

**Ohio Environmental Protection Agency (OEPA)**

**And**

**Ravenna Army Ammunition Plant (RVAAP)**

**2004 Correspondences**



State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

January 26, 2004

RE: **RAMSDELL QUARRY LANDFILL**  
**GROUND WATER MONITORING**

Mr. John Jent P.E.  
U.S. Army Corps of Engineers  
600 Martin Luther King Place  
P.O. Box 59  
Attn: CEORL-ED-GS  
Louisville, KY 40201-0059

Dear Mr. Jent:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO) has reviewed the following listed documents:

1. GROUND WATER QUALITY ASSESSMENT REPORT (RESULTS OF APPENDIX II SAMPLING OF RQL-006 AND RQL-007), DATED NOVEMBER 16, 2001, RECEIVED NOVEMBER 16, 2001;
2. APRIL 30, 2002, GROUND WATER MONITORING SAMPLING EVENT; DATED JUNE 24, 2002; RECEIVED JUNE 28, 2002;
3. OCTOBER 2002, GROUND WATER MONITORING SAMPLING EVENT; DATED NOVEMBER 27, 2002; RECEIVED DECEMBER 6, 2002;
4. APRIL 24, 2003, GROUND WATER MONITORING SAMPLING EVENT; DATED JUNE 23, 2003; RECEIVED JULY 2, 2003;
5. OCTOBER 2003, GROUND WATER MONITORING SAMPLING EVENT; DATED DECEMBER 12, 2003; RECEIVED DECEMBER 15, 2003.

The above referenced reports were submitted to document the results of ground water sampling that occurred at the Ramsdell Quarry Landfill. Included are the results of the Appendix II sampling of wells RQLMW-006 and RQLMW-007 conducted in November 2001 and the semiannual sampling events conducted in 2002 and 2003. Ground water at the site is being monitored under the 1990 municipal solid waste rules (OAC 3745-27-10).

The ground water monitoring network at the site includes upgradient well RQLMW-006 and downgradient wells RQLMW-007 through RQLMW-009 which are located immediately downgradient of the limits of waste placement. Two additional wells (RQLMW-010 and RQLMW-011) are located farther downgradient from the limits of waste placement and were installed as part of a hydrogeologic investigation at the site. These two wells are also downgradient of the quarry pond. Although downgradient wells RQLMW-007 through RQLMW-009 fulfill the requirements of OAC 3745-27-10 (B)(1)(b), RQLMW-010 and -011 also are sampled during each ground water monitoring event.



Constituents analyzed during each ground water sampling event include the indicator parameters (pH, specific conductance, total organic carbon (TOC) and chemical oxygen demand (COD)) as well as site specifics such as VOCs, explosives, and metals.

The Ramsdell Quarry Landfill is located within a larger area of concern (AOC) currently being investigated as part of CERCLA activities at the Ravenna Army Ammunition Plant (RAAP). Upon the signing of the Director's Final Findings and Orders for the RAAP (currently nearing completion), ground water monitoring at the Ramsdell Quarry Landfill will be conducted under the Facility-wide Ground Water Monitoring Program Plan (FWGWMPP) as part of the CERCLA activities at the site.

Ohio EPA has completed abbreviated reviews of the five documents and has the following comments:

#### **GENERAL COMMENTS**

1. Several constituents (e.g., arsenic, nickel) are regularly detected in the samples obtained from upgradient well RQL-006 at concentrations exceeding those detected in the downgradient wells at the site. The facility should determine whether the water quality at RQL-006 is being affected by the landfill or if it is the result of other historical activities that were conducted at the larger Ramsdell Quarry AOC that is being investigated and remediated under CERCLA. It may be necessary to install an alternate upgradient well if the water quality at RQL-006 is being affected by the landfill. Alternatively, one of the additional wells installed as part of CERCLA activities at the site may be a more appropriate upgradient sampling point. In addition, once the ground water monitoring is conducted as part of the FWGWMPP, it may be possible to use the facility-wide background values for naturally occurring constituents established during CERCLA activities at the facility in any statistical analysis performed on the ground water data.
2. The Appendix II sampling of RQL-006 and RQL-007 was initiated due to statistically significant differences between the values obtained for several indicator parameters in ground water samples obtained from the two wells. When ground water monitoring becomes part of the FWGWMPP, it is recommended that statistics no longer be performed on indicator parameters. Alternatively, statistics should be performed on specific constituents of concern that are detected in the ground water samples obtained from the site wells (e.g., arsenic, nickel, explosives, propellants, VOCs).
3. When ground water monitoring at Ramsdell Quarry Landfill becomes part of the FWGWMPP, parameters such as temperature, pH, and specific conductance should be monitored and reported as field measurements only. The analysis of other indicator parameters such as TOC and COD should be evaluated to determine if they may be discontinued.



### **COMMENTS: GROUND WATER QUALITY ASSESSMENT REPORT**

1. On September 20, 2001, wells RQLMW-006 and RQLMW-007 were sampled for the parameters included in Appendix II to OAC 3745-27-10. Samples also were analyzed for site specific explosive materials and propellants. Due to problems at the laboratory with the cyanide samples, the wells were resampled for that parameter, only, on September 26, 2001.
2. Among the constituents that were detected in RQLMW-006 during the September 2001 Appendix II sampling event are acetone (1.9J ug/L), methylene chloride (1.1B ug/l), arsenic (0.019 mg/L), and nickel (0.25 mg/L). A J-flag means that the concentration is estimated because the result is less than the reporting limit, and a B-flag means that the associated method blank contains the target analyte at a reportable level.
3. It should be noted that the post digestion spike recovery for thallium was between 40 and 55 percent due to matrix interference. Thus, the thallium results may be biased low. In addition, the surrogate recoveries for 2-fluorophenol and 2,4,6-tribromophenol were outside control limits and results for similar semi-volatile compounds may be biased low.
4. Among the constituents that were detected in RQLMW-006 during the September 2001 Appendix II sampling event are acetone (1.8J ug/L), chloromethane (0.30J ug/L), methylene chloride (0.49JB ug/l), and arsenic (0.053 mg/L).
5. It should be noted that the second page of the laboratory data sheet for metals for well RQLMW-007 was not included in the report. Therefore, it is unknown whether the following metals were detected in the sample obtained from this well: nickel, lead, antimony, selenium, tin, thallium, vanadium, and mercury. The second page of the laboratory data sheet for metals for RQLMW-007 should be submitted for review.

### **COMMENTS: APRIL 30, 2002, GROUND WATER MONITORING REPORT**

1. Statistical analyses indicate that there are statistically significant differences between background well RQLMW-006 and downgradient well RQLMW-007 for the indicator parameters TDS and specific conductance. No other statistically significant differences were calculated.
2. The following are among the constituents that were detected in the ground water samples collected and analyzed during this sampling event.

Arsenic in RQLMW-006 (30.1 ug/L), RQLMW-007 (10.8 ug/L), and RQLMW-008 (16.1 ug/L).

Nickel in RQLMW-006 (187 ug/L), RQLMW-007 (21.3B ug/L), RQLMW-008 (6.2B ug/L), and RQLMW-009 (4.3B ug/L).

Acetone in RQLMW-007 (1.9JB ug/L), RQLMW-008 (2.9JB ug/L), RQLMW-006 (8.0 JB ug/L), and RQLMW-009 (1.8JB ug/L).

Methylene chloride in RQLMW-007 (0.55 J ug/L), RQLMW-006 (0.53J ug/L), and RQLMW-09 (0.50J ug/L).

Mercury in RQLMW-008 (0.088B ug/L).

2-butanone (MEK) in RQLMW-006 (17 ug/L).

Cadmium in RQLMW-009 (0.29B ug/L).

Cobalt in RQLMW-009 (1.7B ug/L), RQLMW-008 (3.8B ug/L), and RQLMW-006 (23.3B ug/L).

#### **COMMENTS: OCTOBER 2002, GROUND WATER MONITORING REPORT**

1. Statistical analyses indicate that there is a statistically significant difference between background well RQLMW-006 and downgradient well RQLMW-007 for the indicator parameter specific conductance. No other statistically significant differences were calculated.
2. The following are among the constituents that were detected in the ground water samples collected and analyzed during this sampling event.

Arsenic in RQLMW-006 (30.1 ug/L), RQLMW-007 (59.3 ug/L), RQLMW-008 (46.0 ug/L), and RQLMW-009 (12.3 ug/L).

Nickel in RQLMW-006 (161 ug/L), RQLMW-007 (17.7 ug/L), RQLMW-008 (6.3B ug/L), and RQLMW-009 (4.8B ug/L).

Mercury in RQLMW-006 (0.23 ug/L).

Cobalt in RQLMW-009 (2.0B ug/L), RQLMW-008 (2.7B ug/L), RQLMW-006 (16.6B ug/L), and RQLMW-007 (8.4B ug/L).

Chromium in RQLMW-006 (2.7B ug/L).

Thallium in RQLMW-008 (2.4 ug/L).

#### **COMMENTS: APRIL 2003, GROUND WATER MONITORING REPORT**

1. Statistical analyses indicate that there is a statistically significant difference between background well RQLMW-006 and downgradient well RQLMW-007 for the indicator parameter pH. No other statistically significant differences were calculated.



2. The following are among the constituents that were detected in the ground water samples collected and analyzed during this sampling event.

Arsenic in RQLMW-006 (32.9 ug/L), RQLMW-007 (2.7B ug/L), RQLMW-008 (19.8 ug/L), and RQLMW-009 (2.5B ug/L).

Nickel in RQLMW-006 (134 ug/L), RQLMW-007 (23.9B ug/L), RQLMW-008 (5.9B ug/L), and RQLMW-009 (4.2B ug/L).

Cobalt in RQLMW-009 (1.4B ug/L), RQLMW-008 (3.1B ug/L), RQLMW-006 (10.3B ug/L), and RQLMW-007 (3.2B ug/L).

#### **COMMENTS: OCTOBER 2003, GROUND WATER MONITORING REPORT**

1. Statistical analyses indicate that there is a statistically significant difference between background well RQLMW-006 and downgradient well RQLMW-007 for the indicator parameter pH. No other statistically significant differences were calculated.
2. The following are among the constituents that were detected in the ground water samples collected and analyzed during this sampling event.

Arsenic in RQLMW-006 (54.5 ug/L), RQLMW-007 (30.2 ug/L), RQLMW-008 (30.6 ug/L), and RQLMW-009 (8.6 ug/L).

Nickel in RQLMW-006 (379 ug/L), RQLMW-007 (18.5B ug/L), RQLMW-008 (8.8B ug/L), and RQLMW-009 (4.4 ug/L).

