# Final
# Work Plan for the Sand Creek Survey

## Time Critical Response Action 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

October 2007

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# FINAL
# WORK PLAN for the SAND CREEK SURVEY

# TIME CRITICAL RESPONSE ACTION 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**
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**Contract Number DACA-63-03-D0009**
**Task Order No.: DK01**

**OCTOBER 2007**

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# 1.0 INTRODUCTION

Ravenna Army Ammunition Plant (RVAAP, Federal Facility Identification number: OH213820736) 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. 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). The scope of e²M activities at RVAAP has been expanded to include a Time Critical Response Action (TCRA) at the Rocket Ridge site. The Sand Creek Survey is the first step of the TCRA for Rocket Ridge. This Work Plan addresses the Sand Creek Survey portion of the TCRA.

The Rocket Ridge site is a steep embankment along Sand Creek, located within the Open Demolition Area #2 MRS, 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. All applicable Health and Safety procedures in the Final Work Plan will be followed during the Sand Creek Survey associated with the TCRA. An addendum to the Health and Safety Plan is included in **Appendix A**. The addendum addresses potential hazards associated with working in or near a surface water body.

# 2.0 ROCKET RIDGE BACKGROUND

Rocket Ridge is a steep embankment approximately 500-ft long and 25-ft high located adjacent to Sand Creek within the Open Demolition Area #2 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 due to their condition. The Rocket Ridge slope was used for the disposal of demilitarized munitions. Munitions-related items that could be identified include 75-millimeter (mm) and 105-mm rounds, booster caps, 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 and dumped at the top of the slope. Sand Creek flows in an eastward direction along the northern boundary of the Rocket Ridge site, at the toe of the slope. Due to the steep slope of the disposal area and the stream bank erosion during high water events, some of the demilitarized materials have reached Sand Creek.

On 18 June 2007, a rifle grenade containing white phosphorus exploded on the slope of the Rocket Ridge site. 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

In order to prevent the downstream movement of munitions and explosives of concern (MEC) within Sand Creek, the Army has decided to construct a water barrier system. The system will consist of two steel wire-mesh barriers that will stop any munitions-related materials from being transported downstream of the Open Demolition Area #2 MRS. The location of the barrier system will be based on a survey to be conducted along Sand Creek. The survey will identify the farthest location in Sand Creek where munitions are present. The barrier system will be installed downstream of that location. This Work Plan describes the methodology to be used to perform the Sand Creek Survey.

Following the completion of the Sand Creek Survey, e²M will prepare a TCRA Plan. This plan will include the design specifications for the construction of the barrier system as well as an Operations and Maintenance (O&M) Plan. The O&M Plan will specify the requirements for periodic inspection and maintenance of the barrier system and for the evaluation of its effectiveness.

The Sand Creek Survey will be conducted in the fall of 2007 and the barrier system construction will be completed in the spring of 2008 (see the project schedule in **Appendix B**). It is anticipated that the barrier system will be removed after the completion of a future remedial action at the Rocket Ridge site.

# 4.0 SAND CREEK SURVEY PURPOSE AND METHODOLOGY

## 4.1 Sand Creek Survey Purpose

The main purposes of the Sand Creek Survey are the following:

