

**Final
Time Critical Response Action Plan
for the
Rocket Ridge Area of Open Demolition Area #2
(RVAAP-004-R-01 Open Demolition Area #2 MRS)
Military Munitions Response Program
Ravenna Army Ammunition Plant
Ravenna, Ohio**



March 2008

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FINAL

**TIME CRITICAL RESPONSE ACTION PLAN for the
ROCKET RIDGE AREA OF OPEN DEMOLITION AREA #2
(RVAAP-004-R-01 Open Demolition Area #2 MRS)**

**MILITARY MUNITIONS RESPONSE PROGRAM
RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO**

Submitted To:

**US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
CENWO-PM-HC
1616 Capitol Avenue, Suite 9000
OMAHA, NE 68102-4901**

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**Contract Number DACA-63-03-D0009
Task Order No.: DK01**

MARCH 2008

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Abbreviations and Acronyms	
DMM	Discarded Military Munitions
e ² M	engineering-environmental Management, Inc.
MC	Munitions Constituents
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MMRP	Military Munitions Response Program
MRS	Munitions Response Site
ODA2	Open Demolition Area #2
OE	Ordnance and Explosives
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
O&M	Operations and Maintenance
RAB	Restoration Advisory Board
RVAAP	Ravenna Army Ammunition Plant
SI	Site Inspection
TCRA	Time Critical Response Action
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command
UXO	Unexploded Ordnance

I.0 INTRODUCTION

Ravenna Army Ammunition Plant (RVAAP), Federal Facility Identification number: OH213820736, is located in northeastern Ohio within Portage and Trumbull Counties, approximately three miles east northeast of the city of Ravenna and approximately one mile northwest of the city of Newton Falls. engineering-environmental Management, Inc. (e²M) has been performing work at RVAAP as part of the Military Munitions Response Program (MMRP), which investigates other than operational ranges and other sites with known or suspected unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC). The ongoing e²M work at RVAAP consists of a Site Inspection (SI) of 17 Munitions Response Sites (MRSs) and a Time Critical Response Action (TCRA) at the Rocket Ridge Area of the Open Demolition Area #2 (ODA2) MRS.

Rocket Ridge is a steep embankment along Sand Creek, located within the ODA2 MRS (Army Environmental Database-Restoration Number RVAAP-004-R-01), in the approximate geographical center of the installation. The SI and TCRA activities are being conducted under the MMRP, Contract Number DACA63-03-D0009, Task Order Number DK01. For a detailed description of RVAAP, scope and methodology of the SI activities, and Safety and Health procedures, see the Final SI Work Plan, RVAAP, prepared by e²M and dated September 2007.

The purpose of this TCRA is to prevent the downstream movement of munitions and explosives of concern (MEC) and Munitions Debris (MD) within Sand Creek. This objective will be met by the construction of Engineering Controls consisting of a barrier system within Sand Creek, at a location downgradient of the farthest visible piece of munitions-related material that may have migrated from Rocket Ridge. The location of the farthest visible piece of munitions-related material and the location of the barrier system were identified during a field survey conducted by e²M, the Ohio Environmental Protection Agency (Ohio EPA), and the United States Army Corps of Engineers (USACE), Louisville District, on 5 and 6 November 2007. The barrier system location is approximately 2,700 feet downstream of the Rocket Ridge Area of ODA2 and 26 feet upstream of George Road Bridge.

This TCRA Plan includes the barrier system construction plans (see **Appendix A**) and the post-construction requirements, consisting of a Construction Completion Report and operations and maintenance (O&M) requirements (see **Appendix B**).

2.0 ROCKET RIDGE BACKGROUND

Rocket Ridge is a steep embankment approximately 500-feet long and 25-feet high located adjacent to Sand Creek within the ODA2 MRS. The MRS was used for munitions demilitarization, including detonation of large caliber munitions and off-specification bulk explosives that could not be deactivated or demilitarized by any other means. The Rocket Ridge slope was likely used for the disposal of demilitarized munitions, although not all munitions appear to have been completely demilitarized. Munitions-related items that could be identified by PIKA International, the Ordnance and Explosives (OE) Subcontractor in June 2007 included 75-millimeter and 105-millimeter rounds, booster cups, three 500-pound bombs, white phosphorus rifle grenades, fuzes, and burster tubes. It appears that the demilitarized munitions were transported from the demolition site to the Rocket Ridge Area of ODA2 and dumped at the top of the slope. Sand Creek flows in an eastward direction along the northern boundary of Rocket Ridge, at the toe of the slope. Due to the steep slope of the disposal area and the stream bank erosion resulting from high water events, some of the munitions materials have reached Sand Creek.

On 18 June 2007, a rifle grenade containing white phosphorus exploded on the slope of the Rocket Ridge Area of ODA2. The Incident Report attributes the cause of the explosion to a corroded white phosphorus grenade that might have been overturned by an animal, which exposed the white phosphorus to air, resulting in its auto-igniting, which heated the grenade until the internal burster exploded. No injuries resulted from the incident.

3.0 SCOPE OF TIME CRITICAL RESPONSE ACTION ACTIVITIES

The TCRA for the Rocket Ridge Area of ODA2 consists of the following steps:

- **Scoping Meeting:** The Scoping Meeting was held on 20 September 2007 at RVAAP. The purpose of this meeting was to discuss the current conditions at the Rocket Ridge Area of ODA2, to visit Rocket Ridge, and to determine the short term measures necessary to minimize the risks associated with the site.
- **Sand Creek Survey Work Plan:** A stream survey was deemed necessary for the development of the TCRA Plan. The work plan supporting the survey was finalized and submitted on 24 October 2007.
- **Sand Creek Survey:** The stream survey was conducted on 5 and 6 November 2007. The survey determined the location of the farthest visible piece of munitions-related material that may have migrated from Rocket Ridge and identified a suitable location for the barrier system. A more detailed description of the Sand Creek Survey is included in Section 4 of this document.
- **TCRA Plan** (i.e., this document): The TCRA Plan includes the design of the barrier system and the O&M Plan.
- **Barrier System Construction:** This step consists of the actual construction of the barrier.
- **Construction Completion Report.** This report will document the construction activities and the as-built system.
- **O&M Activities:** This step will include the requirements for periodic site visits, inspections, and maintenance of the barrier system. The field personnel will examine the materials accumulated on the screens and determine if any munitions-related materials are present. They will remove all materials from the screens, inspect the integrity of the system and document the site conditions at the beginning and end of the visit.
- **Quarterly Effectiveness Evaluation Reports:** The O&M activities will be summarized every three months in a Quarterly Effectiveness Evaluation Report. The report will include an assessment of whether the system has functioned as intended, and a summary of the maintenance activities performed.

4.0 SAND CREEK SURVEY RESULTS

4.1 Sand Creek Survey Purposes

The main purposes of the Sand Creek Survey were to:

- a) Identify the farthest visible location downstream of Rocket Ridge where munitions-related materials are present;
- b) Examine the creek topography downstream of that location in order to determine a suitable site for the barrier system;
- c) Conduct a topographic survey of the cross section of Sand Creek at the site identified as suitable for the barrier system; and
- d) Document site conditions that may help in the development of the TCRA Plan and the construction activities (e.g., access to the barrier site(s), characteristics of the creek bottom, distance to roads, etc.).

4.2 Sand Creek Survey Results

The Sand Creek Survey was conducted on 5 and 6 November 2007 by e²M with the support of PIKA International, and Don Trocchio, the Topographic Survey Subcontractor. Also participating were representatives of Ohio EPA and the USACE.

The team accessed Sand Creek from George Road Bridge (see **Figure I**) and walked upstream toward Rocket Ridge. The survey included the stream and adjacent bank areas and relied on the hand-held magnetometer operated by PIKA and visual observations. The anomalies signaled by the magnetometer were visually investigated. At each anomaly location, an attempt was made to expose the source of the instrument alert signal. Locations where the apparent anomaly sources were buried were not dug up but marked with pin flags. Approximately 19 anomaly locations were identified. At six of them the sources were found to be old and deteriorated metallic objects such as what appeared to be saw blades, a hinge, a piece of wire, etc. (see **Photograph I**). None of the objects were munitions-related. At the remaining 13 locations the anomaly sources could not be identified because they were buried.



Photograph 1: Non-munitions related anomaly sources

The first munitions-related item was encountered in the stream, approximately 1,500 feet from the George Road Bridge and 1,200 feet from the Rocket Ridge Area of ODA2. The item was the rusted, deteriorated, bottom part of a 75-millimeter cartridge casing (see **Photograph 2** and **Figure 1**). This item represented the farthest visible munitions-related item located downstream of Rocket Ridge.



Photograph 2: Munitions debris located approximately 1,500 feet from George Road Bridge

After marking the location where the item was found, the Team walked back downstream to identify a location suitable for the construction of the barrier system. The main siting criteria included steep and tall banks close to each other (to eliminate the risk of flood waters bypassing the barrier and to limit the width of the barrier), shallow water (to allow construction without diverting the stream), and a level stream bottom (to facilitate anchoring the screen). The location that best satisfied these criteria was a short creek segment just upgradient of George Road Bridge (see **Photograph 3**). This location provides additional benefits, including easy access from the road, which will minimize the impact of construction and O&M activities on the environment, and good visibility from the bridge, which will allow casual observations of the condition of the screens. Finally, this location is downstream of all of the 13 flagged subsurface anomaly locations that were not dug up. Consequently, no additional anomaly investigations were deemed necessary.