Cobalt in RQLMW-009 (2.2B ug/L), RQLMW-008 (6.1B ug/L), RQLMW-006 (75.9 ug/L), and RQLMW-007 (11.4B ug/L).

Thallium in RQLMW-006 (1.9B ug/L), RQLMW-007 (0.60B ug/L), and RQLMW-008 (1.8B ug/L).

Acetone in RQLMW-006 (19 ug/L).

2-butanone in RQLMW-006 (1.9J ug/L).

#### **CONCLUSIONS AND RECOMMENDATIONS**

The occurrence of some constituents such as arsenic and nickel at higher concentrations in RQLMW-006, the upgradient well, than in the downgradient wells indicates that this well may not be an appropriate upgradient well for the landfill, itself. The facility should determine whether the water quality at RQL-006 is being affected by the landfill or if it is the result of other historical activities that



Mr. John Jent P.E.  
U.S. Army Corps of Engineers  
January 26, 2004  
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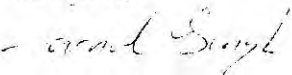
were conducted at the larger Ramsdell Quarry AOC that is being investigated and remediated under CERCLA. It may be necessary to install an alternate upgradient well if the water quality at RQL-006 is being affected by the landfill. Alternatively, one of the additional wells installed as part of CERCLA activities at the site may be a more appropriate upgradient sampling point. In addition, once the ground water monitoring is conducted as part of the FWGWMPP, it may be possible to use the facility-wide background values for naturally occurring constituents established during CERCLA activities at the facility in any statistical analyses performed on the ground water data.

Currently, statistical analyses are conducted only on the indicator parameters as required by OAC 3745-27-10 D(4). Well RQLMW-007 typically has indicator parameters that are elevated to a statistically significant degree above background.

It is recommended that when the ground water monitoring at Ramsdell Quarry Landfill is being conducted in accordance with the Facility-wide Ground Water Monitoring Program (FWGWMP), that statistical analyses be performed only on site specific constituents. Indicator parameters such as temperature, pH, and specific conductance should continue to be measured in the field and reported as field parameters, only. Statistics should not be calculated for the indicator parameters. An evaluation of the other indicator parameters such as TOC and COD should be completed to determine if they can be omitted from the analytical suite once sampling becomes part of the FWGWMP.

If you have any technical questions regarding this review, please contact Diane Kurlich at 330-963-1150 or Jarnal Singh at 330-963-1276. Please submit all correspondence to Jarnal Singh, Ohio EPA, Northeast District Office, Division of Solid and Infectious Waste Management, 2110 East Aurora Road, Twinsburg, Ohio 44087.

Sincerely,



Jarnal Singh, RS  
Environmental Specialist  
Division of Solid and Infectious  
Waste Management

JS:cl

cc: Diane Kurlich, DDAGW-NEDO  
Eileen Mohr, Site Coordinator, DERR, NEDO  
DuWayne Porter, Portage County Health Department  
Mark Patterson, IOC-RVAAP  
File: [Tukel/LAND/Ramsdell/GRO/67]



State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

May 19, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
DRAFT RAMSDELL QUARRY LANDFILL  
HHRA WHITE PAPER

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "White Paper Human Health Risk Assessment Approach for the Ramsdell Quarry Landfill Phase I Remedial Investigation, Ravenna Army Ammunition Plant, Ravenna, Ohio, Rev. 2." This document, dated April 12, 2004 and received via e-mail at Ohio EPA on April 11<sup>th</sup>, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District, by Science Applications International Corporation (SAIC). The following comments were generated from the review of the above-referenced document:

**COMMENTS**

- Comment # 1: Section 2.0 - The second paragraph does not provide the justification for evaluating the AOC as a single exposure unit. Add a few words stating that this is appropriate given the restricted access and current future use.
- Comment # 2: Section 2.0 - What is the depth at which bedrock is encountered? Please include this information in the second paragraph.
- Comment # 3: Section 2.0, 2<sup>nd</sup> paragraph, last sentence - The text states that "surface water and subaqueous sediment data from 1998 groundwater investigation will not be included in the HHRA because these exposure media are not applicable to receptors at Ramsdell Quarry (see Section 3.0)." Please specify which subsection in Section 3. Also, what about trespasser or wildlife biologists? What mechanism excludes them from being a





receptor and what prevents them from coming in contact with the pond water and/or the subaqueous sediments?

- Comment # 4: Section 2.0, last paragraph, last sentence - The text states that "other soil depths are not applicable to receptors at Ramsdell Quarry (see Section 3)." Please specify which subsection in Section 3.
- Comment # 5: Section 3.1 - Does the Ohio National Guard intend on keeping this area restricted in the future? This is implied, but not stated straightforward. Please add a sentence to say this.
- Comment # 6: Section 3.2 - The second paragraph lists possible activities and exposures that may occur in the future, such as groundwater exposure via groundwater sampling activities, sampling, natural resource management, etc. The third paragraph states that the security guard/maintenance worker is not expected to have surface water, sediment, or groundwater exposure. Therefore, how can this receptor be appropriate for all exposure considerations as is? This receptor should be modified to include exposure to groundwater and surface water, since some future use activities include groundwater exposure via groundwater sampling activities, sampling of surface water for natural resource management, and exposure during maintenance work. The other option is to consider developing a site-specific receptor that would better reflect future exposures. The last option is to provide justification and the rationale for not evaluating these types of exposure even though the text mentions that activities may result in exposure to these media.
- Comment # 7: Section 3.2 - Similar to the approach for groundwater, will subsurface soil COPCs be identified even though exposure to subsurface soil is not expected and subsurface soil is not evaluated in the risk assessment?
- Comment # 8: Table 1 - Security guard / maintenance worker receptor is not expected to have surface water, sediment, or groundwater exposure. Therefore, this receptor and the associated exposure assumption table should be modified to include exposure to groundwater and surface water, since some of the future use activities could include groundwater exposure via

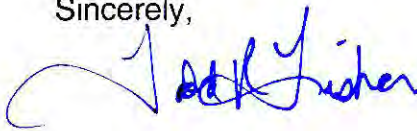
MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
MAY 19, 2004  
PAGE 3

groundwater sampling activities, sampling of surface water for natural resource management, and exposure during maintenance work. The other option is to consider developing a site-specific receptor that would include these exposures to better reflect future activities.

Comment # 9: Will an ecological risk assessment be done per facility wide ecological risk assessment work plan? If so, add Section 6.0 that states this point.

If you have any questions regarding these comments, 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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

cc: Eileen Mohr, Ohio EPA, DERR, NEDO  
Laurie Moore, Ohio EPA, OFFO, SWDO  
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Sharon Robers, SAIC, Twinsburg  
Kevin Jago, SAIC, Oakridge  
Barney Cornaby, SAIC, Oakridge  
Glen Beckham, USACE, Louisville  
John Jent, USACE, Louisville  
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ec: Mike Eberle, Ohio EPA, DERR, NEDO





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Bob Taft, Governor  
Christopher Jones, Director

June 15, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
FINAL RAMSDELL QUARRY LANDFILL  
HHRA WHITE PAPER

Mr. Mark Patterson  
Environmental Program Manager  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, OH 442466

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "White Paper Human Health Risk Assessment Approach for the Ramsdell Quarry Landfill Phase II Remedial Investigation, Ravenna Army Ammunition Plant, Ravenna, Ohio, Rev. 3." This document, dated June 9, 2004 and received via e-mail at Ohio EPA on June 9, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District, by Science Applications International Corporation (SAIC). This revision has incorporated all changes requested by Ohio EPA and, therefore, Ohio EPA considers Revision 3 (June 9, 2004) to be final.

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](mailto:Todd.Fisher@epa.state.oh.us)

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cc: Eileen Mohr, Ohio EPA, DERR, NEDO  
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State of Ohio Environmental Protection Agency

Northeast District Office

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

November 8, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
PRELIMINARY DRAFT  
~~RAMSDELL QUARRY LANDFILL PHASE 1~~  
REMEDIAL INVESTIGATION REPORT

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "Preliminary Draft, Phase I Remedial Investigation Report for Ramsdell Quarry Landfill at the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated August 2004 and received at Ohio EPA on August 20, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District by SAIC, Inc., under contract number F44650-D-99-0007, delivery order number CY11.

This document was reviewed by personnel from Ohio EPA's Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), Office of Federal Facilities (OFFO), and the Division of Drinking and Ground Waters (DDAGW). The comments are presented in table form (see enclosure).

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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

enclosure

cc: Eileen Mohr, Ohio EPA, NEDO, DERR  
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Laurie Moore, Ohio EPA, SWDO, OFFO  
Conni McCambridge, Ohio EPA, NEDO, DDAGW

John Jent, USACE, Louisville  
Paul Zorko, USACE, Louisville  
David Brancato, USACE, Louisville  
Glen Beckham, USACE, Louisville

ec: Mike Eberle, Ohio EPA, NEDO, DERR



**PRELIMINARY DRAFT - RAMSDELL QUARRY LANDFILL PHASE I RI  
OHIO EPA COMMENTS**

**Reviewers: C. McCambridge, Laurie Moore, Todd Fisher**

<b>Cmt. No.</b>	<b>Page # Line #</b>	<b>Comment</b>	<b>Recommendation</b>	<b>Response</b>
1	GENERAL	One of the primary objectives of the Phase I RI was the abandonment of existing monitoring wells MW-1, MW-2, MW-3, MW-4, and MW-5. However, abandonment of these monitoring wells did not occur. As mentioned in the ES Recommendations Section, these wells should be properly abandoned, to ensure they do not become preferential pathways for contaminant migration to the ground water table.	Ohio EPA recommends that RVAAP make every effort to secure funding for abandonment of these wells in a timely manner. This action will require a separate work plan that will be reviewed and approved by Ohio EPA.	
2	GENERAL	The Table of Contents does not include Appendices A through M.	Please include Appendices A through M in the Table of Contents, which should also include a brief description of what each appendix contains.	
3	GENERAL	On the memo's distribution list, "Laurie Eggert" is used instead of "Laurie Moore."	Please change all references of "Laurie Eggert" to "Laurie Moore."	
4	GENERAL	Sample Chain of Custodies are missing from this report.	Please include Chain of Custodies as appendix to this report, and all RI reports in the future (see comment # 39 ).	

