.gov/midwest/Endangered/lists/candidat.html#massasauga or contact this office directly.

The proposed project lies within the range of the elubshell mussel (Pleurobema clava), a Federallylisted endangered species, the bald eagle (Haltacettus leucocephalus), and the northern monkshood (Aconitum noveboracense), both Federally-listed threatened species. Due to the project location, the presence of clubshell mussel is not likely; no impacts to this species are anticipated. There are no known bald eagle nests within a half mile of the project are; no impacts to bald eagles are anticipated. The site does not appear to contain shaded cliff faces in wooded ravines, or other suitable habitat for the northern monkshood; therefore no impacts to this species are anticipated. Relative to these species, this precludes the need for further action on this project as required by the 1973 Endangered Species Act, as amended. Should, during the term of this action, additional information on listed or proposed species or their critical habitat become available, cr if new information reveals effects of the action that were not previously considered, consultation with the Service should be reinitiated to assess whether the determinations are still valid.

This technical assistance letter is submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C.661 et seq.), the Endangered Species Act of 1973, as amended, and is consistent with the intent of the National Environmental Policy Act of 1969, and the U.S. Fish and Wildlife Service's Mitigation Policy.

It you have any questions regarding our response or it you need additional information, please contact Karyn Tremper at extension 13.

Sincerely,

mary Knapp

Mary Knapp, Ph.D. Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

Appendix A

Page A-13

Appendix C – Records of Interviews

Interview Form for Information Related to RVAAP Sites CC-78 Quarry Pond Surface Dump CC-80 Group 2 Propellant Can Tops

Name of Person Interviewed – Jim McGee Current Address - RVAAP Current Telephone - 330 358-3005

Date of Interview – 8 November 2010

Approximate Dates you were at RVAAP – Brought up here: 1946 - 1955 Worked here 1964 - 1979; 1981 - Present

RVAAP Employer – Firestone 1st time, then Olin for 27 years; Mason & Hanger 5 years Toltest- MKM- Pika- Vista 10 years

RVAAP Position – Olin - Maint & Security Manager Firestone - Maintenance Supr; Toltest-MKM-Pika-Vista - Project Manager

RVAAP Main duties – Firestone/Olin - Supervised maintenance, then security & maintenance Mason & Hanger - Site Manager Toltest-MKM-Pika-Vista - Project Manager w/no one else to report to on site

Knowledge of CC-78 (Quarry Pond Surface Dump)

Written information (maps, memos, SOPs, reports, etc) - Doesn't know of any

First hand knowledge

- When started was apprentice carpenter for Firestone- had couple of places to dispose of transite and other inert, non-organic materials as bricks, concrete blocks, etc;
 - Sand Creek sewage treatment plant and Fuze & Booster (F & B) pond.
 - Materials placed in these areas were anything that didn't rot, no wood.
- The F & B quarry was one big pit and was usually dry.
- When the dams were constructed in the early 1970's in the F & B quarry for Water Works 4, the transite and other inert materials were excavated from the pit and then the remaining muck was dredged out down to rock.
- It was common practice to fill any depressions with inert materials, including transite.
- Transite sources- wanted to keep facility buildings in good condition and rain proof so did repairs on roofs to keep them water tight. Was part of Mobilization Plans to be able to be up and running in a short time
- Rough estimated that approximately one pick-up truck load a month of transite was disposed of.

On the west side of the facility, transite was disposed of in the F &B quarry

On the east side of the facility, transite was disposed of adjacent to the Sand Creek Sewage Treatment Plant. This was the area cleaned up by MKM in the early 2000's.

Estimated overall about 75 % went to Sand CreeK; only about 25% at F & B quarry Never saw any burning in the F&B quarry.

After the ponds were built, the northern was the pond with the least amount of water by the middle pond.

Any other sources of information that might be helpful Nobody still alive

Knowledge of CC-80 (Group 2 Propellant Can Tops)

A,B Knowledge of Group 2 Magazines

Written records (SOPs, studies, annual reports, etc) - Doesn't know of any

First hand knowledge -

The Group 2 magazines were above ground buildings.