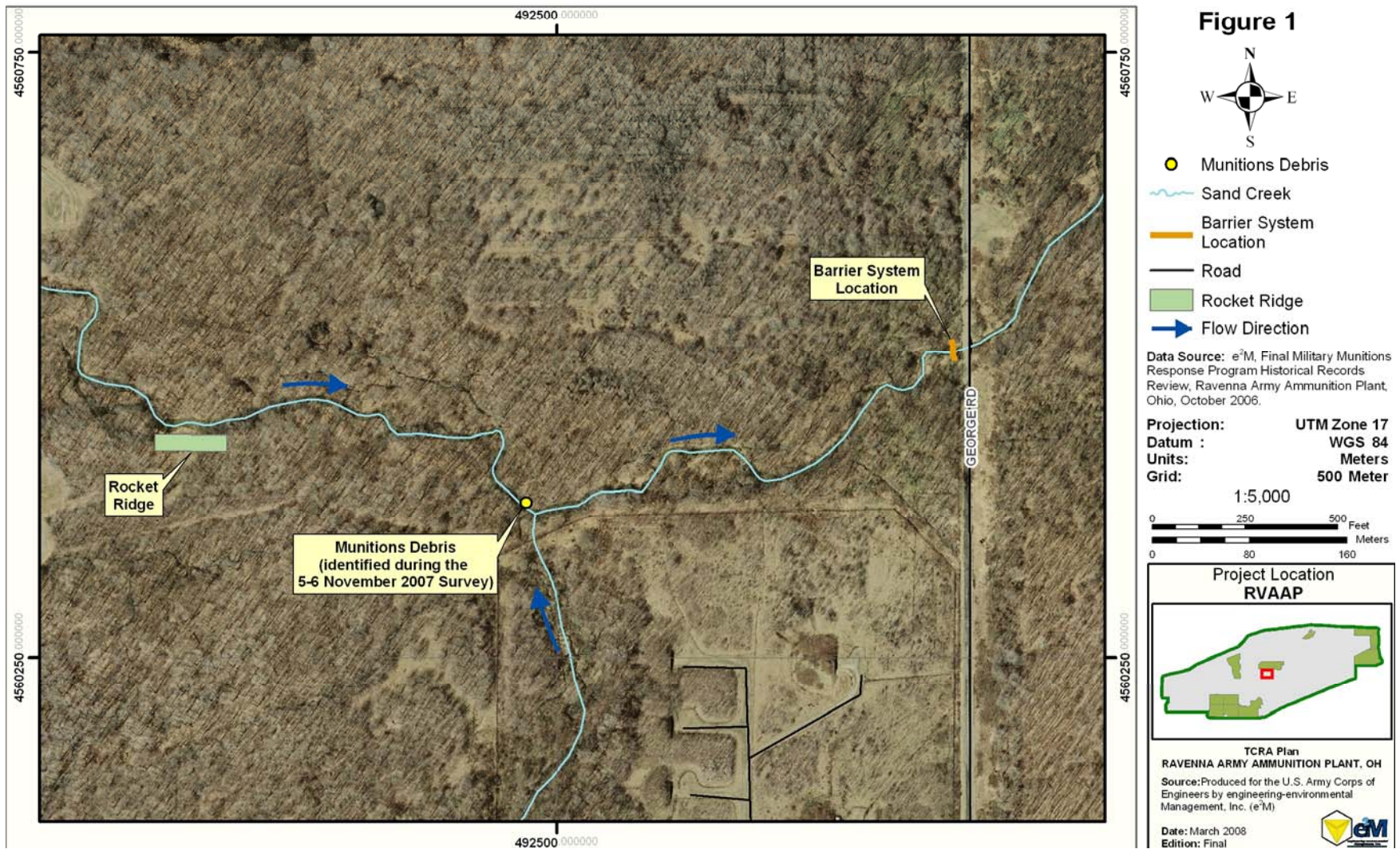
Photograph 3: Barrier system site

Next, the Surveyor and e2M determined the coordinates of the location of the munitions debris item and a representative Sand Creek cross section in the area of the barrier system site (see location map in **Figure I**). The topographic survey work concluded the Sand Creek survey activities.



TIME CRITICAL RESPONSE ACTION PLAN

Ravenna Army Ammunition Plant, OH



5.0 ENGINEERING CONTROL DESIGN

The Engineering Control is designed to prevent the downstream movement of MEC and MD from Rocket Ridge within Sand Creek. The Engineering Control will consist of two parallel rigid screens installed across Sand Creek at a location 26 feet upstream of George Road Bridge (see **Figure 2**).

The distance between the screens will be ten feet. The screens will be made of green polyester powder-coated galvanized steel wires. The top of the barriers will be approximately two feet above the bottom of the creek (see **Appendix A** for the construction plans).

The screens will consist of a welded lattice of one ¼ inch vertical wire and two 5/16 inch horizontal wires. The lattice of the upstream screen will have 3-inch square openings whereas the downstream screen will have 1-inch square openings. The screen panels will be installed on 2 inch by 2 inch, 11 gage (0.12 inch), galvanized steel square posts. The posts will be installed in bedrock footings and will be braced with diagonal stay posts that will also be anchored into the bedrock (see the top and side views of the barrier in **Appendix A**).

The bottom of the screen panels installed on the stream banks will be buried into the bank soil. The bottom of the screen panels installed between posts with bedrock footings will be placed into an approximately 1 inch wide cut made in the bedrock. The cut will extend the width of the stream channel. This design ensures there is no open space between the bottom of the screen panels and the stream banks and stream bed.

The barrier system is a temporary measure intended to address concerns associated with the Rocket Ridge Area of ODA2. The barrier system will be removed when the MEC concerns in Sand Creek, upstream of George Road Bridge, have been addressed. At that time, all of the barrier system components will be removed from the site. The removal operations will be conducted with portable tools. No tracked or wheeled equipment will be required to access the site for the barrier system removal.



TIME CRITICAL RESPONSE ACTION PLAN Ravenna Army Ammunition Plant, OH

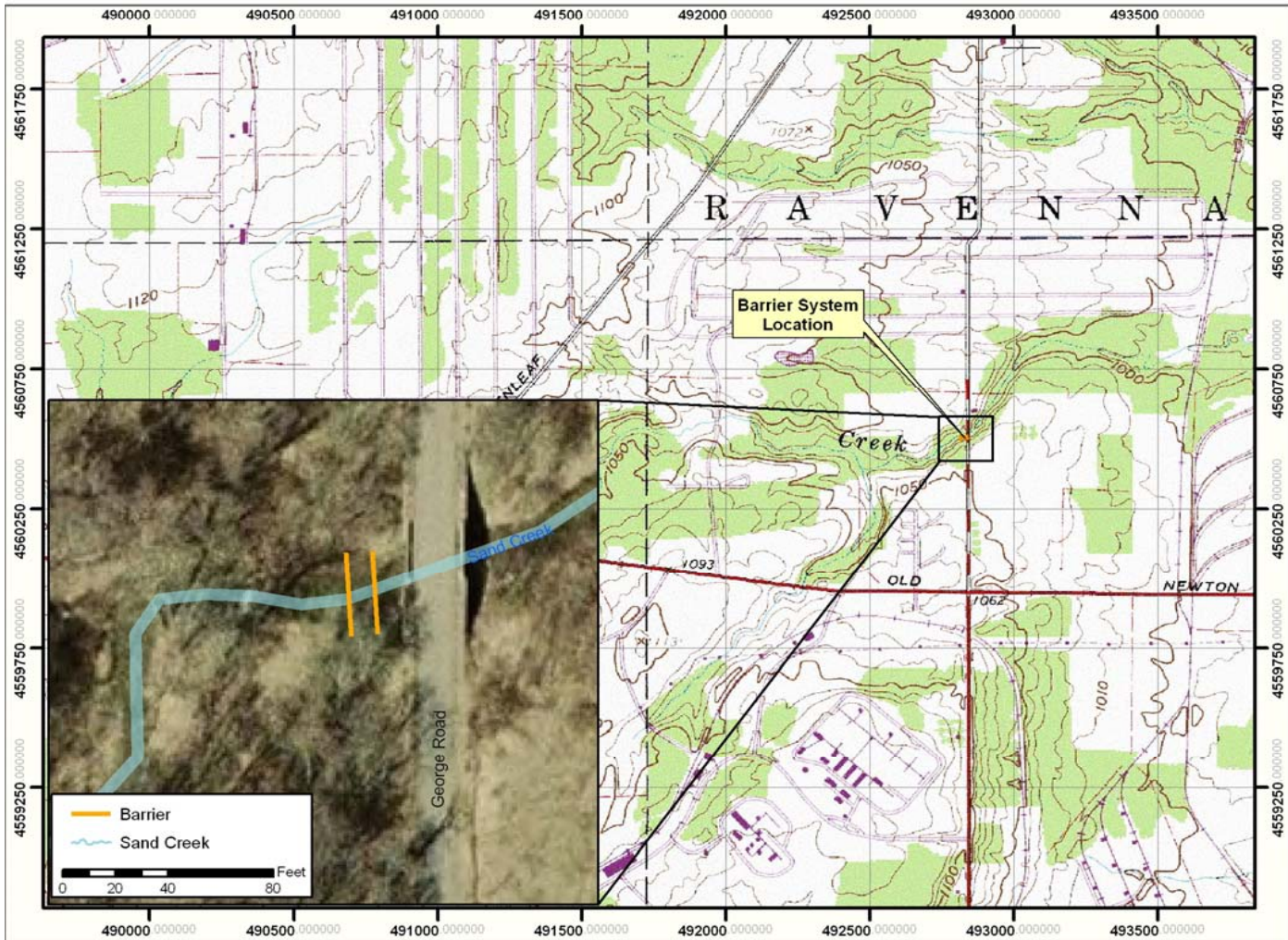


Figure 2

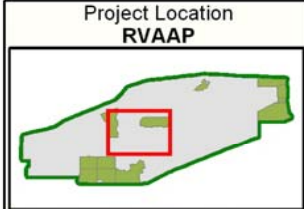


Barrier System
Location

Data Source: eM, Final Military Munitions
Response Program Historical Records
Review, Ravenna Army Ammunition Plant,
Ohio, October 2006.