5	Executive Summary, Line 21	There is no reference for the Facility-Wide Ecological Risk Assessment Manual at RVAAP	Please include the reference for the Facility-Wide Ecological Risk Assessment Manual at RVAAP	
6	Executive Summary, Previous Investigation, page xv	What are the conclusions of the previous investigations?	Please summarize.	
7	Executive Summary, page xx	The "Lessons Learned" section is a good addition to this report. Will this section be included in all future reports?	This section should also highlight things that did not work as well as those things that worked and should be continued. Recommend inclusion of "Lessons Learned" section on all future RI reports.	
8	Section 1.0, Figure 1-2, page 1-3	Figure 1-2 shows Erie Burning Grounds in yellow, with large black lettering, however, Ramsdell Quarry Landfill is not represented the same way on the figure.	Please remove the yellow shaded area and black lettering from Erie Burning Grounds, but apply this technique to Ramsdell Quarry Landfill AOC on this figure.	
9	Section 1.3.1, page 1-7, lines 27-32	The text states that Ramsdell Quarry is approximately 14 acres, and a portion of the abandoned quarry was permitted as a sanitary landfill. What is the approximate size of the permitted portion, and what is the approximate size of the portion that is not permitted as a sanitary landfill?	Please make the appropriate changes to the text.	
10	Section 2.2, page 2-1, lines 18-19	The text states that "RQL is located in the northeast portion of RVAAP and encompasses about 5.7 ha (14 acres) (Figure 1-3)."	Figure 1-3 shows the CERCLA approach at RVAAP (flow chart). Please change "Figure 1-3" to "Figure 1-2" in the text.	



11	Section 2.4.1.4, page 2-11, lines 20-21	The text states that “all water bodies at RVAAP support an abundance of aquatic vegetation and are stocked with fish.” This statement is incorrect. While all water bodies support an abundance of aquatic vegetation, they all are not “stocked” with fish.	Please remove “are stocked with” from the text in this paragraph.	
12	Section 2.4.2, Figure 2-4, page 2-12	<p><u>Issue 1:</u> It is unclear where the water table elevations used to construct Figure 2-4 (May 2004) are located in the submittal. These water table elevations are needed to verify the well elevations found in Figure 2-4.</p> <p><u>Issue 2:</u> Figure 2.4 does not contain arrows delineating the inferred ground water flow direction.</p>	<p><u>Issue 1:</u> Please indicate where these data sheets are available in the submittal.</p> <p><u>Issue 2:</u> Add arrows to delineate the inferred ground water flow direction.</p>	
13	Section 3.1.2.1, Discrete Samples, page 3-5	This section is confusing as written, because the discussion of composite sampling for explosives is intermixed with the discussion of discrete sampling for all other analytes.	Please revise the text to discuss all aspects of the composite sampling for explosives (lines 13-15 and lines 22-24) separate from the discrete sampling discussion. This could be done as separate sections, since the explosive sampling was actually a composite sample rather than a discrete, as the section title implies.	

14	Section 3.2.2, page 3-7	<p><u>Issue 1:</u> The text states that monitoring well boring logs are provided in Appendix C (Line 13). These logs are found in Appendix B.</p> <p><u>Issue 2:</u> The text states that <i>"Headspace readings were not conducted per the Phase I RI SAP Addendum No."</i> No headspace readings (field screening for VOCs) were recorded on boring logs during monitoring well installation activities (see Comment 12 below).</p> <p><u>Issue 3:</u> The text states that the well construction diagrams are provided in Appendix C (Line 32). The well construction diagrams appear in Appendix B.</p>	<p><u>Issue 1:</u> Revise this sentence to reflect the location of the monitoring well boring logs in Appendix B.</p> <p><u>Issue 2:</u> Section 4.1.1.2 of the Phase I RI SAP Addendum No. 1 states that <i>"all monitoring wells will be field screened for VOCs prior to sample collection..."</i> (pg. 4-3). Please provide a discussion concerning this omission.</p> <p><u>Issue 3:</u> Revise this sentence to reflect the location of the well construction diagrams in Appendix B.</p>	
15	Section 3.2.4, page 3-8	<p><u>Issue 1:</u> The text indicates that when insufficient water was present in a well during purging activities, the well was purged dry and allowed to recover (Line 23). The length of time that such a well was allowed to recover is not clarified in the submittal.</p> <p><u>Issue 2:</u> The test does not state whether ground water elevations were collected before purging or sampling.</p>	<p><u>Issue 1:</u> Provide additional clarification as to the standard length of recovery time used during purging activities.</p> <p><u>Issue 2:</u> Please provide additional details concerning this issue.</p>	

16	Section 3.2.5, page 3-9, line 21	The text states: <i>"The results of slug tests are presented in Appendix E..."</i> The slug tests results appear in Appendix D.	Please revise this sentence to reflect the location of the slug test results in Appendix D.	
17	Section 3.4, page 3-13, line 21	The text states: <i>"The OE reconnaissance results at RQL are... presented in Appendix L..."</i> The slug tests results appear in Appendix J.	Revise this sentence to reflect the location of the OE reconnaissance results in Appendix J.	
18	Section 4.2.4, page 4-12, lines 11-12	Were VOCs, pesticides, and PCBs analyzed in all discrete samples, but only detected and evaluated in one of those samples (RQL-024)?	Please clarify.	
19	Table 4-7, page 4-17	Were the analytical methods and reporting limits the same for both the multi-incremental and discrete samples?	Please clarify. Also, remove the footnote on line 5 that states "blank cell represents non-detect values," since no cells in the table are blank.	



20	Section 4.3.6, page 4-18, lines 8-17	Review of multi-incremental data and discrete data from the area corresponding to the multi-incremental sample area suggested a pattern of sporadic occurrence for explosives in soil. Review of data for constituents other than explosives resulted in a similar pattern - one where the laboratory analysis for a particular constituent collected discretely generally resulted in a higher concentration than was reported when the sample was multi-incremental. If this continues to be the pattern when both multi-incremental and discrete samples are collected, will the conclusion always be that the contamination is sporadic and the likelihood for capturing detectable concentrations is low? Is it possible that this pattern is a result of different sampling approaches or chemical/physical properties of the contaminant in question? How will these differences in results and sampling approaches be used for decision making?	Please clarify.	
21	Section 4.4, Table 4-8, page 4-19	This table indicates that the summary statistics were only compared with site background criteria. This data was not compared with MCLs.	Revise this table to ensure that MCLs are listed in addition to site background criteria.	



22	Section 4.4.1.1, Table 4-9, page 4-21	No explanation is given at the bottom of the table for the various symbols (=, *, and J) used on the table.	Provide an explanation of the symbology used in Table 4-9.	
23	Section 5.5.2.1, page 5-10	<u>SESOIL Model</u> : It is unclear as to the size of the source area(s) used in the SESOIL model.	Provide a discussion whether the source area size(s) used for the model represents the area size where ground water contamination is known to exist.	
24	Section 5.5.2.1, Table 5-1, page 5-14	<u>SESOIL Model</u> : Geotechnical data from Load Line 1 was used for the following input parameters: fraction of organic carbon ( $f_{oc}$ ), bulk density, total porosity and aquifer thickness and listed on Table 5-1.	Provide a discussion concerning the justification for using the input parameters from another location (Load Line 1) as a data source in Table 5-1.	

25	Section 5.5.2.2, Table 5-1, page 5-14	<p><u>AT123D Model:</u></p> <p><u>Issue 1:</u> The facility did not provide all model input values used for the AT123D model (i.e., decay constant value, <math>K_d</math>, and <math>R_f</math> values).</p> <p><u>Issue 2:</u> The submittal referenced the work plan in Table 5-1, submitted earlier, for the magnitude of hydraulic gradient. A discussion concerning how this value was derived was not found in the text. Does this value consider that the possibility of seasonal variations in the direction and magnitude of hydraulic gradient based on additional potentiometric maps? Could a change in ground water flow affect the distance between the source to the point of compliance?</p>	<p><u>Issue 1:</u> Provide all AT1232D model input parameters, along with appropriate justifications, in the revised version of Table 5-1.</p> <p><u>Issue 2:</u> This issue should be addressed.</p>	
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26	Section 5.5.4, page 5-16	<p><u>Issue 1:</u> The presence of heterogeneity beneath the site area and how it could effect ground water flow and contaminant migration in the site area was not discussed.</p> <p><u>Issue 2:</u> The effects of uncertainty in the input values used for model predictions were not evaluated and addressed in the report.</p>	<p><u>Issue 1:</u> Provide a discussion concerning the possibility of the presence of preferential pathways beneath the site and its effect on ground water flow and contaminant migration</p> <p><u>Issue 2:</u> Provide a discussion which identifies the parameters that are sensitive and conduct a sensitivity analysis to evaluate what effect of uncertainty will have on the model predictions.</p>	
27	Section 6.1, page 6-1, lines 20-22	Per a conference call between Ohio EPA and USACE, on September 9, 2004, regarding White Papers and the use of the FWHHRAM, it was decided and agreed to that all risk assessments at Ravenna would evaluate the five receptors listed in the FWHHRAM (Security Guard/Maintenance Worker, Hunter/Trapper/Fisher Recreator, National Guard Trainee, National Guard Fire and Dust Suppression Worker, and Resident).	Therefore, please remove the last sentence of this paragraph (Lines 20-22) and make it the first sentence of a new paragraph. Include text from Section 6.3.1 on page 6-6 to explain why this is the only receptor evaluated.	