- The area between the eastern-most buildings of Group 2 and the eastern Group 2 fence were used to store items or materials that didn't need to be covered, like brass ingots. There were trainloads of brass ingots stored on the hardstand area in this area.
- GSA, of which a portion morphed into the Defense Logistics Agency (DLA) stored items and materials in these magazines and the associated hardstand area that weren't used for any operations at Ravenna; much like the chromium ore piles on the east side of the facility.
- Mr. McGee remembers black powder cans, about 2' high, 16" square, with rounded corners on the sides. On the top were 8" threaded can lids, some sealed with compression clamps.
- Mr. McGee thinks the kind of lid in the photographs taken recently had a gasket.
- Mr. McGee thinks only empty powder storage cans were stored outdoors at Group 2. When space would allow empty as well as full cans of propellants were kept in the Group 3 magazines.
- Mr. McGee remembers the sides of the propellant cans being thin sheet metal, while the lids or tops were cast iron.
- Mr. McGee believes the thin sheet metal sides rusted away leaving only the cast iron lids.
- Black powder was derived from the demil of 90 mm projectiles, wherein after the shells were pulled apart, the perforated nuggets or course size pieces of black powder were poured into the propellant cans.
- Mr. McGee remembers the facility and associated storage facilities being full in the 1960's and 1970's.
- The common term for the containers was "powder can".
- Mr. MGee remembers the Group 3 magazines typically being about ½ full of empty powder cans.
- Generally, Mr. McGee remembers there being outdoor storage being fairly common, especially in the depot areas and mostly lumber related.

Any other sources of information or people that might be helpful

Larry Boggs, supervisor in storage facilities 330 821-4545

- C.L.Davis, also supervisor in storage department 330 947-2497 had detailed first hand knowledge
- Gary Wolfganag mid 60s; was surveillance manager; would have taken samples for quality contro I- was also safety manager/ always involved in demil work was very knowledgeable since he was in safety & surveillance 330 923-0835

Possibly, Ray McDaniel

Marv Gorden - was union president Larry Johnson - just retired Jim Bullock - 330 297-7327 Harold Cooper – was plant engineer

Interview Form for Information Related to RVAAP Sites CC-78 Quarry Pond Surface Dump CC-80 Group 2 Propellant Can Tops

Name of Person Interviewed - John Eller

Current Address - Defense Logistics Agency (DLA) / Warren, Ohio

Current Telephone - Office 330 652-1456 / Cell 304 675-0545

Date of Interview - 9 November 2010

Approximate Dates you were at RVAAP - Last few years

RVAAP Employer - NA

RVAAP Position - NA Manager of DLA at Warren, OH

RVAAP Main duties - NA

Knowledge of CC-78 (Quarry Pond Surface Dump) - Mr. Eller said there was no information at the DLA, Warren regarding the Quarry Pond Surface Dump.

Written information (maps, memos, SOPs, reports, etc)

First hand knowledge

Any other sources of information that might be helpful

Knowledge of CC-80 (Group 2 Propellant Can Tops) - Mr. Eller said there was no information at the DLA, Warren regarding the Group 2 Magazine Area.

A Knowledge of Group 2 Magazines

Written records (SOPs, studies, annual reports, etc)

First hand knowledge

Any other sources of information or people that might be helpful

B Knowledge of Propellant Can Tops at Group 2 Magazines

Written records

First hand knowledge

Any sources of information or people that might be helpful

Name of Interviewer – John P. Jent

Company of Interviewer – Prudent Technologies, Inc.
Name of Person Interviewed - Tom Chanda Current Address- USACE Louisville Current Telephone- 502 315- 6868

Date of Interview -10 November 2010

Approximate Dates you were at RVAAP - 1979 - 1993

RVAAP Employer Firestone - Rockor (Physics International), Olin Corp

- RVAAP Position Environmental manager for RVAAP Operating Contractor/ supervised the power house, water works; sewer plants; industrial treatment facilities (e.g. explosive wastewater, landfill, RCRA storage & treatment activities); & all other environmental activities.
- RVAAP Main duties Oversight and implementation for permits, inventories, & operations associated to the TSCA NPDES; SWDA; RCRA; CAA; SDWA;

Knowledge of CC-78 (Quarry Pond Surface Dump)

Written information (maps, memos, SOPs, reports, etc) - Doesn't know of any

First hand knowledge

Word of mouth from senior employees,

Cleaned out the quarry when the dams for Water Works 4 were built Fuze and Booster quarry had been a disposal area for the fuze and booster lines Probably just donnage; explosive materials went to the Winklepeck Burning Ground Donnage- wood, wood crates, munition boxes, any scrap, damaged booster parts, gears Never any mention of domestic waste, probably went to the landfill north of Winklepeck