Projection: UTM Zone 17
Datum : WGS 84
Units: Meters
Grid: 500 Meter

1:24,000



TCRA Plan
RAVENNA ARMY AMMUNITION PLANT, OH
Source: Produced for the U.S. Army Corps of
Engineers by engineering-environmental
Management, Inc. (eM)
Date: March 2008
Edition: Final



6.0 CONSTRUCTION COMPLETION REPORT

e²M will perform field oversight of all construction activities performed by the barrier installation subcontractor. A Field Change Request will be submitted by e²M to USACE, Omaha District, for approval, before implementing any changes from the construction drawings included in **Appendix A** to this TCRA Plan.

Within two calendar weeks of the completion of the barrier system construction, e²M will submit a Construction Completion Report. The report will document the construction activities and schedule, materials used, variations from the construction drawings (if any), construction difficulties and methods used to address them, and safety and health issues. The Construction Completion Report will also include a photographic log.

7.0 OPERATIONS AND MAINTENANCE PLAN

The purpose of the O&M Plan is to establish the schedule and methodology for the inspection and maintenance of the barrier system. The O&M Plan covers these activities for the first twelve months following the construction of the barrier. The experience accumulated during the first O&M year may be used to refine the O&M Plan for the subsequent year(s). It is anticipated that the barrier system will be maintained by the Army in accordance with the O&M Plan for as long as it is in place. The barrier system is a temporary measure intended to address concerns associated with the Rocket Ridge Area of ODA2.

The scope of the O&M Plan includes the following:

- a) O&M field activities: pre-trip coordination, barrier inspection, management of accumulated debris and munitions-related materials, and post trip reporting;
- b) O&M field trip frequency: establishment of calendar-based O&M trip schedule and event-triggered schedule;
- c) Quarterly Effectiveness Evaluation Report: preparation of a report that summarizes the O&M trip findings and assesses whether the barrier system functions as planned; and
- d) Safety and Health Plan: addresses the safety and health issues associated with the O&M activities.

The O&M Plan is included in **Appendix B**.

8.0 PROJECT TEAM

The multi-disciplined Project Team is comprised of representatives from the Stakeholders and e²M. The Stakeholders include:

- a) The United States Army Environmental Command (USAEC) is the overall program manager and is responsible for program management, project development, and providing guidance and oversight.
- b) USACE, Omaha District, is responsible for executing this TCRA, and contractor procurement and management, as well as providing technical oversight of the TCRA activities.
- c) Representatives from RVAAP and the Ohio Army National Guard (OHARNG) provide site-specific information and guidance related to Rocket Ridge and the installation.
- d) The Ohio EPA is the lead regulatory agency working with RVAAP under the MMRP and provides regulatory oversight and approval of proposed actions to be taken at the installation, including those conducted during this TCRA.
- e) The Restoration Advisory Board (RAB). The RAB is kept informed of the TCRA details, progress, and schedule.

e²M is responsible for the development of the Sand Creek Survey Work Plan, execution of the Sand Creek Survey field activities, development of the TCRA Plan, oversight of the construction activities, and preparation of the Construction Completion Report and Quarterly Effectiveness Evaluation Reports. e²M is also responsible for subcontractor procurement and oversight.

Contact information for Project Team representatives is provided in **Table I**.

Table I: Project Team Representatives Contact Information

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Table I: Project Team Representatives Contact Information (continued)

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<p>Irving Venger Industrial Specialist Ravenna Army Ammunition Plant 8451 State Route 5 Ravenna, OH 44266-9297 Telephone: 330-358-7311 E-mail: irving.b.venger@us.army.mil</p>	<p>Mark Patterson Facility Manager Ravenna Army Ammunition Plant 8451 State Route 5 Ravenna, OH 44266-9297 Telephone: 330-358-7311 E-mail: mark.c.patterson@us.army.mil</p>
<p>Katie Elgin Environmental Specialist 2 OHARNG -RTLS Ravenna Training and Logistics Site 1438 State Route 534 SW Newton Falls, Ohio 44444 Telephone: 614-336-6136 E-mail: katie.elgin@us.army.mil</p>	<p>Phil Werner Technical Project Manager 2751 Prosperity Avenue, Suite 200 Fairfax, VA 22031 Telephone: 703-752-7755 (ext. 108) Facsimile: 703-752-7754 E-mail: pwnerner@e2m.net</p>
<p>Terry Samson USACE Project Manager U.S. Army Corps of Engineers, Omaha District 106 South 15th Street Omaha, NE 68102 Phone: 402-221-7171 Fax: 402-221-7796 E-mail: terry.l.samson@usace.army.mil</p>	<p>Cheryl Groenjes USACE Project Manager USACE, Omaha District U.S. Army Corps of Engineers, Omaha District 106 South 15th Street Omaha, NE 68102-1618 Telephone: 402-221-7744 E-mail: cheryl.groenjes@usace.army.mil</p>
<p>Daniel Zugris Technical Program Manager e²M 2751 Prosperity Avenue, Suite 200 Fairfax, VA 22031 Telephone: 703-752-7755 (ext. 126) Facsimile: 703-752-7754 E-mail: dzugris@e2m.net</p>	

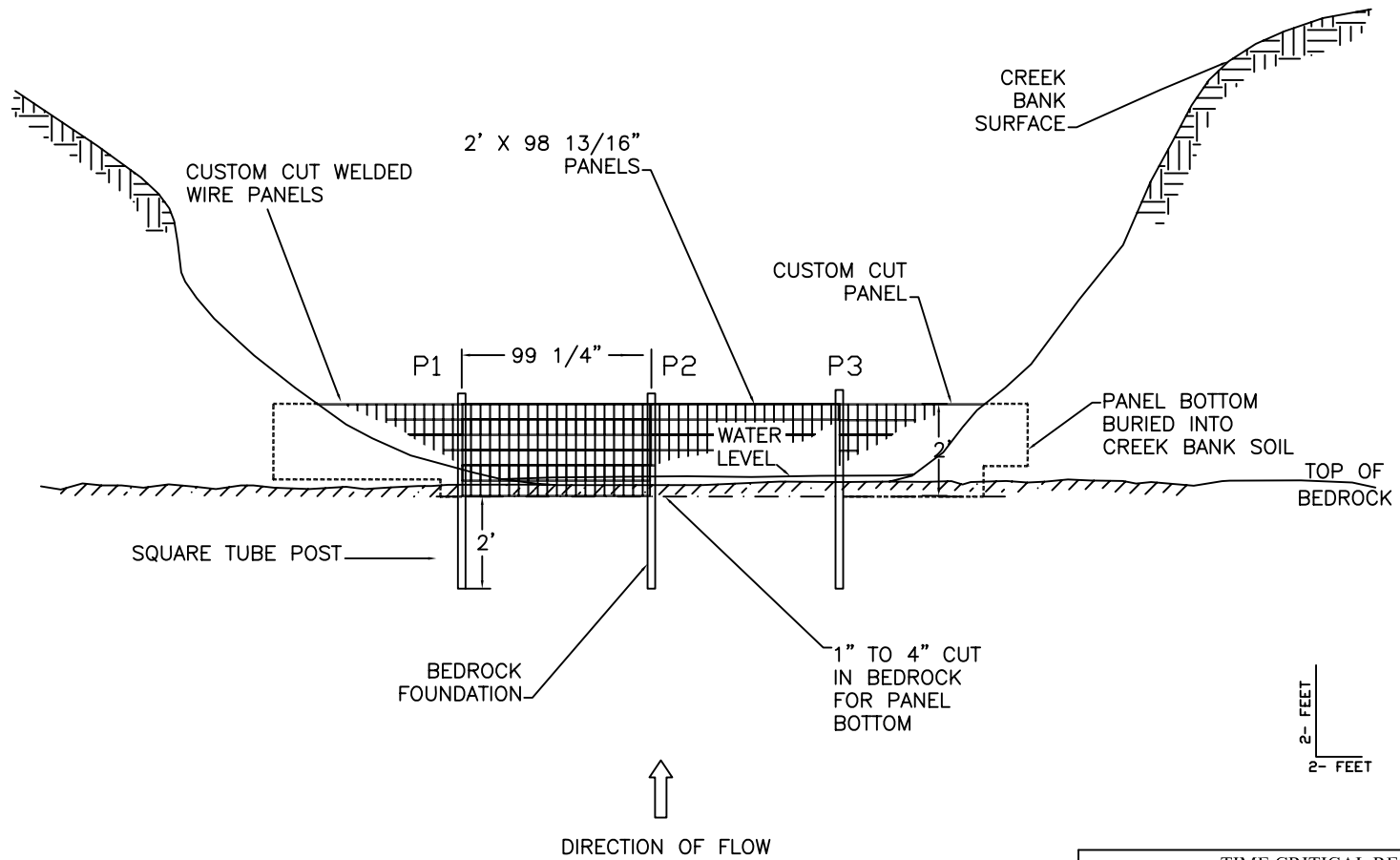
9.0 REFERENCES

- e²M, 2007 engineering-environmental Management, Inc. (e²M). Stakeholder Final SI Work Plan, Military Munitions Response Program, Ravenna Army Ammunition Plant, Ohio, September 2007.
- e²M, 2007 engineering-environmental Management, Inc. (e²M). Final Work Plan for Sand Creek Survey, Rocket Ridge Area of Open Demolition Area #2, Military Munitions Response Program, Ravenna Army Ammunition Plant, Ohio, October 2007.