28	Section 6.2.1 to Section 6.5.2.1	<p>These sections discuss the screening process to select COPCs to evaluate in the baseline human health risk assessment. The screening process and the selection of COPCs should be summarized.</p>	<p>Please include the table that summarizes this screening process and the selection of COPCs in the main portion of the report. This table should provide summary statistics and the Exposure Point Concentration used in the BRA calculations. There are references to a table in the appendix, but this information should be placed in the main text. Table 6-1 on page 6-5 provides a list of what constituents are considered COPCs for what media, but a more detailed table with concentrations and statistics should be included in the main portion of the report. In addition, without this information, it is unclear if and how the multi-incremental sample results were used in the risk assessment.</p>	
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29	Table 6-4, RGO's for Surface Soil, page 6-22	Explain why the total Surface Soil RGO for the Security Guard/Maintenance Worker at RQL is a lower concentration than the Surface Soil RGO that was calculated for the National Guard Trainee at Load Lines 1-4 for the following PAHs: Benzo(a)anthracene, Benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene? The national guard trainee is considered to have a greater exposure time and frequency than a security guard, therefore, the outcome of these RGO's is questioned. Also, the value listed in the total RGO column doesn't make sense when looking at the other columns.	Please check the accuracy of this table.	
30	Section 7.0, Screening Ecological Risk Assessment, page 7-1, lines 10-28	There is no reference made to the Ravenna Facility-Wide Ecological Risk Assessment Guidance that has been developed and finalized for this site.	Please add this reference to the report.	
31	Section 7.4.2.1, Conclusion and extension of the SERA, page 7-18, line 25	Change Sample management Decision Plan (SMPD) to Scientific Management Decision Point (SMPD), which is the terminology used for this acronym in Ohio EPA's ERAG guidance.	Please make the appropriate changes to the text	



32	Section 7.5, Recommendation, page 7-29	This section gives managers many possible directions to proceed without recommending one over the others. In addition, another possible consideration is to generate ecological RGO's in a feasibility study, if it is felt that it's appropriate and possible at this time.	Therefore, it is unclear what path forward is being recommended - please clarify.	
33	Figure 8-1, CSM for RQL, page 8-7	The graphical representation of this figure is awesome and is nice and easy to read. However, it doesn't present some aspects of a Conceptual Site Model that are typically found, such as listing exposure pathways, media, potential source, receptors, contact points, or media.	Please include this information or change the name of the figure to something more specific to groundwater investigation.	
34	Appendix B, Well Boring Logs	<p><u>Issue 1</u>: No headspace readings, related to field screening for VOCs, were recorded on all HTRW drilling logs.</p> <p><u>Issue 2</u>: On the HTRW logs, the core samples for the following wells were not cross-referenced to the core box number: RQLmw-013, RQLmw-014, and RQLmw-016.</p>	<p><u>Issue 1</u>: Please see Comment 26 - Issue 2 above.</p> <p><u>Issue 2</u>: Provide this information.</p>	
35	Appendix B, Well Development Logs	Water table elevations were not recorded on the well development logs, following development, as per Phase I RI SAP, Section 4.1.1.1, page 4-1.	Please provide the water table elevations for the well development activities.	

36	Appendix C, Well Sampling Logs	<p><u>Issue 1:</u> Water table elevations, prior to purging, were not recorded on the field data sheets that are included in the submittal.</p> <p><u>Issue 2:</u> The water table elevation data, needed to calculate the well volume for each well, is missing.</p> <p><u>Issue 3:</u> Final turbidity readings of &gt;5 NTUs were noted on the following sampling logs of Phase I ground water sampling activities: RQLmw-013, RQLmw-015, RQLmw-016, and RQLmw-017.</p>	<p><u>Issue 1:</u> Please provide the water table elevations for this sampling event (December 2003).</p> <p><u>Issue 2:</u> Please insert a summary (table) of water table elevation information.</p> <p><u>Issue 3:</u> Provide a discussion concerning the measurement of turbidity and the procedures that were implemented to obtain representative ground water samples.</p>	
37	Appendix E, Field Change Orders (FCO)	FCO NO 001 is missing	Please provide FCO NO 001.	
38	Appendix E, Field Change Orders (FCO)	FCO NO004 is not signed by USACE or Ohio EPA	Please provide signed FCO or provide an explanation for the missing signature	
39	Appendix G	The analytical results section does not contain the chain of custody forms for the December 2003 sampling event.	Insert the chain of custody forms in the revised document.	





State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

May 19, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
DRAFT ~~ERIE BURNING GROUNDS~~  
HHRA WHITE PAPER

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "White Paper Human Health Risk Assessment Approach for the Erie Burning Grounds Phase II Remedial Investigation, Ravenna Army Ammunition Plant, Ravenna, Ohio, Rev. 2." This document, dated April 12, 2004 and received via e-mail at Ohio EPA on April 11<sup>th</sup>, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District, by Science Applications International Corporation (SAIC). The following comments were generated from the review of the above-referenced document:

**COMMENTS**

- Comment # 1: Section 2.0 - Please clarify what "RIR" refers to in the first paragraph. Does "RIR" represent the RI Report?
- Comment # 2: Section 2.0 - The second paragraph does not provide the justification for evaluating the AOC as a single exposure unit. Add a few words stating that this is appropriate given the restricted access and current future use.
- Comment # 3: Section 2.0, last paragraph, last sentence - The text states that "other soil depths are not applicable to receptors at EBG (see Section 3.0)." Please specify which subsection in Section 3.
- Comment # 4: Section 3.2 - Will future natural resource management include groundwater sampling in which exposure could occur? If so, then the receptor should be evaluated for incidental groundwater exposure.
- Comment # 5: Section 3.2 - Similar to the approach for groundwater, will subsurface soil COPCs be identified, even though exposure to subsurface soil is not expected and subsurface soil is not evaluated in the risk assessment?



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
MAY 19, 2004  
PAGE 2

Comment # 6: Will an ecological risk assessment be done per the facility wide ecological risk assessment work plan? If so, add Section 6.0 that states this point.

If you have any questions regarding these comments, 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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

cc: Eileen Mohr, Ohio EPA, DERR, NEDO  
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Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Sharon Robers, SAIC, Twinsburg  
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Barney Cornaby, SAIC, Oakridge  
Glen Beckham, USACE, Louisville  
John Jent, USACE, Louisville  
David Brancato, USACE, Louisville

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State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

June 14, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
FINAL ~~ERIE BURNING GROUNDS~~  
HHRA WHITE PAPER

Mr. Mark Patterson  
Environmental Program Manager  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, OH 442466

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "White Paper Human Health Risk Assessment Approach for the Erie Burning Grounds Phase II Remedial Investigation, Ravenna Army Ammunition Plant, Ravenna, Ohio, Rev. 3." This document, dated June 9, 2004 and received via e-mail at Ohio EPA on June 9, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District, by Science Applications International Corporation (SAIC). This revision has incorporated all changes requested by Ohio EPA and, therefore, Ohio EPA considers Revision 3 (June 9, 2004) to be final.

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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

cc: Eileen Mohr, Ohio EPA, DERR, NEDO  
Laurie Moore, Ohio EPA, OFFO, SWDO  
Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Sharon Robers, SAIC, Twinsburg  
Kevin Jago, SAIC, Oakridge  
Barney Cornaby, SAIC, Oakridge  
Glen Beckham, USACE, Louisville  
John Jent, USACE, Louisville  
David Brancato, USACE, Louisville  
Brian Tucker, Ohio EPA, CO, DERR

ec: Mike Eberle, Ohio EPA, DERR, NEDO





State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

February 10, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
DRAFT, INVESTIGATION DERIVED  
WASTE (IDW) REPORTS FOR ~~ERIE~~  
~~BURNING GROUNDS~~ (EBG) AND  
~~RAMSDELL QUARRY LANDFILL (RQL)~~,  
PORTAGE/TRUMBULL COUNTIES

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the documents entitled: "Draft, Investigation Derived Waste (IDW) Characterization and Disposal Reports for Well Cuttings, Development and Purge Water, and Decontamination Fluids for Ramsdell Quarry Landfill (RQL) and Erie Burning Grounds (EBG), Ravenna Army Ammunition Plant, Ravenna, Ohio." These documents were prepared by Science Applications International Corporation (SAIC) for the U.S. Army Corps of Engineers (USACE) under Contract No. 44650-99-0007, ECAS 431 and 409, respectively. Ohio EPA received both documents on February 2, 2004. The following comments were generated from the review:

**RAMSDELL QUARRY LANDFILL**

- Comment # 1: Table 1. Summary of Ramsdell Quarry Phase I IDW, Generation Dates, page 2 - Generation date(s) for container number "USACE Decon-02" are missing. If date(s) are unknown, please provide an estimated range under column "GENERATION DATES."
- Comment # 2: Page 3, 5<sup>th</sup> paragraph, 2<sup>nd</sup> sentence - The text states, "as defined in CFR Part 261 Subpart D." Please change "Subpart" to "Subpart" in the text.
- Comment # 3: Attachments 1 and 2, Table Heading - Please change "Ramsdale" to "Ramsdell."

**ERIE BURNING GROUNDS**

- Comment # 4: Page 4, 1<sup>st</sup> paragraph, 2<sup>nd</sup> sentence - The text states, "as defined in CFR Part 261 Subpart D." Please change "Subpart" to "Subpart" in the text.



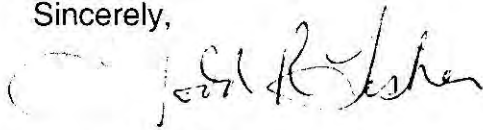


Mr. Mark Patterson  
Ravenna Army Ammunition Plant  
February 10, 2004  
Page 2

Ohio EPA concurs with SAIC's waste classifications and proposed disposal recommendations. Ohio EPA considers these reports final upon completion of the above requested changes to the text.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Todd R. Fisher". The signature is written in a cursive style with a large, stylized "F".

Todd R. Fisher  
Project Coordinator  
Division of Emergency and Remedial Response  
[Todd@ToddFisher.us](mailto:Todd@ToddFisher.us)

TRF/kss

cc: Bonnie Buthker, Ohio EPA, SWDO/OFFO, CO  
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Glen Beckham, USACE, Louisville  
Paul Zorko, USACE, Louisville  
Martha Clough, SAIC, Twinsburg  
Kevin Jago, SAIC, Oakridge

ec: Mike Eberle, Ohio EPA, DERR, NEDO





State of Ohio Environmental Protection Agency

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

March 29, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
OE/UXO REMOVAL REPORT - ODA1

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the following document: "Final, OE/UXO Removal and Interim Removal Action Report for the Open Demolition Area # 1." This document, dated March 2004, and received at Ohio EPA, NEDO, DERR, on March 25, 2004, was prepared by MKM Engineers, Inc. for the U.S. Army Joint Munitions Command (JMC).

This document was reviewed with respect to the draft document (dated April 2002 and received at Ohio EPA on May 15, 2002); Ohio EPA comments on the draft document, dated June 25, 2002; and the comment response table (CRT) provided on March 25, 2004.

Although the CRT indicates that the scope of work (SOW) for this project only provided for two submissions of the report, please submit replacement pages (if noted) with revised text for the following comments:

1. Original Ohio EPA Comment # 2 - The revised text was changed to indicate that in May 1999, the National Guard Bureau (NGB) assumed operational control of 19,938 acres at the Ravenna Army Ammunition Plant (RVAAP). This is not correct. Please provide the correct chronology of the land transfer. (Replacement page required.)
2. Original Ohio EPA Comment # 10 - Please revise as requested; i.e., in line 6, change "completion" to "initiation." (Replacement page required.)
3. In the revised text on page 4-2 (Section 4.1), please indicate whether or not the use of a lesser grade of acetone during the field screening process could have resulted in false negatives. (Provide an explanation and, if this is a possibility, then a replacement page will be required that contains the explanation and a description of the impact upon the project.)
4. Figure 5-1 in the revised text is significantly different from the original figure, especially with respect to information presented in the data boxes. Please provide an explanation and a revised figure, if necessary.