Any other sources of information that might be helpful Drawings from OHARNG, probably not a complete set

Knowledge of CC-80 (Group 2 Propellant Can Tops)

A Knowledge of Group 2 Magazines - nothing explosive was stored there, just inert materials
 People who operated the magazines were in the stores and transportation
 department - there were many people in that department
 The Group 2 buildings have transite (asbestos) roofing

Written records (SOPs, studies, annual reports, etc) – doesn't know of any

First hand knowledge- none

Any other sources of information or people that might be helpful- Gary Wolfgang

B Knowledge of Propellant Can Tops at Group 2 Magazines - none

Written records- doesn't know of any

First hand knowledge - none

Any sources of information or people that might be helpful - none

Name of Interviewer – John P. Jent

Name of Person Interviewed – Mark Patterson Current Address - RVAAP Current Telephone - 330 358-7312

Date of Interview - 10 November 2010

Approximate Dates you were at RVAAP – Jul 97 till present

RVAAP Employer - BRACD

RVAAP Position - BRACD Environmental Coordinator/Facility Manager

RVAAP Main duties - Manage environmental cleanup and liquidation of property

Knowledge of CC-78 (Quarry Pond Surface Dump)

Written information (maps, memos, SOPs, reports, etc) - doesn't know of any First hand knowledge comes from Jim McGee

Any other sources of information that might be helpful- historical aerial photographywhat's available- like 1952 aerial photographs / Katie Tait has digital 1952 aerials on a CD

Knowledge of CC-80 (Group 2 Propellant Can Tops)

A Knowledge of Group 2 Magazines

Written records (SOPs, studies, annual reports, etc) - never looked at until propellant cans became a concern

First hand knowledge - none

Any other sources of information or people that might be helpful - Aerial photographs

B Knowledge of Propellant Can Tops at Group 2 Magazines

Written records – doesn't know of any

First hand knowledge - none

Any sources of information or people that might be helpful Ray McDaniel - Katie Tait has Mr. McDaniel's telephone number

Name of Interviewer – John P. Jent

Name of Person Interviewed – Larry Boggs

Date of Interview – 11 November 2010

Approximate Dates you were at RVAAP - 1965 - 1998

RVAAP Employer - Mostly Olin Mason & Hanger - last 5 years

RVAAP Position - mostly in shipping and receiving (laborer, trucking, supervisor)
 2 or 3 years in maintenance
 2 or 3 years as supervisor in demilitarization of munitions at LL-12 worked at Winklepeck burning grounds
 2 or 3 years at Demolition Area 2

RVAAP Main duties - Did everything from laborer on up

Knowledge of CC-78 (Quarry Pond Surface Dump)

Written information (maps, memos, SOPs, reports, etc) - doesn't know of any

First hand knowledge – not real familiar with the Fuze & Booster (F & B) Quarry Believes the F & B quarry was where demolition debris related to the renovation of LL-7 to produce 40 mm's in the late 1960's was placed Doesn't remember any burning ever taking place there

Any other sources of information that might be helpful - doesn't know any other people who might have knowledge of activities at the F & B quarry other than Jim McGee

Knowledge of CC-80 (Group 2 Propellant Can Tops)

A,B Knowledge of Group 2 Magazines

Written records (SOPs, studies, annual reports, etc)-

There were safety manuals and SOPs related to the magazines

This type information would have been contained in files called "receiving and shipping, stores & transportation" and there was a large amount of such written information

First hand knowledge

Believes propellants were stored in the Group 3 magazines (Class 3 propellants)
Believes Class 2 materials were stored in Group 2 (boxed, filled mostly 152 and 155 mm projectiles without fuzes or boosters)

Remembers propellant cans and lids being stored inside the magazines in Group 2

His recollection of propellant cans was they were made of galvanized steel less than 3' tall, rectangular about 8-10" on one side and 18" or so on the other side. There was a cap on the top to fill and unfil the cans. The hole at the top had a locking lid.

The propellant cans were strong, but tipsy; 12 would be placed on a wooden pallet and when the pallet would be picked up, some of the cans would fall off along the long side of the can.