APPENDIX A

Sand Creek Water Barrier System Construction Plans

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TIME CRITICAL RESPONSE PLAN
 ROCKET RIDGE AREA OF OPEN
 DEMOLITION AREA #2
 RAVENNA ARMY AMMUNITION PLANT
 RAVENNA, OHIO



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 Fairfax, VA 22031

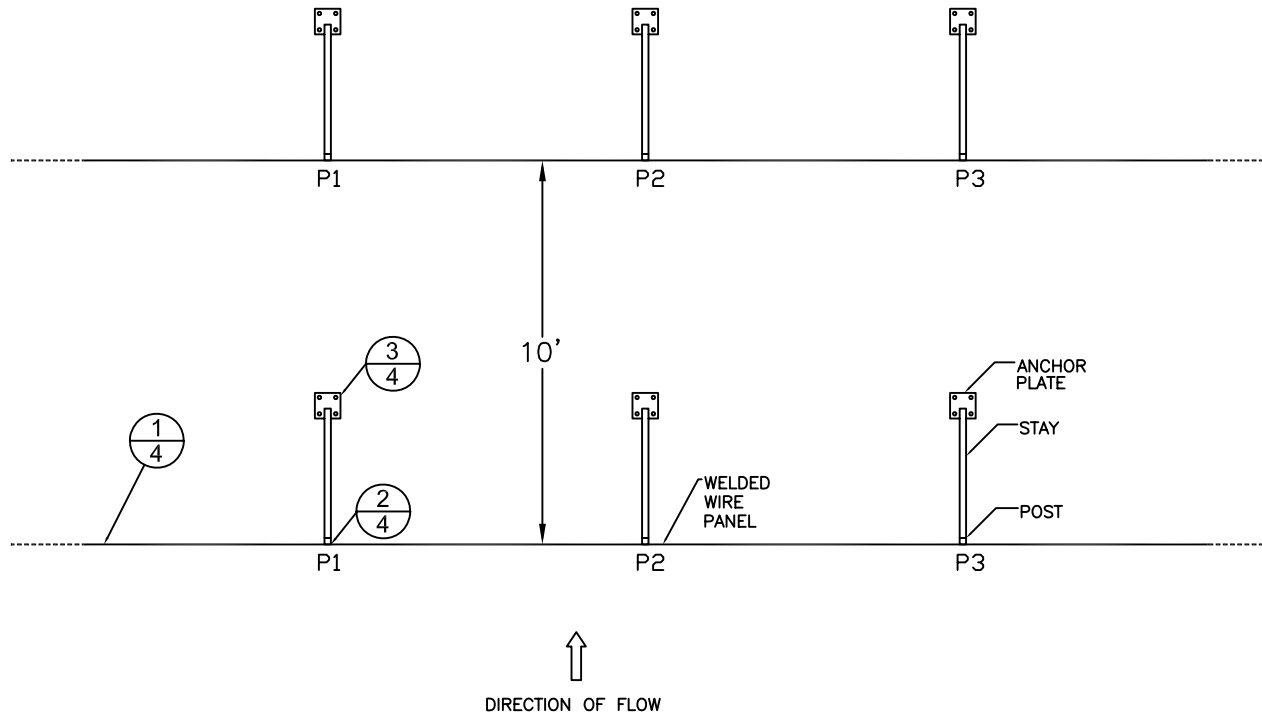
DATE
 1/10/08

FRONT VIEW
 SAND CREEK
 BARRIER SYSTEM

SCALE
 AS SHOWN
 TASK:
 4100.993.01.07

SHEET 1

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2- FEET

TIME CRITICAL RESPONSE PLAN
 ROCKET RIDGE AREA OF OPEN
 DEMOLITION AREA #2
 RAVENNA ARMY AMMUNITION PLANT
 RAVENNA, OHIO



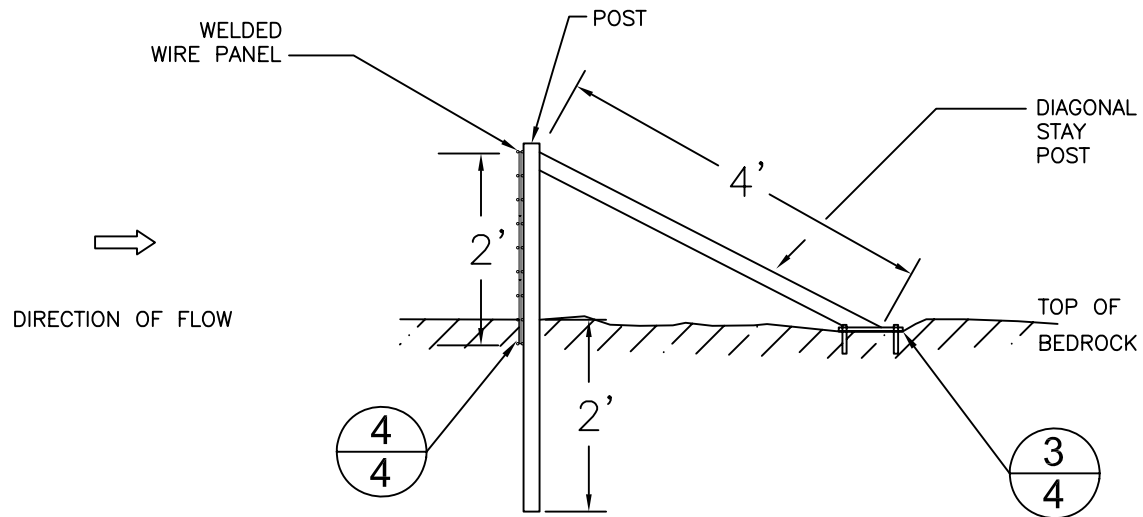
2751 Prosperity Avenue, Suite 200
 Fairfax, VA 22031

DATE
 1/10/08

TOP VIEW
 SAND CREEK
 BARRIER SYSTEM

SCALE
 AS SHOWN
 TASK:
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 SHEET 2

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2- FEET

TIME CRITICAL RESPONSE PLAN
 ROCKET RIDGE AREA OF OPEN
 DEMOLITION AREA #2
 RAVENNA ARMY AMMUNITION PLANT
 RAVENNA, OHIO



2751 Prosperity Avenue, Suite 200
 Fairfax, VA 22031

DATE
 1/10/08

TYPICAL SIDE VIEW
 SAND CREEK
 BARRIER SYSTEM

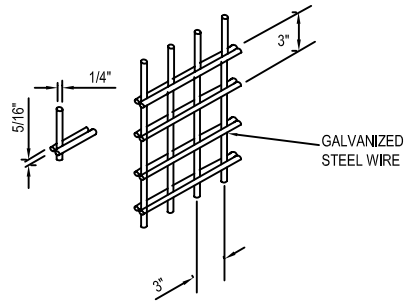
SCALE
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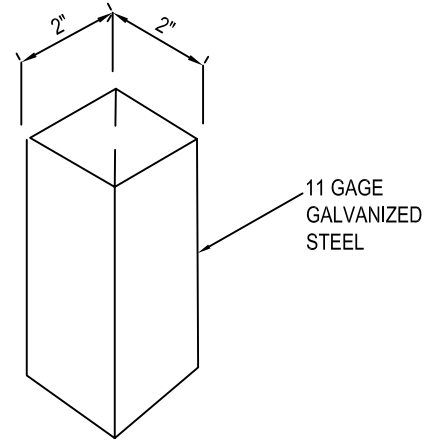
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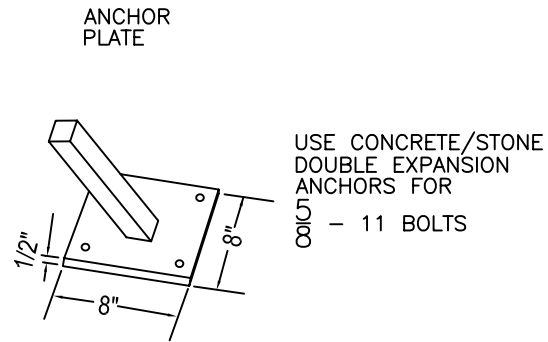
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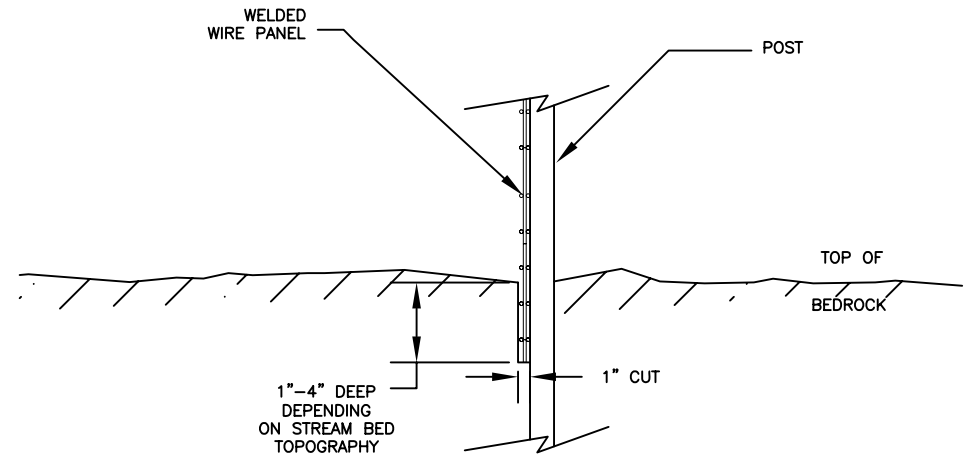
1
4
SCREEN DETAIL
N.T.S