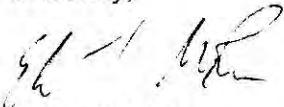
Mr. Mark Patterson  
Ravenna Army Ammunition Plant  
March 29, 2004  
Page 2

5. On page 7-1 (line 25), the volume of soil placed on grid 1 was reduced from 430 to 390 cubic yards. Please provide an explanation. (Replacement page required, if 390 cubic yards is not the correct volume.)
6. In future projects, on chain of custody (COC) forms, please ensure that the forms are completely filled out, and that the proper convention for making changes is followed. Additionally, on the form identified as Lab Lot # 203895, please provide an explanation for the elevated cooler temperature upon receipt at the laboratory (16 degrees C) and whether or not there was any impact upon the data.

After review of the replacement pages and insertion into all distributed copies, the report may be considered final.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Laurie Moore, Ohio EPA, SWDO, OFFO  
LTC Tom Tadsen, OHARNG  
JoAnn Watson, AEC  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville  
Rick Callahan, MKM  
Mike Samelak, MKM  
Brian Stockwell, MKM

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR





State of Ohio Environmental Protection Agency

Northeast District Office

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

April 27, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
ODA 1 FINAL OE/UXO REMOVAL REPORT

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), received and reviewed the comment response table (CRT) and the replacement pages for the following document: "Final OE/UXO Removal and Interim Removal Action Report for the Open Demolition Area # 1, Ravenna Army Ammunition Plant, Ravenna, Ohio 44266." The CRT and replacement pages were prepared by MKM Engineers, Inc. for the U.S. Army Joint Munitions Command (JMC) and were received at Ohio EPA, NEDO, on April 26, 2004.

The CRT and replacement pages are acceptable to Ohio EPA, and the report is considered final.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,

Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Laurie Moore, Ohio EPA, OFFO SWDO  
LTC Tom Tadsen, OHARNG  
JoAnn Watson, AEC  
Glen Beckham, USACE Louisville  
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Rick Callahan, MKM  
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ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR







State of Ohio Environmental Protection Agency

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

~~January 5, 2004~~

Mark Patterson  
Commander's Representative  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, OH 44266-9297

**RE: RAVENNA ARMY AMMUNITION PLANT (OH5-210-020-730), PORTAGE COUNTY;  
LABORATORY DATA PACKAGE FROM THE MODIFIED APPENDIX IX  
SAMPLING COMPLETED IN MAY 2001; DATED NOVEMBER 2003; RECEIVED  
NOVEMBER 7, 2003**

Dear Mr. Patterson:

~~The Open Demolition Area #2~~ (OD2) at the Ravenna Army Ammunition Plant (RVAAP) has entered the compliance phase of ground water monitoring (OAC 3745-54-99) based on confirmed statistically significant differences between the concentrations of arsenic and specific conductance detected in the upgradient well (DET-1B) and downgradient wells DET-4 and DET-2, respectively. The uppermost aquifer at the site is found at the interface between glacial tills composed of clayey silt and the underlying, Pennsylvanian age, shale bedrock. Comment 2 from a May 2003 Ohio EPA letter to RVAAP requested the submission of the laboratory QA/QC information from the May 2001 modified Appendix IX sampling event conducted at OD2. This information had originally been requested when the data were reviewed in July 2002. Ohio EPA has reviewed the QA/QC information from the May 2001 modified Appendix IX sampling event at the OD2 and has the following comments.

**COMMENTS:**

1. Only the chain of custody forms for the metals samples collected from DET-3 and DET-4 include information concerning field filtering and preservation. The chain of custody for DET-3 indicates that the metals samples were field filtered and preserved. The chain of custody for DET-4 indicates that preservatives were added in the field but that the metals sample was not field filtered. Several issues require clarification.
  - A. Since the chain of custody forms for the other samples (DET-1B, DET-2, and the duplicate) do not include information concerning the field filtering and preservation of the metals samples, it is unclear how these samples were handled. This should be clarified and the field notes taken during the collection of these samples should be submitted for review.



- B. The reason that the metals sample from DET-4 was not field filtered should be documented and submitted for review.
  - C. It is unclear if the metals sample obtained from DET-4 was preserved in the field. The chain of custody indicates that preservatives were added in the field, however, it is unclear if this refers to the metals sample or to the other samples documented on the form that also require field preservation. The "Sample Discrepancy Report" completed by the laboratory indicates in one place that the sample was to be filtered in the laboratory but that it had already been preserved. In another area of the same report, it states that the sample was filtered and preserved in the laboratory. Because the concentrations of metals detected in a sample are dependant upon the sequence and timing of filtration and preservation, this should be clarified and supporting documentation submitted for review.
  - D. Additional information should be submitted to fully document which samples were preserved in the field and what preservatives were used. This should be done for not only the metals samples as requested above, but for all sample requiring field preservation. In the future, the documentation on the chain of custody should be much more specific as to which samples were preserved and what preservative(s) was used.
2. The sample receipt information included on the chain of custody form for the field blank was not completed by the laboratory. This should be explained and, if available, documentation of this sample's condition upon receipt at the laboratory should be submitted for review. In the future, although this is a QA/QC sample rather than a primary sample from a monitoring well, the sample receipt information still should be documented by the laboratory.
3. The case narrative for the semi-volatile compound analyses indicates that although the spike recovery for pyrene is above QC limits in the matrix spike duplicate, all other spike recoveries and relative percent difference (RPD) values are within QC limits for the specified compounds in the matrix spike/matrix spike duplicate samples. However, the data included in the quality control summary tables indicate that other compounds have matrix spike and/or matrix spike duplicate percent recoveries that also are outside QC limits. This includes benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, hexachlorobenzene, butylbenzylphthalate, bis(2-ethylhexyl)phthalate, di-n-octylphthalate, and benzo(a)pyrene. The information on these same tables indicate that the matrix spike and/or matrix spike duplicate RPD for benzo(a)anthracene, di-n-octylphthalate, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene also are outside QC limits. In addition, the blank spike recovery data also indicate that indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene are outside QC limits. This apparent discrepancy between the information in the case narrative and the data included in the quality control summary tables should be explained.

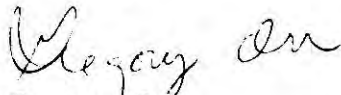
In addition, it should be noted that the sample used for the matrix spike/matrix spike duplicate was from the site. Therefore, the matrix interferences that affected the matrix spike/matrix spike duplicate also may have affected the other semi-volatile samples.

4. The case narrative for the volatile organic compounds indicates that all matrix spike/matrix spike duplicate recoveries and RPD values are within QC limits for the controlled compounds. However, a review of the quality control summary tables indicate that the matrix spike percent recovery for chloromethane is outside of QC limits. The matrix spike duplicate percent recovery for 2-butanone is also outside of QC limits. And the matrix spike duplicate RPD for chloromethane, bromomethane, and 2-butanone also are outside QC limits. These apparent discrepancies should be explained.

RVAAP should respond to the abovementioned comments within thirty (30) days upon receipt of this letter.

If you should have any questions regarding this matter, please feel free to contact me at (330) 963-1189 or via e-mail at [greg.orr@epa.state.oh.us](mailto:greg.orr@epa.state.oh.us).

Sincerely,



Gregory Orr  
Environmental Specialist  
Division of Hazardous Waste Management

GO:ddw

cc: Jeremy Carroll, DHWM, CO  
ec: Natalie Oryshkewych, DHWM, NEDO  
Diane Kurlich, DDAGW, NEDO  
Eileen Mohr, DERR, NEDO  
Todd Fisher, DERR, NEDO





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Bob Taft, Governor  
Christopher Jones, Director

February 2, 2004

Mark Patterson  
Commander's Representative  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, OH 44266-9297

**RE: RAVENNA ARMY AMMUNITION PLANT (OH5-210-020-730); PORTAGE COUNTY; SEPTEMBER 23, 2003, GROUND WATER MONITORING WELL SAMPLING EVENT, ~~OPEN DETONATION AREA 2 (ODA-2)~~; DATED OCTOBER 31, 2003; RECEIVED NOVEMBER 24, 2003**

Dear Mr. Patterson:

The above report has been submitted by the Army to document the ground water monitoring event that was conducted at ODA-2 on September 23, 2003. Ground water at the site is monitored in accordance with OAC 3745-54-90 through 3745-55-01. A compliance monitoring plan in accordance with OAC 3745-54-99 has been approved and will be implemented at the site during the first sampling event of 2004. Ohio EPA has the following comment regarding the submittal.

**COMMENT**

The text of the report indicates that the following statistically significant differences were observed between the concentrations of constituents in the upgradient well DET-1B and the cited downgradient wells:

arsenic in DET-2 (11.1 ug/L) and DET-3 (10.9 ug/L);  
pH in DET-2 (8.2); and  
specific conductance in DET-4 (970 umhos/cm).

The above cited statistically significant differences were observed between the upgradient well DET-1B and downgradient wells DET-2, DET-3, and DET-4 during the September 2003 sampling event. However, because a compliance monitoring plan has been approved and implementation of the plan is scheduled to begin with the first sampling event of 2004, no additional response by the facility is necessary at this time.

If you should have any questions regarding this matter, please feel free to contact me at (330) 963-1189 or via e-mail at [greg.orr@epa.state.oh.us](mailto:greg.orr@epa.state.oh.us).

Sincerely,

Gregory Orr  
Environmental Specialist  
Division of Hazardous Waste Management

cc: Jeremy Carroll, DHWM, CO  
ec: Natalie Oryshkewych, DHWM, NEDO  
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~~February 13, 2004~~

Mark Patterson  
Commander's Representative  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, OH 44266-9297

**RE: RAVENNA ARMY AMMUNITION PLANT (OH5-210-020-730); PORTAGE COUNTY;  
RESPONSE TO COMMENTS CONCERNING THE LABORATORY DATA PACKAGE  
FROM THE MODIFIED APPENDIX IX SAMPLING COMPLETED IN MAY 2001;  
RESPONSE LETTER DATED FEBRUARY 4, 2004.**

Dear Mr. Patterson:

Ravenna Army Ammunition Plant (RVAAP) submitted the above referenced response letter to address Ohio EPA comments concerning the laboratory QA/QC information, from the May 2001 modified Appendix IX sampling event, conducted at the ~~Open Detonation Area #2 (ODA2)~~. All of the Ohio EPA comments concerning the QA/QC information have been adequately addressed. No further action is required of the Army with respect to this submittal.