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

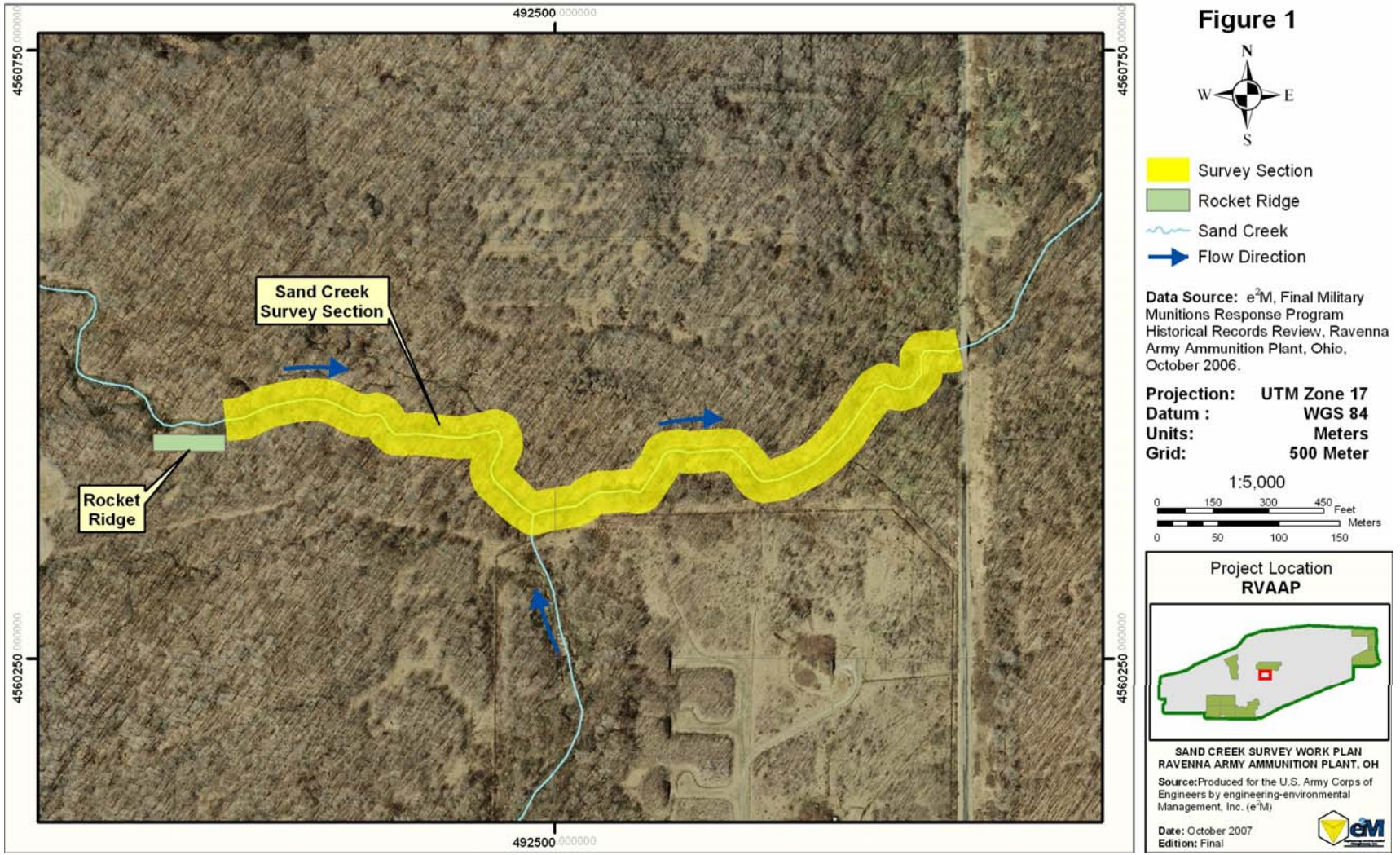
## 4.2 Sand Creek Survey Methodology

The Sand Creek Survey will be conducted by e²M with the support of an Ordnance and Explosives (OE) Subcontractor and a Topographic Survey Subcontractor. e²M and the OE Subcontractor will walk the creek bed upstream from the George Road bridge toward Rocket Ridge (see **Figure 1**) while carefully examining the stream bottom for munitions-related items. The survey will rely on visual observations augmented by the use of a hand-held magnetometer.

The location of the farthest munitions from Rocket Ridge will be marked with a flag that will be subsequently surveyed by the Topographic Survey Subcontractor. After the farthest munitions have been marked, e²M will walk downstream to examine the topography of Sand Creek and identify a suitable location for the barrier system. Site selection criteria will include depth and width of channel, likelihood of flooding, distance from access roads, characteristics of stream bottom, etc. Identification of a marginal site may require locating a second site for comparison and final selection. The identified sites will be flagged for surveying. Downstream areas on Sand Creek banks that show potential for flooding during high water events will be surveyed to confirm the absence of munitions-related items. During this phase of the work, the OE Subcontractor will accompany the e²M personnel for UXO avoidance purposes.

Following the identification of the potential barrier system location(s), the Topographic Surveyor Subcontractor will conduct a survey of the flagged sites. At the potential barrier site(s), the Surveyor will develop cross sections of the creek. The data collected during the Sand Creek Survey will be used in the development of the TCRA Plan.