Remembers inert materials also being stored in the Group 2 magazines Doesn't remember any outdoor storage of materials

Any other sources of information or people that might be helpful Gary Wolfgang

- C.L. Davis- was employed in shipping and receiving whole time he was there/ worked his way up from laborer to supervisor
- B Knowledge of Propellant Can Tops at Group 2 Magazines (See A)

Written records

First hand knowledge

Any sources of information or people that might be helpful

Name of Interviewer- John P. Jent

CC-78 Quarry Pond Surface Dump CC-80 Group 2 Propellant Can Lids

Name of Person Interviewed – Gail Harris Current Address - RVAAP Current Telephone - 330 358-7304

Date of Interview - 12 November 2010

Approximate Dates you were at RVAAP – 6/2004 till present

RVAAP Employer - SpecPro, SpecPro Technologies, Vista Sciences Corporation

RVAAP Position – Archivist/Technical Librarian

RVAAP Main duties – assess and catalog historical and current RVAAP documents, maintain two public repositories

Knowledge of CC-78 (Quarry Pond Surface Dump)

Written information (maps, memos, SOPs, reports, etc) - doesn't know of any

First hand knowledge - none

Any other sources of information that might be helpful Will check on donated items at local historical societies, Mahoning Valley Historical Society Windham Historical Society Newton Falls Public Library Portage County Historical Society

Knowledge of CC-80 (Group 2 Propellant Can Tops)

A Knowledge of Group 2 Magazines

Written records (SOPs, studies, annual reports, etc) - not found in existing files, no work orders one article about testin g- measurement of the canister ?

First hand knowledge - None

Any other sources of information or people that might be helpful Same as above One person who has artifacts about Ravenna, George Buckner; his wife worked here Mr. Buckner is retired, probably is in his late 60's, early 70's

B Knowledge of Propellant Can Tops at Group 2 Magazines

Written records – doesn't know of any

First hand knowledge - none

Any sources of information or people that might be helpful - none

Name of Interviewer – John P. Jent

Name of Person Interviewed - Tim Morgan Current Address- Camp Ravenna, Joint Military Training Center Current Telephone- 614 336-6568

Date of Interview – 12 November 2010

Approximate Dates you were at RVAAP – 8/1988 till present

RVAAP Employer - Olin (88 - 93), DA (94 - 2000), OHARNG (2000 - Present)

- RVAAP Position Olin- Land Management Specialist, Army- forrester/environmental manager OHARNG- Envir/Program Superviser
- RVAAP Main duties When with Olin was land management, real property manager, cultural/natural resource manager, pest management coordinator-Army/Ohio Army National Guard- oversight of environmental program

Knowledge of CC-78 (Quarry Pond Surface Dump)

Written information (maps, memos, SOPs, reports, etc) doesn't know of any Was groundwater discharge treatment facility for Water Works - 3/ after ponds created water went into the top pond Iin 1992 WW3 was shut down

First hand knowledge- was told did demolition in the quarry

Any other sources of information that might be helpful Larry Johnson - what was discharged into the ponds 330 297-5757 Ray McDaniel - worked multiple jobs LTC Tom Tadsen- 330 256-0921

Knowledge of CC-80 (Group 2 Propellant Can Tops)

A Knowledge of Group 2 Magazines

Written records (SOPs, studies, annual reports, etc) – doesn't know of any

First hand knowledge- none

Any other sources of information or people that might be helpful Got covered with

B Knowledge of Propellant Can Tops at Group 2 Magazines

Written records

First hand knowledge

Interviewer asked why north site of Group 2 was suspect
 Mr. Morgan said a 1952 aerial shows outdoor storage in that area too
 At south end, found elongated tubes (2 ft long, 3-4" diameter metal, probably black rubber donut-shaped rings
 UXO Technicican thought tubes were packaging for stored an old tank rounds
 Thought Group 2 was never an area that would be a safety concern

Any sources of information or people that might be helpful – Tom Tadsen

Name of Interviewer – John Jent

Name of Person Interviewed - Gary Wolfgang Current Telephone- 330 923-0835

Date of Interview - 12 November 2010

Approximate Dates you were at RVAAP – 6/1968 - 1993

RVAAP Employer - RAI / Firestone

RVAAP Position - Safety Inspector/ Supervisor/ Engineer / Manager/ Dir of Safety & Surveillance Surveillance during his time at RVAAP meant quality control