If you should have any questions regarding this matter, please feel free to contact me at (330) 963-1189 or via e-mail at [greg.orr@epa.state.oh.us](mailto:greg.orr@epa.state.oh.us).

Sincerely,

Gregory Orr  
Environmental Specialist  
Division of Hazardous Waste Management

GO:ddw

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ec: Natalie Oryshkewych, DHWM, NEDO  
Diane Kurlich, DDAGW, NEDO  
Eileen Mohr, DERR, NEDO  
Todd Fisher, DERR, NEDO



**WHITE PAPER**  
**HUMAN HEALTH RISK ASSESSMENT APPROACH**  
**FOR THE DEMOLITION AREA 2 PHASE II REMEDIAL**  
**INVESTIGATION, RAVENNA ARMY AMMUNITION PLANT,**  
**RAVENNA, OHIO, REV. 0, FEBRUARY 27, 2004**

## **1.0 INTRODUCTION**

The purpose of this white paper is to briefly document the methods and assumptions that will be used to conduct the Phase II Remedial Investigation (RI) Human Health Baseline Risk Assessment (HHBRA) for the Demolition Area 2 at the Ravenna Army Ammunition Plant (RVAAP). This white paper is not intended to represent a comprehensive workplan. Instead it provides details of how the Facility Wide Human Health Risk Assessors Manual (FWHHRAM, USACE 2004) will be applied at Demolition Area 2.

The HHBRA consists of four steps:

- Data Evaluation – Section 2
- Exposure Assessment – Section 3
- Toxicity Assessment – Section 4
- Risk Characterization – Section 5

## **2.0 DATA EVALUATION**

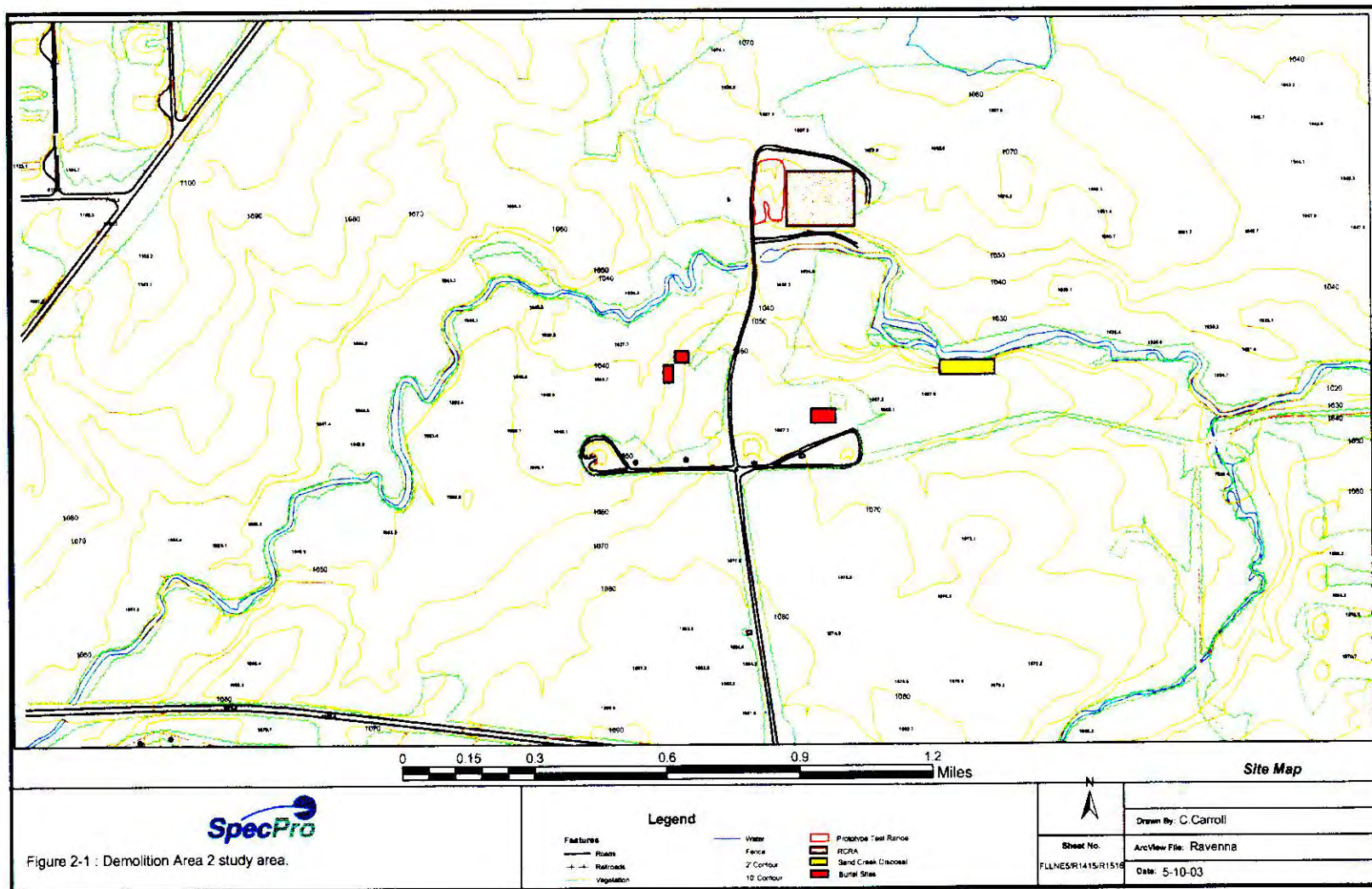
The purpose of the data evaluation is to develop a set of chemical data suitable for use in the HHBRA. Data are evaluated to establish a list of site-related chemicals of potential concern (COPCs) using screening criteria.

Demolition Area 2 encompasses approximately 25 acres bisected east to west by Sand Creek. Figure 2-1 shows the Demolition Area 2 study area and sampling locations. The open detonation area and open burning area make up the 2.5 acre Resource Conservation and Recovery Act (RCRA) unit located within the larger Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) unit. The RCRA unit is not included in the closure of the Demolition Area 2 CERCLA unit. Soil contamination at the RCRA unit will be investigated and remediated as needed in accordance with RCRA closure or other applicable requirements.

The sampling data will be grouped into two exposure units based on geographic location: north of Sand Creek (excluding the RCRA unit) and south of Sand Creek.

Per the FWHHRAM (USACE 2004), selection of COPCs is based on: (1) a frequency-of-detection/weight-of-evidence; (2) screening of essential nutrients; (3) screening against risk-based concentrations; and (4) comparison to facility-wide background criteria as described below.





### ***Frequency-of-Detection***

Chemicals that are never detected will be eliminated as COPCs. For sample aggregations with greater than 20 samples and a frequency-of-detection of less than 5%, a weight-of-evidence approach will be used to determine if the chemical is site-related. The magnitudes and locations (e.g., clustering) of the detections and potential source of the chemical will be evaluated. If the detected results show no clustering, the chemical is not a COPC in any other medium, the concentrations are not substantially elevated relative to the detection limit, and the chemical was not used in the area under investigation, the chemical will be eliminated from further consideration. This screen will be applied to all organic and inorganic chemicals with the exception of explosives and propellants. No detected explosives or propellants will be eliminated based on their frequency of detection.

### ***Essential Nutrients***

Eight chemicals are considered essential nutrients (calcium, chloride, iodine, iron, magnesium, potassium, phosphorus, and sodium) and will not be evaluated as COPCs as long as they are (1) present at low concentrations (i.e., only slightly elevated above naturally occurring levels), and (2) toxic at very high doses (i.e., much higher than those that could be associated with contact at the site).

### ***Risk-Based Screen***

If the maximum concentration of a constituent does not exceed the U.S. Environmental Protection Agency (EPA) Region 9 residential preliminary remediation goal (PRG) for a cancer risk of  $10^{-6}$  or a hazard quotient of 0.1, the constituent will be eliminated as a COPC.

### ***Background Screen***

If the maximum concentration of an inorganic constituent passing the first three screens exceeds the background value the constituent is considered a COPC. Background values are the final facility-wide background values for RVAAP, published in the *Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 1999). Note, surface soil (collected from 0-1 feet below ground surface [bgs]) results will be compared to surface soil background (collected from 0-1 ft bgs.) concentrations. Other soil depths are not applicable to receptors at Demolition Area 2 (see Section 3).

## **3.0 EXPOSURE ASSESSMENT**

The exposure assessment includes four steps:

- identify current and future land use,
- identify potentially exposed populations, exposure media, and exposure pathways,
- calculate exposure point concentrations, and
- estimate intake.

### ***Current and Future Land Use***

The extensive presence of unexploded ordnance (UXO) prevents most activity at Demolition Area 2, including most National Guard training activities, and there are no plans for UXO removal at this site beyond what has been previously conducted.

Demolition Area 2 is classified as Restricted Access-Authorized Personnel Only. It is closed to all normal training and administrative activities. Surveying, sampling and other essential security, safety, natural resources management, and other directed activities may be conducted here only after authorized personnel have been properly briefed on potential hazards/sensitive areas. Individuals unfamiliar with the hazards/restrictions will be escorted by authorized personnel at all times while in the restricted area (USACE 2004).

There are no immediate plans for active re-use of Demolition Area 2. In the near term, limited material obtained during previous UXO removal activities may occasionally be detonated at the RCRA unit. This type of UXO demolition may occur approximately 1 week per year. The UXO material to be detonated is stored primarily in Building 1501 (see Figure 2-1). Activity outside the RCRA unit would be limited to UXO technicians transport material from storage to the RCRA unit for demolition.

In the future, the RCRA unit may be used as a hand grenade familiarization range and a light demolition range. These uses would include a dedicated impact area where no activity is allowed (a "dead zone") surrounded by a high berm. Firing positions would be on the outside of the berm. Observation of training activities would be conducted from an observation tower. Activity outside the RCRA unit would be limited to soldiers driving to the RCRA unit or parking near the gate (at Building 1502, see Figure 2-1) and walking from the gate to the range area. If a parking area is established outside the gate, some maintenance of this area would be required.

#### ***Potentially Exposed Populations, Exposure Media, and Exposure Pathways***

Potentially contaminated media at Demolition Area 2 are surface soil (0-1 feet bgs), subsurface soil (>1 foot bgs), groundwater, surface water, and sediment.