2
4
POST DETAIL
N.T.S



3
4
ANCHOR PLATE DETAIL
N.T.S



4
4
BEDROCK POST AND SCREEN DETAIL
N.T.S

TIME CRITICAL RESPONSE PLAN ROCKET RIDGE AREA OF OPEN DEMOLITION AREA #2 RAVENNA ARMY AMMUNITION PLANT RAVENNA, OHIO		DATE 1/10/08
 2751 Prosperity Avenue, Suite 200 Fairfax, VA 22031		SCALE AS SHOWN
FRONT VIEW SAND CREEK BARRIER SYSTEM		TASK: 4100.993.01.07
		SHEET 4

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APPENDIX B
Operations and Maintenance Plan

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OPERATIONS AND MAINTENANCE PLAN

ROCKET RIDGE AREA OF OPEN DEMOLITION AREA #2

MILITARY MUNITIONS RESPONSE PROGRAM RAVENNA ARMY AMMUNITION PLANT RAVENNA, OHIO

Submitted To:

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**Contract Number DACA-63-03-D0009
Task Order No.: DK01**

MARCH 2008

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Abbreviations and Acronyms	
ARPA	Archaeological Resources Protection Act
CFR	Code of Federal Regulations
CRM	Cultural Resources Manager
e ² M	engineering-environmental Management, Inc.
EOD	Explosive Ordnance Disposal
MEC	Munitions and Explosives of Concern
mm	millimeter
MMRP	Military Munitions Response Program
MRS	Munitions Response Site
NAGPRA	Native American Graves Protection and Repatriation Act
NGB	National Guard Bureau
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
ODA2	Open Demolition Area #2
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
O&M	Operations and Maintenance
PDF	Portable Document Format
QEE	Quarterly Effectiveness Evaluation
RTLS	Ravenna Training and Logistics Site
RVAAP	Ravenna Army Ammunition Plant
S&H	Safety and Health
SOP	Standard Operating Procedure
TCRA	Time Critical Response Action
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command
UXO	Unexploded Ordnance

I.0 PURPOSE

The purpose of this Operations and Maintenance (O&M) Plan is to establish the work practice standards that will ensure that the Sand Creek Barrier System at the Ravenna Army Ammunition Plant (RVAAP) is properly maintained. This plan includes the activities associated with the inspection and maintenance of the barrier system and the assessment and removal of accumulated materials. Because the purpose of the barrier system is to stop any munitions-related materials that may migrate downstream of the Rocket Ridge Area of the Open Demolition Area #2 (ODA2) munitions response site (MRS) (Army Environmental Database-Restoration Number RVAAP-004-R-01), the O&M field activities shall be performed by, or under the field supervision of an Unexploded Ordnance (UXO) Technician III and a UXO Technician II.¹ The barrier system is located approximately 2,700 feet downstream of the Rocket Ridge Area of ODA2 and 26 feet upstream of the George Road Bridge.

¹ UXO Technician III minimum qualification standards: 1) Graduate of a military Explosive Ordnance Disposal (EOD) School of the United States, Canada, Great Britain, Germany, or Australia, or graduate of a formal training course of instruction or EOD assistant courses; 2) Minimum 8 years of EOD/UXO experience; and 3) Prior military EOD and/or commercial UXO experience in munitions response actions or range clearance activities, as appropriate for the contracted operation. (USACE EP-75-1-2)

UXO Technician II minimum qualification standards: 1) Graduate of a military EOD School of the United States, Canada, Great Britain, Germany, or Australia; and 2) Prior military EOD experience OR 1) Graduate of a formal training course of instruction or EOD assistant courses; 2) Minimum 3 years of EOD/UXO experience; and 3) Experience in response munitions response actions or range clearance activities, as appropriate for the contracted operation, plus specific project/explosives safety training. (USACE EP-75-1-2)

2.0 SITE INFORMATION AND HISTORY

RVAAP (Federal Facility Identification number: OH213820736) is located in northeastern Ohio within Portage and Trumbull Counties, approximately three miles east northeast of the city of Ravenna and approximately one mile northwest of the city of Newton Falls. As of February 2006, a total of 20,403 acres of the former 21,683 acre RVAAP have been transferred to the National Guard Bureau (NGB) and have been subsequently licensed to the Ohio Army National Guard (OHARNG) for use as a military training site. The Sand Creek Barrier System is located within the OHARNG acreage, in the central part of the installation, just west of the George Road Bridge and within Sand Creek. Approved personnel/contractors must enter RVAAP through the guarded main entrance on State Route 5 and must coordinate with OHARNG to pass through the unguarded locked gate on George Road.

Rocket Ridge is a steep embankment approximately 500-feet long and 25-feet high located adjacent to Sand Creek within Open Demolition Area #2 (ODA2), approximately 2,700 feet upstream of the George Road Bridge. ODA2 was used for munitions demilitarization, including detonation of large caliber munitions and off-specification bulk explosives that could not be deactivated or demilitarized by any other means. The Rocket Ridge slope was used for the disposal of demilitarized munitions, although not all munitions appear to have been completely demilitarized. Munitions-related items that could be identified include 75-millimeter (mm) and 105-mm rounds, booster cups, three 500-pound bombs, white phosphorus rifle grenades, fuzes, and burster tubes. It appears that the munitions were transported from the demolition site to Rocket Ridge and dumped at the top of the slope. Sand Creek flows in an eastward direction along the northern boundary of the Rocket Ridge Area of ODA2, at the toe of the slope. Due to the steep slope of the disposal area and the stream bank erosion resulting from high water events, some of the munitions materials have reached Sand Creek.

On 18 June 2007, a rifle grenade containing white phosphorus exploded on the slope of Rocket Ridge. The Incident Report attributes the cause of the explosion to a corroded white phosphorus grenade that might have been overturned by an animal, which exposed the white phosphorus to air, resulting in its auto-igniting, which heated the grenade until the internal burster exploded. No injuries resulted from the incident.

In order to prevent the downstream movement of munitions and explosives of concern (MEC) within Sand Creek, the Army constructed a barrier system. The system consists of two steel wire screen

barriers installed across Sand Creek approximately 2,700 feet downstream of Rocket Ridge and 26 feet upstream of George Road Bridge. The barrier location is downstream of the farthest visible piece of munitions-related material that may have migrated from Rocket Ridge. A survey conducted on 5-6 November 2007 upstream of the George Road Bridge identified a piece of munitions debris approximately 1,200 feet downstream of Rocket Ridge. Thirteen additional magnetometer anomalies from buried sources were found in the stream between the piece of munitions debris and the location of the barrier system. The sources of these subsurface anomalies have not been investigated.

3.0 OPERATIONS AND MAINTENANCE SCOPE OF WORK

The scope of work for the O&M phase at the Sand Creek Barrier System is focused on inspecting and removing the debris accumulated on the screens and assessing the integrity of the construction. The O&M activities will begin after the completion of the barrier construction. The O&M field team will include at least one UXO Technician III and one UXO Technician II.

3.1 O&M Field Activities

Each O&M trip will include the following activities:

- Prior to the trip, contact RVAAP Facility Manager, Mr. Mark Patterson, the OHARNG representative, Ms. Katie Elgin, and the Ohio EPA representative, Ms. Eileen Mohr (their contact information is included in Table I of the Time Critical Response Action [TCRA] Plan). Schedule the date of the O&M trip and confirm access through the George Road gate.
- Access the barrier site from the George Road Bridge and inspect the materials accumulated on the screens. Take a minimum of two digital photographs of each barrier at arrival.
- If human remains or artifacts are observed on the screens, follow the procedures in **Table I** below.