# SAND CREEK SURVEY
## Ravenna Army Ammunition Plant, OH



# 5.0 PROJECT PERSONNEL

The multi-disciplined Project Team is comprised of representatives from the Stakeholders and e²M, the TCRA Contractor. 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. The US Army Corps of Engineers (USACE), Omaha District, is responsible for executing this TCRA, contractor procurement and management, as well as providing technical oversight of the TCRA activities. Representatives from RVAAP provide site-specific information related to Rocket Ridge. The Ohio Environmental Protection Agency (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. 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 Effectiveness Evaluation Reports. e²M is also responsible for subcontractor procurement and oversight.

Contact information for Project Team representatives is provided in **Table 1**.

**Table 1: Project Team Representatives Contact Information**

| | |
|---|---|
| Mary Ellen Maly<br>MMRP Project Manager<br>US Army Environmental Command<br>E4480 Beal Road<br>Aberdeen Proving Ground, MD 21010-5401<br>Telephone: 410-436-7083<br>Facsimile: 410-436-1548<br>E-mail: maryellen.h.maly@us.army.mil | Eileen Mohr<br>Project Manager<br>Ohio Environmental Protection Agency<br>Division of Emergency and Remedial Response<br>2110 East Aurora Road<br>Twinsburg, OH 44087<br>Telephone: 330-963-1221<br>E-mail: eileen.mohr@epa.state.oh.us |
| Mark Krivansky<br>Environmental Restoration Manager<br>US Army Environmental Command<br>E4480 Beal Road<br>Aberdeen Proving Ground, MD 21010-5401<br>Telephone: 410-436-0542<br>Facsimile: 410-436-1548<br>E-mail: mark.krivansky@us.army.mil | Bonnie Buthker<br>Supervisor<br>Ohio Environmental Protection Agency<br>Office of Federal Facilities<br>Southwest District Office<br>401 E. Fifth Street<br>Dayton, OH 45402<br>Telephone: 937-285-6469<br>E-mail: bonnie.buthker@epa.state.oh.us |

**Table 1: Project Team Representatives Contact Information (continued)**

| | |
|---|---|
| Irving Venger<br>Industrial Specialist<br>Ravenna Army Ammunition Plant<br>8451 State Route 5<br>Ravenna, OH 44266-9297<br>Telephone: 330-358-7311<br>E-mail: irving.b.venger@us.army.mil | Mark Patterson<br>Facility Manager<br>Ravenna Army Ammunition Plant<br>8451 State Route 5<br>Ravenna, OH 44266-9297<br>Telephone: 330-358-7311<br>E-mail: mark.c.patterson@us.army.mil |
| Katie Elgin<br>Environmental Specialist 2<br>OHARNG -RTLS<br>Ravenna Training and Logistics Site<br>1438 State Route 534 SW<br>Newton Falls, Ohio 44444<br>Telephone: 614-336-6136<br>E-mail: katie.elgin@us.army.mil | Phil Werner<br>Technical Project Manager<br>2751 Prosperity Avenue, Suite 200<br>Fairfax, VA 22031<br>Telephone: 703-752-7755 (ext. 108)<br>Facsimile: 703-752-7754<br>E-mail: pwerner@e2m.net |
| Jerome Stolinski<br>USACE Project Manager<br>U.S. Army Corps of Engineers, Omaha District<br>106 South 15th Street<br>Omaha, NE 68102<br>Phone: 402-221-7674<br>Fax: 402-221-7796<br>E-mail: jerome.f.stolinski@usace.army.mil | Cheryl Groenjes<br>USACE Project Manager<br>USACE, Omaha District<br>U.S. Army Corps of Engineers, Omaha District<br>106 South 15th Street<br>Omaha, NE 68102-1618<br>Telephone: 402-221-7744<br>E-mail: cheryl.groenjes@usace.army.mil |
| Daniel Zugris<br>Technical Program Manager<br>2751 Prosperity Avenue, Suite 200<br>Fairfax, VA 22031<br>Telephone: 703-752-7755 (ext. 126)<br>Facsimile: 703-752-7754<br>E-mail: dzugris@e2m.net | |

# 6.0 REFERENCES

e²M, 2007 engineering-environmental Management, Inc. (e²M). Stakeholder Final SI Work Plan, Military Munitions Response Program, Ravenna Army Ammunition Plant, Ohio, September 2007.