Given the restricted access to Demolition Area 2, the most likely receptors will be individuals entering the area on an occasional basis to evaluate wildlife to meet the needs of natural resources management, or to check the status of the area for security or safety reasons and UXO technicians transporting material from storage to the RCRA unit. If a range is built at the RCRA unit, individuals using the range may drive or walk from the gate (near Building 1502) to the RCRA unit. Based on this information the Security Guard/Maintenance Worker scenario outlined in the FWHHRAM (USACE 2004) is protective of potential receptors at Demolition Area 2. This scenario assumes a Security Guard/Maintenance Worker patrols Demolition Area 2 every day for one hour. Security patrols occur daily across the installation but not within Demolition Area 2 and patrolmen usually remain within their vehicles during these patrols. Although the security guard is not currently exposed to contaminated media at Demolition Area 2 on a daily basis, the potential exposure of this receptor is considered protective of receptors with more irregular exposure (e.g., a wildlife ecologist who spends a several days at the site once every few years, security personnel who may periodically evaluate the site, or UXO technicians who may periodically transport materials to the RCRA unit). It will also be protective of the Ohio Army National Guard (OHARNG) personnel driving or walking from the gate to the RCRA unit, or conducting periodic maintenance of a parking area if a range is built in the future. Therefore, as a worst-case assumption, it is assumed that a security guard visits Demolition Area 2 and leaves his or her vehicle on a daily basis.

The Security Guard/Maintenance Worker is assumed to be exposed to surface soil (0-1 feet bgs) only. Because of UXO issues, there will be no intrusive activities; therefore, subsurface soil will not be evaluated in the quantitative HHBRA. This receptor is not involved in recreational or training activities



that would result in exposure to surface water or sediment. Because Demolition Area 2 will not be routinely used, no potable water will be available there; therefore, exposure to groundwater is not evaluated.

Exposures to contaminants in surface soil at Demolition Area 2 will be evaluated for soil ingestion, dermal contact with soil, and inhalation of soil particles and volatile organic chemicals (VOCs).

#### ***Exposure Point Concentrations***

The Demolition Area 2 HHBRA will evaluate the reasonable maximum exposure (RME). The RME is an estimate of the highest exposure reasonably expected to occur at the site. Because of the uncertainty associated with any estimate of exposure concentration, the 95% upper confidence limit on the mean (UCL<sub>95</sub>) for either a normal or lognormal distribution is the recommended statistic for evaluating the RME. In cases where the UCL<sub>95</sub> exceeds the maximum detected concentration, the maximum detected concentration will be used as an estimate of the RME.

EPCs are calculated using equations from EPA guidance, *Supplemental Guidance to RAGS: Calculating the Concentration Term* (EPA 1992). The data are tested using the Shapiro-Wilk test to determine distribution, normal or lognormal, of the concentrations. This guidance notes that environmental data are often lognormally distributed but does not give specific guidance for data sets with unknown distributions.

For Demolition Area 2 the UCL<sub>95</sub> on the mean is calculated using the normal distribution equation (see Equation 1) when the concentrations are normally distributed, when concentrations are not judged to be normally or lognormally distributed, when the data set contains fewer than five detections, or when the frequency of detection is less than 50%. For these situations, the UCL<sub>95</sub> on the mean is calculated using the following equation:

$$UCL_{95}(normal) = \bar{x}_n + \frac{(t)(s_x)}{\sqrt{n}}, \quad (1)$$

where

- $\bar{x}_n$  = mean of the untransformed data,
- t = student-t statistic,
- $s_x$  = standard deviation of the untransformed data,
- n = number of sample results available.

EPA guidance *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites* (EPA 2002a) provides several methods for calculating the UCL<sub>95</sub> for data sets that are neither normally nor log-normally distributed. All of the methods in this guidance are based on the assumption of random sampling. Sampling at Demolition Area 2 was biased toward areas with the greatest potential for contamination. The reason for defaulting to the t-distribution (i.e., assumption of normality) when the distribution cannot be determined is that this method is simple and robust; even when the assumption that the underlying distribution is normal is violated, the estimate of the UCL<sub>95</sub> is expected to be reasonably close to the true value.

For lognormally distributed concentrations, the UCL<sub>95</sub> on the mean is calculated using the following equation:

$$UCL_{95}(\lognormal) = e^{\left( \bar{x}_l + 0.5(s_l^2) + \frac{(s_l)(H)}{\sqrt{n-1}} \right)}, \quad (2)$$

where

- $e$  = constant (base of the natural log, equal to 2.718),
- $\bar{x}_l$  = mean of the transformed data [ $l = \log(x)$ ],
- $s_l$  = standard deviation of the transformed data,
- $H$  = H-statistic,
- $n$  = number of sample results available.

EPA guidance (EPA, 2002a) notes that use of the H statistic may result in overestimating the true  $UCL_{95}$  if the data are not lognormal. Even small deviations from lognormality can greatly influence the results using the H-statistic, yielding upper bounds that are much too large (Singh et al. 1997).

#### ***Exposure Parameters and Calculations for Estimating Intakes***

Standard intake equations from EPA guidance (EPA 1989) for ingestion, dermal contact, and inhalation of chemicals in soil (shown below) are used along with the exposure parameters shown in Table 1. Exposure parameters and intake equations are from the FWHHRAM (USACE 2004).

Incidental ingestion of soil is estimated for using Equation 3:

$$\text{Chemical Intake (mg/kg-day)} = \frac{C_s \times IR_s \times EF \times ED \times FI \times ET \times CF}{BW \times AT}, \quad (3)$$

where

- $C_s$  = chemical concentration in soil (mg/kg),
- $IR_s$  = ingestion rate (kg/day),
- $EF$  = exposure frequency (days/year),
- $ED$  = exposure duration (years),
- $FI$  = fraction ingested (value of 1, unitless),
- $ET$  = exposure time (hr/day),
- $CF$  = conversion factor for ET (day/hr),
- $BW$  = body weight (kg),
- $AT$  = averaging time (days) for carcinogens or noncarcinogens.

The dermally absorbed dose (DAD) from chemicals in soil is calculated using Equation 4:

$$\text{Chemical DAD (mg/kg-day)} = \frac{C_s \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}, \quad (4)$$

where

- $C_s$  = chemical concentration in soil (mg/kg),
- $CF$  = conversion factor [ $(10^{-6} \text{ kg/mg}) \times (10^4 \text{ cm}^2/\text{m}^2)$ ],
- $SA$  = skin surface area exposed to soil ( $\text{m}^2/\text{event}$ ),
- $AF$  = soil to skin adherence factor ( $1 \text{ mg}/\text{cm}^2$ ),
- $ABS$  = chemical-specific absorption factor (unitless),
- $EF$  = exposure frequency (events/year),

ED = exposure duration (years),  
 BW = body weight (kg),  
 AT = averaging time (days) for carcinogens or noncarcinogens.

Inhalation of soil is calculated using Equation 5:

$$\text{Chemical Intake (mg/kg-day)} = \frac{C_s \times IR_a \times EF \times ED \times (VF^I + PEF^I) \times ET \times CF}{BW \times AT}, \quad (5)$$

where

$C_s$  = chemical concentration in soil (mg/kg),  
 $IR_a$  = inhalation rate (m<sup>3</sup>/day),  
 EF = exposure frequency (days/year),  
 ED = exposure duration (years),  
 VF = volatilization factor (m<sup>3</sup>/kg),  
 PEF = particulate emission factor (m<sup>3</sup>/kg),  
 ET = exposure time (hr/day)  
 CF = conversion factor for ET (day/hr),  
 BW = body weight (kg),  
 AT = averaging time (days) for carcinogens or noncarcinogens.

**Table 1. Exposure Parameters for Security Guard/Maintenance Worker at Demolition Area 2, RVAAP**

Parameter	Units	Value
<b>Incidental Soil ingestion</b>		
Soil ingestion rate	kg/day	0.0001
Exposure time	hours/day	1
Exposure frequency	days/year	250
Exposure duration	years	25
Body weight	kg	70
Carcinogen averaging time	days	25550
Noncarcinogen averaging time	days	9125
Fraction Ingested	unitless	1
Conversion Factor	days/hour	0.042
<b>Dermal contact with soil</b>		
Skin area	m <sup>2</sup> /event	0.33
Adherence factor	mg/cm <sup>2</sup>	0.7
Absorption fraction	unitless	Chemical-specific
Exposure frequency	events/year	250
Exposure duration	years	25
Body weight	kg	70
Carcinogen averaging time	days	25550
Noncarcinogen averaging time	days	9125
Conversion Factor	(kg-cm <sup>2</sup> )/(mg-m <sup>2</sup> )	0.01
<b>Inhalation of VOCs and dust</b>		
Inhalation rate	m <sup>3</sup> /day	20



Parameter	Units	Value
Volatilization factor	m <sup>3</sup> /kg	chemical-specific
Particulate emission factor	m <sup>3</sup> /kg	9.24E+08 m <sup>3</sup> /kg
Exposure time	hours/day	1
Exposure frequency	days/year	250
Exposure duration	years	25
Body weight	kg	70
Carcinogen averaging time	days	25550
Noncarcinogen averaging time	days	9125
Conversion Factor	days/hour	0.042

#### 4.0 TOXICITY ASSESSMENT

The toxicity assessment will be performed using standard EPA-derived toxicity factors taken from the *Integrated Risk Information System* (IRIS) (EPA 2004) and, secondarily, from the *Health Effects Assessment Summary Tables* (HEAST) (EPA 1997). Oral and inhalation cancer slope factors (CSFs) and reference doses (RfDs) are currently available. Per the FWHHRAM, dermal CSFs and RfDs will be estimated from the oral toxicity values using chemical-specific gastrointestinal absorption factors (GAFs) to calculate the total absorbed dose for chemicals with GAF values < 0.5. Chemical-specific GAF values available from EPA (2002b) will be used whenever possible. Not all COPCs have specific GAF values. When quantitative data are insufficient, a default GAF is used. A default value of 1.0 for organic and inorganic chemicals will be used (EPA 2002b).

#### 5.0 RISK CHARACTERIZATION

Risks will be calculated from toxicity information and the results of the exposure assessment. For carcinogens, incremental lifetime cancer risks (ILCRs), or the increased lifetime probability of cancer, will be estimated. In addition to estimated cancer risks, potential non-cancer toxic effects of COPCs will be evaluated by calculating a hazard quotient (HQ) for each COPC and a total Hazard Index (HI) for all COPCs combined. Chemicals of concern (COCs) will be identified as those COPCs that exceed acceptable risk criteria for each receptor and pathway. The COCs will be specific to media and receptor. These chemicals represent the main contributors to human health risks at the site that will need to be addressed during remedial action.