Table I: Procedures for Inadvertent Discovery of Cultural Materials

<p>Contact(s): Kim Ludt, Cultural Resources Manager (CRM), 614-336-6569 (Alternate contact, RTLS Environmental Office, 614-336-6568/6136) (Ravenna Training and Logistics Site [RTLS] Range Control 614-336-6562/6793/6041)</p> <p>Scope: This Standard Operating Procedure (SOP) outlines the steps to be taken upon inadvertent discovery of cultural resources. It is intended for all personnel.</p>
<p>Statutory Reference(s):</p> <p>Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulation (43 Code of Federal Regulations [CFR] 10) Archaeological Resources Protection Act (ARPA) National Historic Preservation Act (NHPA) and its implementing regulation (36 CFR 800).</p>
<p>Procedures: In the event that artifacts or human remains are encountered in or near the stream barrier on Sand Creek, either by the contractor performing maintenance on the barrier, or by other personnel observing the barrier, the following steps should be followed.</p> <ul style="list-style-type: none">• Report any observations or discoveries of artifacts or human remains immediately to the CRM/Environmental Office. If the CRM is not available, report the discovery to Range Control.• The CRM or Range Control will collect or secure any artifacts or remains identified in the stream barrier for analysis or curation, as appropriate. Human remains are not to be disturbed or removed from the barrier.• The CRM will examine the stream banks immediately upstream of the barrier to determine whether an archaeological deposit or human burial has been exposed within the stream bank, and will take measures to protect the location from further erosion or disturbance.• If human remains are known or suspected to be present, the CRM or Range Control will also promptly notify the state police or Federal Bureau of Investigation, as appropriate.• The CRM will promptly notify the Ohio Historic Preservation Office (OHPO) of the discovery. The CRM will follow NAGPRA and ARPA procedures to contact Native American tribes and any other stakeholders, as appropriate.• If a site area or burial is identified as the source of the materials found in the stream barrier, the CRM will make arrangements for site recordation and stabilization, in consultation with the OHPO and any interested Native American tribes.

- If no munitions-related materials are found at the screens, remove all leaf litter and woody debris and place it high on the banks of the stream. When necessary, use a chainsaw to cut

larger woody debris into pieces. If, after several O&M trips, the debris pile becomes significant, as determined by OHARNG, use a wood chipper to reduce the volume of material and spread the resulting mulch on the land above the creek banks.

- If munitions-related materials are found, notify the Facility Manager and propose the steps to be taken. Do not initiate any work on the munitions-related materials until receiving written approval from the Facility Manager or its designees. Also notify OHARNG, for informational purposes only, that munitions-related materials were found at the screens. **Table 2** below is a guide of potential management alternatives:

Table 2: Management Alternatives for Munitions-Related Materials

Type of Munitions Material Found	Potential Action
Munitions Debris	Store at an onsite designated location until it can be destroyed at ODA2 (must follow Ohio EPA Notification Procedure)
	Ship offsite to permitted scrap metal recycling facility (requires filling out Form DD 1348-1A and Chain of Custody Form)
MEC that can be safely moved	Store at onsite designated location (in accordance with current security requirements) until it can be destroyed at ODA2 (must follow Ohio EPA Notification Procedure)
	Move directly to ODA2 and destroy (must follow Ohio EPA Notification Procedure)
MEC that cannot be safely moved from the Sand Creek Barrier System area	Blow in place (must follow Ohio EPA Notification Procedure)

- If munitions-related materials are found on the screens, take a minimum of ten digital photographs to document their condition and to support the management option implemented.
- Take a minimum of two digital photographs of each barrier after the removal of accumulated debris.
- The Contractor will be prepared to complete small repairs and adjustments (e.g., loose or missing bolts, post caps, etc.) during the O&M trip. More extensive repairs, such as replacing a screen panel or a post, will be completed within two calendar weeks of the trip date. Spare barrier components, such as screen panels and posts, will be available at RVAAP.
- Following the trip, prepare a brief trip report to document field activities. The report shall include a description of the debris inspection and removal activities, barrier integrity, an assessment of any changes in barrier condition since the previous trip, any repairs made or needed to be made, copies of any forms or documents generated as a result of the field trip

findings, and photographs. The trip report shall be submitted to the recipients listed in **Table 3** within seven calendar days of the completion of the field trip or of the completion of the barrier system repairs (if performed). The submittal shall be in print and in electronic form (Adobe Acrobat Portable Document Format [PDF]).

Table 3: Recipient List for Barrier System O&M Submittals

<p>Mark Patterson Facility Manager Ravenna Army Ammunition Plant 8451 State Route 5 Ravenna, OH 44266-9297 Telephone: 330-358-7311 E-mail: mark.c.patterson@us.army.mil</p>	<p>Eileen Mohr Project Manager Ohio Environmental Protection Agency Division of Emergency and Remedial Response 2110 East Aurora Road Twinsburg, OH 44087 Telephone: 330-963-1221 E-mail: eileen.mohr@epa.state.oh.us</p>
<p>Mark Krivansky Environmental Restoration Manager US Army Environmental Command E4480 Beal Road Aberdeen Proving Ground, MD 21010-5401 Telephone: 410-436-0542 Facsimile: 410-436-1548 E-mail: mark.krivansky@us.army.mil</p>	<p>Terry Samson USACE Project Manager U.S. Army Corps of Engineers, Omaha District 106 South 15th Street Omaha, NE 68102 Phone: 402-221-7171 Fax: 402-221-7796 E-mail: terry.l.samson@usace.army.mil</p>
<p>Katie Elgin Environmental Specialist 2 OHARNG -RTLS Ravenna Training and Logistics Site 1438 State Route 534 SW Newton Falls, Ohio 44444 Telephone: 614-336-6136 E-mail: katie.elgin@us.army.mil</p>	<p>Daniel Zugris Technical Program Manager e²M 2751 Prosperity Avenue, Suite 200 Fairfax, VA 22031 Telephone: 703-752-7755 (ext. 126) Facsimile: 703-752-7754 E-mail: dzugris@e2m.net</p>

3.2 O&M Field Trip Frequency

The Contractor shall conduct 12 O&M field trips during the first O&M calendar year (this number may be adjusted during the second O&M year based on the experience gained in the first year). It appears reasonable to correlate the frequency of the O&M trips with the regional monthly precipitation rate, since the amount of debris accumulated on the screens is a function of the amount of water flowing in the creek as well as the season. This rationale could be used to develop a calendar-based schedule. It is

also reasonable to assume that there will occasionally be intense rain events with high debris potential that are not captured in the average monthly precipitation data. This type of rain event would require a flexible, non calendar-based, schedule. A combination of the two rationales may provide a suitable scheduling tool for the Sand Creek Barrier System:

- One O&M trip per month will be conducted during the eight calendar months with precipitation averages over three inches. According to the National Oceanic and Atmospheric Administration (NOAA) precipitation data for Akron, Ohio (<http://lwf.ncdc.noaa.gov/oa/climate/online/ccd/nrmlprcp.html>) shown in **Table 4**, these months are March, April, May, June, July, August, September, and November.

Table 4: Normal Monthly Precipitation for Akron, Ohio, between 1971 and 2000 (Inches)

AKRON, OHIO	YEARS	JAN	FEB	MAR	APR	MAY	JUN
	30	2.49	2.28	3.15	3.39	3.96	3.55
ANNUAL	JUL	AUG	SEP	OCT	NOV	DEC	
38.47	4.02	3.65	3.43	2.53	3.04	2.98	

- Four additional O&M trips will be set aside for trips following intense rain events or flooding, or when OHARNG personnel driving over George Road Bridge observe a significant debris accumulation on the screens. In these cases, the O&M Contractor will be contacted by the United States Army Corps of Engineers (USACE), Omaha District, and required to conduct an O&M trip outside of the monthly scheduled events. The O&M Contractor shall mobilize to the site within seven calendar days of the request. The organizations that may trigger one of the additional trips include RVAAP, OHARNG, Ohio EPA, United States Army Environmental Command (USAEC), and USACE. Prior to the request being transmitted to USACE, Omaha District, the organization requesting the trip will consult with RVAAP and OHARNG to reach agreement.

3.3 Quarterly Effectiveness Evaluation Report

Within two calendar weeks of the completion of a three-month period of O&M activities, the Contractor shall submit a Quarterly Effectiveness Evaluation (QEE) Report. This report shall include a

summary of the routine and unique O&M activities performed within the previous quarter and an assessment of whether the barrier system has functioned as intended. If warranted, the QEE Report shall include recommendations for addressing any schedule, coordination, reporting, O&M field work, or construction shortcomings.

3.4 Safety and Health Plan

Within three calendar weeks of receiving the funding and go-ahead for the O&M activities, the Contractor shall submit a Draft Safety and Health (S&H) Plan for review that will document all possible UXO activities associated with the O&M work. The recipients of the draft plan are included in **Table 3** of this document. The S&H Plan shall cover all on-site work to be performed by the O&M Contractor and subcontractors under the O&M scope of work. In particular, the Contractor shall discuss in detail the O&M Activities specified in **Subsection 3.1** of this O&M Plan. The site information necessary for the development of the S&H Plan is included in the references to the TCRA Plan. Within two weeks of receiving review comments on the Draft S&H Plan, the O&M Contractor shall submit the Final S&H Plan for review and approval. The O&M Contractor shall have a copy of the approved S&H Plan available every time O&M activities are performed on site.

3.5 Revised Sand Creek Barrier System O&M Plan

Within four calendar weeks of receiving the funding and go-ahead for the O&M activities, the Contractor shall submit a Draft Revised Sand Creek Barrier System O&M Plan that will include the required elements of an explosives management plan, explosives siting plan, quality control plan, and any other UXO-specific elements not included in the current version of the O&M Plan. The recipients of the draft plan are included in **Table 3** of this document. Within two weeks of receiving review comments on the Draft Revised Sand Creek Barrier System O&M Plan, the O&M Contractor shall submit the Final Plan for review and approval.