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# APPENDIX A
# Safety and Health Plan Addendum

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## SAFETY AND HEALTH PLAN ADDENDUM

The Sand Creek Survey activities will be conducted in accordance with the approved Final Site-Specific Site Inspection Safety and Health Plan prepared by e²M and dated September 2007. The text below addresses potential safety and health issues not included in the September 2007 Plan.

### 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. 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, an intense rain event may create a drowning hazard in areas where the water is deep or fast moving. Personnel entering the stream will wear waders. A concerted effort will be made to identify deep water pools and sections of fast flow that may hamper mobility, and restrict access to these areas. Personnel entering the stream in areas where water may be deep will use a marked walking stick to test water depth. A potential indicator of deep water is failure to see the stream bottom, while an indicator of swiftly moving water is any depth above the knee and water moving at a sufficient pace to cause an unbalanced state. If either of these indicators is identified or the water is above mid-thigh even when not moving swiftly, the survey personnel will move toward the shore where the stream depth and velocity are safe. The survey may be continued as long as the examination of the stream bottom is not impeded by stream conditions. In case the identification of munitions-related materials in the stream is hampered by stream conditions, the survey will be suspended until conditions improve.

#### Slips, Trips, and Falls Hazard Mitigation/Prevention

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.

**Table1** below depicts potential hazards and risks associated with creek surveys:

**Table 1: Potential Hazards and Risks Associated with Creek Surveys**

| 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 |
| Slips, Trips, and Falls | Moderate to High |
| Manual Lifting | Low |
| 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 |

# APPENDIX B
# Rocket Ridge TCRA Schedule

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RVAAP Rocket Ridge - Draft Schedule
08 October 2007

| ID | Task Name | Start | Duration | Finish |
|---|---|---|---|---|
| 0 | **RVAAP Rocket Ridge** | **Mon 10/1/07** | **506 days** | **Mon 9/7/09** |
| 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 TCRA Plan | Fri 12/28/07 | 14 days | Wed 1/16/08 |
| 15 | ***Development/Submittal of Action Memorandum*** | Fri 12/28/07 | 14 days | Wed 1/16/08 |
| 16 | Review of Draft TCRA Plan by Ohio EPA and Army | Thu 1/17/08 | 30 days | Wed 2/27/08 |
| 17 | ***RAB Meeting*** | Thu 2/28/08 | 4 days | Tue 3/4/08 |
| 18 | Development of Final TCRA Plan | Wed 3/5/08 | 14 days | Mon 3/24/08 |
| 19 | Approval of Final TCRA Plan | Tue 3/25/08 | 1 day | Tue 3/25/08 |
| 20 | **Implementation** | **Wed 3/26/08** | **14 days** | **Mon 4/14/08** |
| 21 | Construction of water barrier system | Wed 3/26/08 | 14 days | Mon 4/14/08 |
| 22 | **Construction Completion Report** | **Tue 4/15/08** | **101 days** | **Tue 9/2/08** |
| 23 | Development of Internal Army Draft Completion Report | Tue 4/15/08 | 14 days | Fri 5/2/08 |
| 24 | Review of Internal Army Draft by USAEC and USACE | Mon 5/5/08 | 14 days | Thu 5/22/08 |
| 25 | Development of Draft Completion Report | Fri 5/23/08 | 14 days | Wed 6/11/08 |
| 26 | Review of Draft Completion Report by Ohio EPA and Army | Thu 6/12/08 | 30 days | Wed 7/23/08 |
| 27 | ***Response to Comments Meeting*** | Thu 7/24/08 | 14 days | Tue 8/12/08 |
| 28 | Development of Final Completion Report | Wed 8/13/08 | 14 days | Mon 9/1/08 |
| 29 | Approval of Final Construction Completion Report | Tue 9/2/08 | 1 day | Tue 9/2/08 |
| 30 | **Operation and Maintenance Activities (One Year)** | **Tue 4/15/08** | **365 days** | **Mon 9/7/09** |
| 31 | 12 Site Visits per Year for Maintenance and Documentation | Tue 4/15/08 | 365 days | Mon 9/7/09 |
| 32 | Preparation/Submittals of Quarterly Effectiveness Evaluation Reports | Tue 4/15/08 | 365 days | Mon 9/7/09 |