RVAAP Main duties - His duties were self explanatory from the RVAAP positions
 Magazine inspections, shipping and receiving inspections (incoming and outgoing materials)
 Had much information on shipping and receiving
 Truck inspections
 Any energetic material had shipping information on it
 RVAAP was the central storage area for nitroguanadine (stored at A, B, C, D Block igloos)

Knowledge of CC-78 (Quarry Pond Surface Dump)

Written information (maps, memos, SOPs, reports, etc) - there were many SPMs (standarad practice manuals); an SPM for virtually every major activity The government had SOPs, and the contractors replicated them in SPMs

First hand knowledge - ACM was not an issue in those days Had safety procedures, but environmental concerns were less an issue then Buried transite At Winklepeck, 3rd lane back by old barn Where guards did qualification firing Does not remember transite going to Sand Creek Treatment Plant or the Fuze and Booster Quarry Interviewer asked if could dispose of anything at the Fuze and Booster Quarry Mr. Wolfgang said municipal garbage was disposed of there and at the Ramsdell Quarry Interviewer asked if there was any burning at the Fuze and Booster Quarry Mr. Wolfgang didn't remember any burning taking place there while he was at the RVAAP Interviewer asked if he knew what was done with the materials at the bottom of the Fuze and Booster Quarry pond when the dams were built. Mr. Wolfgang answered that he did not know where excavated materials from the Fuze and Booster Quarry went when the dams were built- said that would have been an ancillary activity that probably wasn't documented.

Mr. Wolfgang said he was more involved with activities at the load lines and in receiving and demolition.

Any other sources of information that might be helpful – mentioned Jim McGee, CL Davis, and Larry Boggs

Knowledge of CC-80 (Group 2 Propellant Can Tops)

A Knowledge of Group 2 Magazines

Written records (SOPs, studies, annual reports, etc)- many SPMs
Had maintenance manuals (roofs, ventilators, doors, etc)
Tons of information
All SPMs and SOPs were on file
MM- Maintenance manuals were in the main file at headquarters building had original plant drawings
Also in safety office had copies of all manuals
Equipment manuals
George Road shops had manuals,
Main garage- 1034 truck maintenance
Thought Army Materiel Command (AMC) might have copies of the SPMs.

First hand knowledge

What activity at Group 2

Were above ground magazines

Were for non mass detonating explosives

Fire hazard, but not explosive

Propellants were stored in Mark 7 cans,

Sealed can with quick release top

Had o-ring around top,

Galvanized steel cans

Empty cans weighed about 24 pounds

About 28-30 in high

About 16 in x 8 in in plan

Filled from top, opening about 5-in diameter

Filled with propellants

Propellant cans

Interviewer asked if he remember where empty cans were stored ?

Stored outside on a hardstand

East side of east-most, but inside the fence, some may have been outside

Mostly on east side during his time, may been on south side before he came here

Outdoor storage was common

At igloos, had outdoor storage pads adjacent to the them, like pole barns, but with no sides along Greenleaf Road

Also, at many igloos- for temporary storage- had more material than could be put in igloos so it was stored outdoors in adjacent areas scheduled for storage

All based on the quanity distance considerations

In WW-2 had temporary storage pads adjacent to the igloos that were used much Since was involved in all activities, especially with safety and surveillance had good knowledge of many activities done at the facility.

Any other sources of information or people that might be helpful – Jim McGee

B Knowledge of Propellant Can Tops at Group 2 Magazines

Written records – didn't know of any

First hand knowledge - none

Any sources of information or people that might be helpful

Name of Interviewer – John P. Jent

Name of Person Interviewed - Susan McCauslin Current Address- DOE, Carlsbad, NM Current Telephone- (575) 234-7349

Date of Interview - 23 November 2010

Approximate Dates you were at RVAAP - 11/1989 - 2003

RVAAP Employer - Olin, Mason & Hanger, Vista, Spec Pro

RVAAP Position - Environmental Manager

RVAAP Main duties - Environmental assessments, reports, coordination, monitoring

Knowledge of CC-78 (Quarry Pond Surface Dump)

Written information (maps, memos, SOPs, reports, etc) – doesn't know of any

First hand knowledge – has no first hand knowledge

Any other sources of information that might be helpful - none

Knowledge of CC-80 (Group 2 Propellant Can Tops)