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APPENDIX C
Rocket Ridge TCRA Schedule

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RVAAP Rocket Ridge - Revise Draft Schedule 18 March 2008						May 2007		January 2008		September 2008		May 2009		J							
ID	Task Name	Start	Duration	Finish	4/22/07	6/17/07	8/12/07	10/7/07	12/2/07	1/27/08	3/23/08	5/18/08	7/13/08	9/7/08	11/2/08	2/2/09	4/19/09	6/14/09	8/9/09	10/4/09	1/2/10
0	RVAAP Rocket Ridge	Mon 10/1/07	539 days	Thu 10/22/09																	
1	Sand Creek Survey Work Plan	Mon 10/1/07	20 days	Fri 10/26/07																	
2	Development of Internal Army Draft Work Plan	Mon 10/1/07	3 days	Wed 10/3/07																	
3	Review of Internal Army Draft by USAEC and USACE	Thu 10/4/07	3 days	Mon 10/8/07																	
4	Development of Draft Work Plan	Tue 10/9/07	3 days	Thu 10/11/07																	
5	Review of Draft Work Plan by Ohio EPA and Army	Fri 10/12/07	7 days	Mon 10/22/07																	
6	Development of Final Work Plan	Tue 10/23/07	3 days	Thu 10/25/07																	
7	Approval of Final Work Plan	Fri 10/26/07	1 day	Fri 10/26/07																	
8	Field Survey	Mon 11/5/07	11 days	Mon 11/19/07																	
9	Field Activities	Mon 11/5/07	4 days	Thu 11/8/07																	
10	Receipt of Topo/GPS data	Fri 11/9/07	7 days	Mon 11/19/07																	
11	Time Critical Response Action (TCRA) Plan, Including O&M Plan	Tue 11/20/07	91 days	Tue 3/25/08																	
12	Development of Internal Draft TCRA Plan	Tue 11/20/07	14 days	Fri 12/7/07																	
13	Review of Internal Army Draft by USAEC and USACE	Mon 12/10/07	14 days	Thu 12/27/07																	
14	Development of Draft Section 106 Form	Fri 12/28/07	10 days	Thu 1/10/08																	
15	Submittal of Draft Section 106 Form	Fri 1/11/08	1 day	Fri 1/11/08																	
16	Review of Draft Section 106 Form by Army	Mon 1/14/08	12 days	Tue 1/29/08																	
17	Preparation of Final Section 106 Form	Wed 1/30/08	3 days	Fri 2/1/08																	
18	Review of Final Section 106 Form by Army	Mon 2/4/08	1 day	Mon 2/4/08																	
19	Submittal of Final Section 106 Form to OH Historic Preservation Office	Tue 2/5/08	1 day	Tue 2/5/08																	
20	Development of Draft TCRA Plan	Fri 12/28/07	14 days	Wed 1/16/08																	
21	Development/Submittal of Action Memorandum	Fri 12/28/07	14 days	Wed 1/16/08																	
22	Review of Draft TCRA Plan by Ohio EPA and Army	Thu 1/17/08	30 days	Wed 2/27/08																	
23	Preparation and approval of responses to comments	Thu 2/28/08	12 days	Fri 3/14/08																	
24	Development of Final TCRA Plan	Mon 3/17/08	6 days	Mon 3/24/08																	
25	Approval of Final TCRA Plan	Tue 3/25/08	1 day	Tue 3/25/08																	
26	Implementation	Wed 3/26/08	47 days	Thu 5/29/08																	
27	Hiring of construction and UXO subcontractors	Wed 3/26/08	7 days	Thu 4/3/08																	
28	Fabricate custom-made screen panels	Fri 4/4/08	30 days	Thu 5/15/08																	
29	Construction of barrier system	Fri 5/16/08	10 days	Thu 5/29/08																	
30	Construction Completion Report	Fri 5/30/08	101 days	Fri 10/17/08																	
31	Development of Internal Army Draft Completion Report	Fri 5/30/08	14 days	Wed 6/18/08																	
32	Review of Internal Army Draft by USAEC and USACE	Thu 6/19/08	14 days	Tue 7/8/08																	
33	Development of Draft Completion Report	Wed 7/9/08	14 days	Mon 7/28/08																	
34	Review of Draft Completion Report by Ohio EPA and Army	Tue 7/29/08	30 days	Mon 9/8/08																	
35	Response to Comments Meeting	Tue 9/9/08	14 days	Fri 9/26/08																	
36	Development of Final Completion Report	Mon 9/29/08	14 days	Thu 10/16/08																	
37	Approval of Final Construction Completion Report	Fri 10/17/08	1 day	Fri 10/17/08																	
38	Operation and Maintenance Activities (One Year)	Fri 5/30/08	365 days	Thu 10/22/09																	
39	12 Site Visits per Year for Maintenance and Documentation	Fri 5/30/08	365 days	Thu 10/22/09																	
40	Preparation/Submittals of Quarterly Effectiveness Evaluation Reports	Fri 5/30/08	365 days	Thu 10/22/09																	

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APPENDIX D
Barrier System Construction
Safety and Health Plan Addendum

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SAFETY AND HEALTH PLAN ADDENDUM

The Sand Creek Barrier System construction activities will follow all applicable safety and health requirements in the approved RVAAP Final Site-Specific Safety and Health Plan, Military Munitions Response Program, prepared by e²M and dated September 2007. This Addendum addresses potential safety and health issues not included in the September 2007 Plan.

I.0 FIRE AND EXPLOSION

Fire and Explosion Hazard Identification

Working with electrical equipment during the Sand Creek Barrier System construction activities can pose fire and explosion hazards due to sparks or heated surfaces. Fire and explosion hazards can cause injury to personnel ranging from burns to more severe injuries including those threatening life and limb. Care must be taken to ensure proper use of electrical equipment to reduce the risk of fire and explosion hazards.

Fire and Explosion Hazard Mitigation/Prevention

Mitigation and prevention measures for fire and explosion hazards include:

- Proper use and operation of electrical equipment.
- Training workers in the hazards of working with electrical equipment.
- Training workers in emergency procedures in case of electrical fire or explosion, including first aid procedures for burns; procedures for extinguishing flames; and procedures for extracting, extinguishing, and stabilizing any burn victims.

2.0 BURNS

Burn Hazard Identification

Burns may result from fire and explosion hazards, electric shock, and equipment use. Welding equipment especially can expose workers to burn hazards.

Burn Hazard Mitigation/Prevention

Mitigation and prevention measures for burn hazards from welding include:

- Making sure all personnel using welding equipment are properly trained and experienced.
- Inform all personnel of welding equipment hazards at the beginning of the project and during daily health and safety briefings.
- Guard all exposed, heated surfaces when practical to prevent accidental contact.
- Use insulated gloves and gauntlets, coveralls, and face protection.

3.0 ELECTRIC SHOCK

Electric Shock Hazard Identification

Electrical equipment and extension cords used on-site may pose a hazard to workers. Electric shock hazards may exist from on-site generators and electrical equipment. Potential adverse effects of electrical hazards include burns and electrocution, which could result in death. All portable electrical equipment will be double insulated or grounded and connected through a ground fault circuit interrupter (GFCI). Conductive materials (rotary coring equipment) will be kept clear of energized power lines.

Electric Shock Hazard Mitigation/Prevention

Mitigation and prevention measures for electric shock hazards include:

- Ensuring that equipment is grounded or provided with GFCI protection.
- Permitting only trained and experienced personnel to operate generator and electrical equipment.
- Making sure fire extinguishers rated for energized electrical systems (Class C) are readily available where generator and electrical equipment is operated.

4.0 SLIPS, TRIPS, AND FALLS

Slips, Trips, and Falls Hazard Identification

Working in and around streams and surface-water bodies can pose slip, trip, and fall hazards due to slippery surfaces that are wet from rain, snow, or water, or due to loose soil on steep stream banks. Uneven terrain can also pose similar hazards to field personnel. Slips, trips, and falls are a leading cause of injuries in field-related work settings, therefore, a concerted effort is needed to identify, control, and eliminate these hazards and ensure the measures needed to reduce or eliminate the possibility of injury are communicated to all site personnel. Potential adverse health effects include falling, and twisting an ankle or knee.

Although Sand Creek is a shallow body of water in the vicinity of the Barrier System construction area, an intense rain event may create a drowning hazard due to fast moving water. A potential indicator of swiftly moving water is any depth above the knee and water moving at a sufficient pace to cause an unbalanced state.

Slips, Trips, and Falls Hazard Mitigation/Prevention

Mitigation and prevention measures for slips, trips, and falls hazards related to Sand Creek Barrier System construction activities include:

- Taking caution to remain in sure footing while any barrier construction activities are taking place.
- Taking caution while moving around or in the stream, or along the loose soil on the banks.

5.0 TRENCHES

Trench Hazard Identification

During installation of the barrier system screens, shallow (less than three feet deep) and narrow (less than two feet wide) trenches will be dug on either bank of the creek to facilitate screen installation and to secure screen edges. Open excavations may pose a trip hazard to workers crossing the excavation or a collapse hazard to personnel working near trench edges.

Trench Hazard Mitigation/Prevention

Mitigation and prevention measures for trenching hazards, including preventing trips include:

- Informing personnel of trip hazards from trenches.
- Ensuring personnel take proper care in moving around open trenches to prevent trips and slips, and collapse of trench walls.

6.0 MANUAL LIFTING

Manual Lifting Hazard Identification

Manual lifting and moving heavy materials and equipment used for barrier construction may expose workers to muscle strain/sprain to the lower back or shoulder. Failure to follow proper lifting techniques can result in back injuries and strains. Back injuries are a serious concern as they are the most common workplace injury, often resulting in lost or restricted work time and long treatment and recovery periods.

Manual Lifting Hazard Mitigation/Prevention

Mitigation and prevention measures for manual lifting hazards and muscle strain prevention include:

- Proper lifting of heavy materials and equipment by personnel.
- Teamwork in transporting excessively heavy materials and equipment.
- Training workers in proper lifting and transporting techniques for heavy materials and equipment.

7.0 NOISE

Noise Hazard Identification

Noise is a potential hazard associated with the operation of equipment, power tools, pumps and generators. Excessive noise presents two potential problems at the site. First, it hinders communication between workers. Second, excessive noise exposures, both continuous and impact noise, may have adverse effects on a person's hearing. These adverse effects include both temporary and permanent hearing damage. The electrical generator and electrical equipment used to install the barrier (including circular saws, rotary coring equipment, and hammers) may create noise hazards to operators or workers in the immediate vicinity.

Noise Hazard Mitigation/Prevention

Mitigation and prevention measures for noise hazards during barrier construction activities include:

- Ensuring communication during electrical equipment operation can be achieved by hand signals, or that a stop signal will ensure safety and the ability for verbal communication during a pause in equipment use.
- Requiring all personnel to wear hearing protection if exposed to steady-state noise at or above 85 decibels or to impulse noise of 140 decibels such as that generated by electrical generators. Disposable ear plugs will be made available to personnel for use if needed.

8.0 ROTARY EQUIPMENT

Rotary Equipment Hazard Identification

Rotary equipment will be used during barrier construction activities for bedrock coring for securing posts and screens. The major hazard associated with rotary equipment is being pinched or struck by the rotary coring equipment and associated tools during coring. Personnel can also be struck by rotary coring equipment as it is removed from bedrock. Slipping of rotary coring equipment from bedrock could also cause injury.

Rotary Equipment Hazard Mitigation/Prevention

Mitigation and prevention measures for rotary equipment hazards include wearing appropriate personal protective equipment (PPE) including work gloves and safety goggles, as well as not wearing any loose-fitting clothing that could be caught in the rotary motion of the equipment. Personnel should be trained in handling and using rotary equipment and made aware of the associated dangers.

9.0 CIRCULAR SAWS

Circular Saw Hazard Identification

A circular saw may be used during barrier construction activities for custom-fitting barrier materials. The main hazard associated with circular saw use is injury due to blade contact including surficial injury as well as severing limbs or appendages. Other hazards include entanglement of clothing or other articles with the blade, causing the operator to be pulled into the blade, and the work piece (i.e., material being cut) being kicked back violently from the rapidly rotating blade. The operator could also slip and fall into the saw. Small pieces of the work piece can also be thrown back onto the operator, posing an injury hazard, especially to the eyes.

Circular Saw Hazard Mitigation/Prevention

Mitigation and prevention measures for circular saw use during barrier construction activities include:

- Cautious use to avoid contact injuries.
- Wearing safety glasses.
- Not wearing any loose-fitting clothing or articles.
- Having a firm footing to prevent trip hazards.
- Ensuring the work piece is placed securely to prevent injury from kick-back.

10.0 HAMMERS

Hammer Use Hazard Identification

Hammers will be used during barrier construction activities for fitting and placement of barrier materials. Hazards associated with the use of hammers include largely contact injury, but also include injury to others due to loss of hammer control, movement of work piece due to contact with hammer, and slips, trips, and falls while working with a hammer could result in injury to self or others.

Hammer Use Hazard Mitigation/Prevention

Mitigation and prevention measures for hammer use during barrier construction activities include:

- Cautious use to avoid contact injuries.
- Wearing safety glasses.
- Having a firm footing to prevent trip hazards.
- Ensuring the work piece is placed securely to prevent injury from slipping or movement.

Site personnel should be constantly on the lookout for potential safety hazards. If the hazard cannot be removed or reduced, action must be taken to warn site workers about the hazard.

Table I below depicts potential hazards and risks associated with the Sand Creek Barrier System construction activities:

Table I: Potential Hazards and Risks Associated with Sand Creek Barrier Construction

Potential Hazard	Anticipated Risk
Inhalation of Dust	Low
Munitions	Moderate
Adverse Weather Conditions	Dependent Upon Forecast
Heat Stress	Dependent Upon Temperature
Fire and Explosion	Low
Burns (Welding and Other)	Low
Electric Shock	Low to Moderate
Slips, Trips, and Falls	Moderate to High
Trenches	Low to Moderate
Manual Lifting	Moderate
Noise	Moderate

**Table I: Potential Hazards and Risks Associated with Sand Creek Barrier Construction
(continued)**

Potential Hazard	Anticipated Risk
Construction Equipment (Rotary Equipment, Circular Saws, Hammers)	Moderate
Insect/Arachnid Bites and Stings	Low
Wild Animals	Low
Snake Bites	Low
Poisonous and Other Harmful Plants	Low to Moderate
Blood borne Pathogens (BBP)	Low

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APPENDIX E
SAND CREEK BARRIER SYSTEM
ASSESSMENT OF POTENTIAL PERMITTING
REQUIREMENTS

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I.0 OHIO EPA DIVISION OF SURFACE WATER

A permit is required if the work is more than 200 feet below the water level or if the stream is of high quality. A stream is of high quality, as defined in OAC 3745-01-07, if the characteristics below are met:

- A. Class III Primary Headwater Habitat Streams;
- B. Coldwater Habitat; and
- C. Seasonal Salmonid.

The table below documents the Sand Creek conditions vs. permit requirements.

Table I: Sand Creek conditions vs. permit requirements

Permitting Criteria	Characteristics	Met by Sand Creek?	Rationale
200 ft below water level	None	No	Work being performed will not extend 200 ft below the surface level of the water.
High quality	Class III	No	Sand Creek does not meet the characteristics of this class ^a because it is classified as a "warmwater" habitat ^b .
High quality	Coldwater habitat	No	Sand Creek is classified as a "warmwater" habitat ^b .
High quality	Seasonal Salmonid	No	Sand Creek has not been designated as "seasonal salmonid" ^c .

Notes:

Note a: According to the Ohio EPA, Class III primary headwater habitat streams are perennial, support a cool water biologic community, and tend to contain species of animals that have adapted to year around presence of cool water. Source of water is mostly from groundwater.

Note b: OAC 3745-01-07: "Coldwater" - these are waters that meet one or both of the characteristics described in paragraphs (B)(1)(f)(i) and (B)(1)(f)(ii) of this rule.

- (i) "Coldwater habitat, inland trout streams" - these are waters which support trout stocking and management under the auspices of the Ohio department of natural resources, division of wildlife, excluding waters in lake run stocking programs, lake or reservoir stocking programs, experimental or trial stocking programs, and put and take programs on waters without, or without the potential restoration of, natural coldwater attributes of temperature

and flow. The director shall designate these waters in consultation with the director of the Ohio department of natural resources.”

- (ii) *"Coldwater habitat, native fauna" - these are waters capable of supporting populations of native coldwater fish and associated vertebrate and invertebrate organisms and plants on an annual basis. The director shall designate these waters based upon results of use attainability analyses.*

Sand Creek is classified as a warmwater habitat (see Facility-Wide Biological and Water Quality Study, 2003, Ravenna Army Ammunition Plant, prepared by the US Army Corps of Engineers [USACE], Louisville District). Warmwater is defined as being “capable of supporting and maintaining a balanced, integrated, and adaptive community of warmwater aquatic organisms. Attainment of this designation is based on criteria in Table 7-15 of OAC 3745-01-07.

Note c: A river or stream which is designated as “seasonal salmonid” is capable of supporting the passage of salmonids from October to May and is a water body large enough to support recreational fishing.

2.0 US ARMY CORPS OF ENGINEERS, PITTSBURG DISTRICT, REGULATORY BRANCH

In November 2007, Ms. Cheryl Groenjes (CENWO-ED-GM) of USACE, Omaha District, contacted the USACE, Pittsburg District, Regulatory Branch, and spoke with Mr. Allen Edris (CELRP-OP-F). The purpose of the call was to find out whether the construction of the Sand Creek Barrier System requires a USACE permit. Mr. Edris determined that the project does not require a USACE permit, based on the type and size of the proposed construction.

3.0 OHIO HISTORICAL SOCIETY, OHIO HISTORIC PRESERVATION OFFICE

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effect of their projects on historic properties. The Section 106 review process is intended to ensure that preservation values are factored into federal agency planning and decision-making.

In order to address this requirement, e²M, in consultation with the Army and Ohio Army National Guard, prepared a Section 106 Review – Project Summary Form. The form was submitted to the Ohio Historic Preservation Office on 5 February 2008. On 21 February 2008 e²M contacted Mr. David Snyder, of the Ohio Historic Preservation Office, to confirm that the submittal had been received. Mr. Snyder confirmed that the RVAAP Form 106 submittal was received and is in the review queue. He estimated that the review would be completed within 45 days of document receipt.