A Knowledge of Group 2 Magazines

Written records (SOPs, studies, annual reports, etc) – doesn't know of any

First hand knowledge – has no firsthand knowledge

Any other sources of information or people that might be helpful - none

B Knowledge of Propellant Can Tops at Group 2 Magazines

Written records – doesn't know of any

First hand knowledge – has no firsthand knowledge

Any sources of information or people that might be helpful - none

Name of Interviewer – John Jent

Name of Person Interviewed - LTC Tom Tadsen

Date of Interview – 2 December, 2010

Approximate Dates you were at RVAAP - June 1999 – Aug 2006

RVAAP Employer - Ohio Army National Guard

RVAAP Position – Garrison Commander

RVAAP Main duties - Managed all military activities on the facility

Knowledge of CC-78 (Quarry Pond Surface Dump)

Written information (maps, memos, SOPs, reports, etc) - doesn't know of any

First hand knowledge - has seen transite there

Any other sources of information that might be helpful - Ray McDaniel

Knowledge of CC-80 (Group 2 Propellant Can Tops)

A Knowledge of Group 2 Magazines

Written records (SOPs, studies, annual reports, etc) – doesn't know of any

First hand knowledge - none

Any other sources of information or people that might be helpful - see below

B Knowledge of Propellant Can Tops at Group 2 Magazines

Written records – doesn't know of any

First hand knowledge- has seen propellant can tops around the foundations of the magazines at Group 2;
 found the propellant can tops when he was clearing brush around the magazines in about 2003 – 2004
 believes Frank Jackson also noticed propellant can tops when he was clearing brush for the railroad track removal

Any sources of information or people that might be helpful-Ray McDaniel Frank Jackson Sgt 1st Class Rex Hufenbach Name of Interviewer – John P. Jent

Name of Person Interviewed - Ray McDaniel

Date of Interview – 2 December 2010

Approximate Dates you were at RVAAP - 1942 - 1984

RVAAP Employer – Atlas Powder Co, Government, Firestone, Physic International, Olin

RVAAP Position/Duties - stared as explosives operator, was guard, millwright, mechanical inspector, foreman

Knowledge of CC-78 (Quarry Pond Surface Dump)

Written information (maps, memos, SOPs, reports, etc) - doesn't know of any

First hand knowledge – doesn't remember transite being taken to the pit when the quarry pit was cleaned out for the dams in the mid 1970's, the inert material at the south pond was removed offsite and sold for scrap there is a spring in the south pond- it used to be stocked with fish doesn't remember garbage ever being taken there did burning of waste in Area 9 where the 40-mm range is now

Any other sources of information that might be helpful - none

Knowledge of CC-80 (Group 2 Propellant Can Tops)

A Knowledge of Group 2 Magazines

Written records (SOPs, studies, annual reports, etc) - doesn't know of any

First hand knowledge - stored boxed ammunition in the magazines

Any other sources of information or people that might be helpful

B Knowledge of Propellant Can Tops at Group 2 Magazines

Written records – doesn't know of any

First hand knowledge – doesn't think there would be much contamination there Doesn't remember seeing any propellant canisters or tops

Any sources of information or people that might be helpful

Name of Interviewer – John Jent

Name of Person Interviewed - Frank Jackson

Date of Interview – 2 December 2010

Approximate Dates you were at RVAAP - May 1982 - Present

RVAAP Employer - Firestone, Toltest, Physics International, Vista, Himself as contractor

RVAAP Position/Duties - Started as millwright for Firestone, was forklift operator, then did general maintenance; has done subcontract work at the facility for the past 10 years.

Knowledge of CC-78 (Quarry Pond Surface Dump)

Written information (maps, memos, SOPs, reports, etc) - doesn't know of any

First hand knowledge - none

Any other sources of information that might be helpful

Knowledge of CC-80 (Group 2 Propellant Can Tops)

A Knowledge of Group 2 Magazines

Written records (SOPs, studies, annual reports, etc) – doesn't know of any

First hand knowledge – in the early years he mowed around the magazines several times each year- doesn't remember seeing any propellant can tops

Any other sources of information or people that might be helpful

B Knowledge of Propellant Can Tops at Group 2 Magazines

Written records – doesn't know of any

First hand knowledge - mowed around the railroad tracks at the south end of Group 2 during removal of the tracks, remembers seeing metal canisters

Any sources of information or people that might be helpful - none

Name of Interviewer – John P. Jent

Name of Person Interviewed - SFC Rex Hufenbach

Current Address- Camp Ravenna Joint Military Training Center (CRJMTC)

Current Telephone- Cell 614 307 0491, Office 614-336-6571

Date of Interview – December 2, 2010

Approximate Dates you were at RVAAP - 2000

RVAAP Employer - Ohio Army National Guard

RVAAP Position – Range Operations Specialist

RVAAP Main duties – Range safety & maintenance

Knowledge of CC-78 (Quarry Pond Surface Dump)

Written information (maps, memos, SOPs, reports, etc)- doesn't know of any

First hand knowledge - none

Any other sources of information that might be helpful

Knowledge of CC-80 (Group 2 Propellant Can Lids)

A Knowledge of Group 2 Magazines

Written records (SOPs, studies, annual reports, etc)- doesn't know of any

First hand knowledge - none

Any other sources of information or people that might be helpful

B Knowledge of Propellant Can Lids at Group 2 Magazines

Written records – doesn't know of any

First hand knowledge – In the process of looking at areas on the facility to place a mobilization infantry training site in the summer of 2008, he and Tom Daugherty found several piles of propellant can lids at the south end of Group 2. He remembered there being approx total of about 100 +/- lids in the piles throughout the area. SFC Hufenbach reported finding the lids to Range Control and Tim Morgan. Tim came to the site and then reviewed 1950's aerial photographs which he thought showed outdoor storage of items that might have been propellant cans.

Any sources of information or people that might be helpful

Name of Interviewer – John Jent

Appendix D – Aerial Photographs























Appendix E – Comment Response Table



Environmental Protection Agency John R. Kasich, Governor Mary Taylor, Lt. Governor Scott J. Nally, Director

March 28, 2011

RE: RVAAP – SITE MG #: 267000859059 RAVENNA ARMY AMMUNITION PLANT PORTAGE/TRUMBULL COUNTIES HISTORICAL RECORDS REVIEW REPORT CC RVAAP-78 AND CC RVAAP-80 DRAFT REPORT

Mr. Mark Patterson Facility Manager Ravenna Army Ammunition Plant 8451 State Route 5 Ravenna, OH 44266

CERTIFIED MAIL

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: Draft. Historical Records Review Report for 2010 Preliminary Assessment Compliance Restoration Sites CC RVAAP-78 Quarry Pond Surface Dump and CC RVAAP-80 Group 2 Propellant Can Tops, Ravenna Army Ammunition Plant, Ravenna, Ohio. This document, dated and received on February 11, 2011 at Ohio EPA, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District, Prudent Technologies, Inc, under contract number W912QR-10-P-0052. This document was reviewed by personnel from Ohio EPA's Division of Emergency and Remedial Response (DERR). Ohio EPA's comments are enclosed with this correspondence.

If you have any questions regarding this correspondence, please do not hesitate to contact me at (330) 963-1148.

Sincerely,

Todd R. Fisher, Project Coordinator Division of Emergency and Remedial Response Todd.Fisher@epa.state.oh.us

TRF/kss

enclosure

ec: Eileen Mohr, Ohio EPA, NEDO, DERR John Jent, Prudent Tomas Hernandez, Prudent Glen Beckham, USACE, Louisville Thomas Chanda, USACE, Louisville Mike Eberle, Ohio EPA, NEDO, DERR MAJ Ed Meade, RTLS Katie Tait, RTLS Derek Kinder, USACE, Louisville Mark Krivansky, AEC Mark Nichter, USACE, Louisville

COMMENT RESOLUTION TABLE

Installation: Ravenna Army Ammunition Plant, Ravenna, Ohio Document: Draft Historical Records Review for 2010 PA Compliance Restoration Sites CC RVAAP-78 Quarry Pond Surface Dump and CC RVAAP-80 Group 2 Propellant Can Tops Reviewer(s): Todd R. Fisher, Ohio EPA, Division of Emergency and Remedial Response Date: March 28, 2011

Comment No.	Page No. Line No.	Ohio EPA Comment	Ohio EPA Recommendation	Prudent's Responses
1	General	A document distribution list (or table) should be included with this document	Add a document distribution list or table to this document.	A document distribution list was provided after the title page in Prudent's copies. Will ensure the Final has it in all copies of the report.
2	General	Facility-wide Background Information has been omitted from this document, which includes a general facility description, demography, and land use section.	Please add the standard General Facility Description, Demography, and Land Use language which was developed and approved for use in all RVAAP documents.	Will use Facility-Wide Background Information from Prudent's Final Sampling Report of Surface and Subsurface Incremental Sampling Methodology at LLs 1-4.
3	General	This document should contain a figure showing the entire installation and its orientation with respect to local communities, counties, and the State of Ohio.	Please provide a figure showing the general location and orientation of RVAAP with respect to local communities, highways, counties, geographic features (reservoir), and the State of Ohio. This figure should include a north arrow and scale. Figures not to scale should be indicated as such.	Will provide.
4	Page 1-1 Lines 19-29	The text states that USACHPPM prioritized the AOCs into low, medium, and high relative risk categories using relative risk	Please indicate in the text that USACHPPM collected environmental samples at each of the AOCs and performed a Relative Risk Site Evaluation (RRSE) which prioritized	Will delete line 20 on page 1-1 after (AOC). Then add suggested text as a new sentence.

COMMENT RESOLUTION TABLE

Installation: Ravenna Army Ammunition Plant, Ravenna, Ohio Document: Draft Historical Records Review for 2010 PA Compliance Restoration Sites CC RVAAP-78 Quarry Pond Surface Dump and CC RVAAP-80 Group 2 Propellant Can Tops Reviewer(s): Todd R. Fisher, Ohio EPA, Division of Emergency and Remedial Response Date: March 28, 2011

Comment No.	Page No. Line No.	Ohio EPA Comment	Ohio EPA Recommendation	Prudent's Responses
		protocols. The document makes no mention that environmental samples were collected to make this determination. Also, the text makes no mention of Relative Risk Site Evaluation (RRSE).	each AOC into three groups: low, medium, and high priorities.	
5	Figures 2-1 and 2-2	These figures do not depict the general location of the burn area associated with Debris Pile B.	Please add general location of burn pile in Debris Pile B on both of these figures.	A yellow dot has been added to show the approximate location of the burn area.
6	Figures 2-1, 2-2, 2-3, and 2-4,	The date at the bottom left hand corner of these figures is erroneous.	Please change "February 11, 20100" to "February 11, 2011."	Corrected.
7	Figure 3-6	Yellow box in bottom left hand corner of figure has no identification. Figure should have legend.	Please make the appropriate changes to the figure.	All objects in figure have been labeled.
8	Figure 4-1, page 4-18	This figure is incorrectly identified as Figure 4-1. It should be Figure 4-2. Figure does not have a legend.	Please make the appropriate changes to the figure.	Corrected.
9	Page 4-20, lines 6-7	The text states that ground water beneath CC RVAAP-80 is not utilized for domestic drinking or irrigation purposes, nor is it	It might be beneficial to mention in this paragraph that a municipal water line from the Village of Windham is being installed along Paris-Windham Road north of this	Suggest deleting line 7 on page 4-20 starting from, "nor is it projected" and adding

COMMENT RESOLUTION TABLE

Installation: Ravenna Army Ammunition Plant, Ravenna, Ohio Document: Draft Historical Records Review for 2010 PA Compliance Restoration Sites CC RVAAP-78 Quarry Pond Surface Dump and CC RVAAP-80 Group 2 Propellant Can Tops Reviewer(s): Todd R. Fisher, Ohio EPA, Division of Emergency and Remedial Response Date: March 28, 2011

Comment No.	Page No. Line No.	Ohio EPA Comment	Ohio EPA Recommendation	Prudent's Responses
		projected to be used in the future.	area. Ohio Army National Guard will most likely utilize this water for soldier use.	the suggested text.
10	Appendix A, page A-15, Photograph 11	Figure caption indicates that a tie bar is embedded in the tree. This feature is difficult to locate on this photograph	Tie bar should be marked or highlighted in some fashion so that it is easily identified by the reader.	Added a red arrow pointing to the tie bar, a red circle around the tie bar and a text box.
11	Appendix A Photographs	Photographs included in this appendix were taken landscape, however the photographs are placed in portrait format on paper. This results in a smaller photograph and harder to see details.	Reposition photographs in landscape on the paper so that they will appear larger.	Photos have been repositioned to landscape except Photos 2 and 17 because they are in portrait layout.