#### 6.0 REFERENCES

- EPA 1989. *Risk Assessment Guidance for Superfund*. Vol. 1: Human Health Evaluation Manual (Part A), EPA/540/1-89/002, Washington, D.C.
- EPA 1992. *Supplemental Guidance to RAGS: Calculating the Concentration Term*.
- EPA 1997. *Exposure Factors Handbook*, EPA/600/P-95/002Fa, Office of Research and Development, U.S. Environmental Protection Agency, Washington, D.C.

- EPA 2002a. *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites* (OSWER 9285.6-10) Office of Emergency and Remedial Response U.S. Environmental Protection Agency, Washington, D.C.
- EPA 2002b. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim, EPA/540/R/99/005.
- EPA. 2004. *Integrated Risk Information System (IRIS) On-line Database of Toxicity Measures*. Office of Research and Development, Environmental Criteria and Assessment Office, US Environmental Protection Agency, Cincinnati, Ohio, USA.
- Singh, A.K., A. Singh, and M. Engelhardt. 1997. *The Lognormal Distribution in Environmental Applications*. U.S. Environmental Protection Agency. EPA/600/R-97-006. December.
- USACE 1999. Phase II Remedial Investigation Report for Winklepeck Burning Grounds at Ravenna Army Ammunition Plant, Ravenna, Ohio.
- USACE 2004. *RVAAP's Facility Wide Human Health Risk Assessor Manual*. January 2004.

**"White Paper, Human Health Risk Assessment Approach for the Demolition Area 2 Phase II Remedial Investigation, Ravenna  
Army Ammunition Plant, Ravenna, Ohio, Rev. 0, February 27, 2004"**

**Reviewers: Laurie Moore, Ohio EPA, SWDO, OFFO and Eileen T. Mohr, Ohio EPA, NEDO DERR  
Date: March 11, 2004**

<b>Page/ Section #</b>	<b>Comment</b>	<b>Recommendation</b>	<b>Response</b>
General	Lines should be numbered for ease of review and comment.	In the revised document, number the lines. This should be done for all future white paper submissions.	Clarification. It is our understanding that the white paper will not be revised. Rather the comment response table (CRT) with agreed-to responses will be amended into the existing document. Future white papers will include line numbers.
General	In the title, the word "investigation" is mis-spelled.	Please run the document through spell check.	Clarification. See general response above. Comment will be considered in future white papers.
Pg 2, section 2.0	The text indicates that Figure 2-1 shows the demolition area and sampling locations. The map does not provide this information.	Revise the map to be consistent with the text.	Agree. Sample locations will be added to a revised map to be included with the final CRT.
Pg 2, section 2.0	The text indicates that there will be two exposure units (EUs) - one north and one south of Sand Creek.	Please provide additional information as to how it was determined that 2 EUs are appropriate for this AOC. Given that there is an existing road from north to south linking the 2 proposed EUS, it is unclear as to why there isn't just a single EU.	Agree. A single EU will be evaluated.
Pg 3, section 2.0	The text under "Essential Nutrients" is elusive - specifically, "only slightly above naturally occurring levels" and "at high doses" - are subjective and the text doesn't define how to determine what is considered "slightly above" and "high doses".	Please revise to be more definitive and objective. Suggest replacing the words "only slightly" and "high" since these are subjective terms. Add text to explain how to determine a "high dose" and what is considered "slightly	Agree. The COPC selection will follow the FWHHRAM. This white paper is meant only to augment the FWHHRAM. Where the FWHHRAM is being followed exactly a summary was provided to keep



	considered "slightly above" and "high doses".	above background." An alternative is to cut and past from the section (or add a reference) to the section on essential nutrients in the FWHHRAM.	the white paper short.
Pg 3, section 2.0	The text under "Background Screen" states that the background screen is applicable to inorganic compounds.	Please add text to clarify that screening against background values is applicable only to chemicals that are naturally occurring, inorganic constituents.	Agree. The background screen applies only to naturally occurring inorganic chemicals.
Pg 4, section 3.0	<u>Current and Future Land Use Section:</u> The text states that ODA2 is classified as Restricted Access-Authorized Personnel Only, however, the last paragraph states that future use may include a hand grenade and light demolition range.	Add the word "Currently" to the beginning of the first sentence of the second paragraph (Currently, Demolition Area 2 is classified....)	Clarification. The area will remain classified as Restricted Access-Authorized Personnel Only even if it is used as a grenade range.
Pg 4, section 3.0	<u>Current and Future Land Use Section:</u> The text references Building 1501 as being identified on Figure 2-1. However, this feature is not denoted on the map.	Revise Figure 2-1 to be consistent with the text.	Agree. Building labels will be added to a revised map and attached to the final CRT.
Pg 4, section 3.0	<u>Current and Future Land Use Section:</u> The text references the current use of the RCRA unit for demolition of UXO from previous UXO removal activities.	Add to the text that ODA2 is also proposed for demolition of UXO encountered during current/future CERCLA investigations. Additionally, as the UXO is generally placed into pits for detonation, sub-surface soil will be encountered. This needs to be taken into account in the next sub-section.	Agree. Occasional demolition of UXO will continue at this site.
Pg 4, section 3.0	<u>Current and Future Land Use Section:</u> The text references future uses of the RCRA unit as a hand grenade familiarization range and as a light demo range. As such, there will be soldiers training in this area, as well as activities requiring a range maintenance worker. In order to reuse the RCRA unit as a hand grenade or light demo range, a construction worker or remedial worker will likely be exposed to soils during future construction	Are these scenarios accounted for in the next sub-section? Will the training soldiers be in foxholes? (This would then allow for contact with sub-surface soils.)	Clarification. The RCRA unit is excluded from this CERCLA risk assessment. Therefore, soldiers coming and going from the grenade range are evaluated but no activities at the range itself are included. FYI – soldiers will be on the backside of a berm that will be constructed around the target area rather than in foxholes.

	projects necessary to convert land use.		
Pg 4, section 3.0	<u>Potentially Exposed Populations, Exposure Media and Exposure Pathways:</u> Given the comments above on the current and future uses, please clarify the issues identified; i.e. where the range maintenance worker fits in, future construction worker receptor, exposure to subsurface soil, etc..	Add this information to the revised text or substantiate why this is not an issue.	Clarification. See response above. The RCRA unit is not included in this CERCLA risk assessment.
Pg 4, section 3.0	<u>Potentially Exposed Populations, Exposure Media and Exposure Pathways:</u> The text indicates that surface water and sediment exposure will not be evaluated. Currently there are identified rounds in Sand Creek and the clearance/removal action of these and at "Rocket Ridge" would require that workers enter Sand Creek. Also will any clearance activities from future potential uses require exposure to surface water and sediment media?	Revise the text accordingly.	Clarification. No future UXO removal is planned.
Page 7 Table 1 (comment applies to section 3.0 potentially exposed populations"	The text does not discuss exposure to soil through dermal contact.	Revise text to include a discussion on dermal exposure to soil by receptors such as construction workers, trainees, maintenance workers that are responsible for maintaining the landscape. These receptors potentially have dermal contact with contaminants in the soil. In addition, incidental ingestion can occur by hand to mouth transfer, therefore dermal contact potentially would be a complete pathway.	Clarification. Dermal exposure is addressed on page 5 (2 <sup>nd</sup> para), page 6 (equation 4), and page 7 (Table 1).





State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

~~March 15, 2004~~

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
~~ODA # 2 HHRA WHITE PAPER~~

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR) and Southwest District Office (SWDO), Office of Federal Facilities Oversight (OFFO), have received and reviewed the document entitled: "White Paper, Human Health Risk Assessment Approach for the Demolition Area 2 Phase II Remedial Investigation, Ravenna Army Ammunition Plant, Ravenna, Ohio, Rev. 0, February 27, 2004." The email of this document was received on March 03, 2004, and the hard copy was received at NEDO on March 09, 2004.

Attached are comments from all reviewers. These comments were previously sent to your attention via email on March 12, 2004. Please revise the white paper in accordance with the attachment and re-submit the document.

If you have any questions or comments, feel free to contact me at (330) 963-1221.

Sincerely,

Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

attachment

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Brian Tucker, Ohio EPA, DERR, CO  
John Jent, USACE Louisville  
Dave Brancato, USACE Louisville  
JoAnn Watson, AEC

Laurie Moore, Ohio EPA, OFFO, SWDO  
Glen Beckham, USACE Louisville  
Paul Zorko, USACE Louisville  
LTC Tadsen, RVAAP

ec: Mike Eberle, Ohio EPA, DERR, NEDO  
Todd Fisher, Ohio EPA, DERR, NEDO



**"White Paper, Human Health Risk Assessment Approach for the Demolition Area 2 Phase II Remedial Investigation,  
Ravenna Army Ammunition Plant, Ravenna, Ohio, Rev. 0, February 27, 2004"**

**Reviewers: Laurie Moore, Ohio EPA, SWDO, OFFO and Eileen T. Mohr, Ohio EPA, NEDO DERR  
Date: March 11, 2004**

<b>Page/ Section #</b>	<b>Comment</b>	<b>Recommendation</b>	<b>Response</b>
General	Lines should be numbered for ease of review and comment.	In the revised document, number the lines. This should be done for all future white paper submissions.	
General	In the title, the word "investigation" is mis-spelled.	Please run the document through spell check.	
Pg 2, section 2.0	The text indicates that Figure 2-1 shows the demolition area and sampling locations. The map does not provide this information.	Revise the map to be consistent with the text.	
Pg 2, section 2.0	The text indicates that there will be two exposure units (EUs) - one north and one south of Sand Creek.	Please provide additional information as to how it was determined that 2 EUs are appropriate for this AOC. Given that there is an existing road from north to south linking the 2 proposed EUS, it is unclear as to why there isn't just a single EU.	

Pg 3, section 2.0	The text under "Essential Nutrients" is elusive - specifically, "only slightly above naturally occurring levels" and "at high doses" - are subjective and the text doesn't define how to determine what is considered "slightly above" and "high doses".	Please revise to be more definitive and objective. Suggest replacing the words "only slightly" and "high" since these are subjective terms. Add text to explain how to determine a "high dose" and what is considered "slightly above background." An alternative is to cut and past from the section (or add a reference) to the section on essential nutrients in the FWHHRAM.	
Pg 3, section 2.0	The text under "Background Screen" states that the background screen is applicable to inorganic compounds.	Please add text to clarify that screening against background values is applicable only to chemicals that are naturally occurring, inorganic constituents.	
Pg 4, section 3.0	<u>Current and Future Land Use Section:</u> The text states that ODA2 is classified as Restricted Access-Authorized Personnel Only, however, the last paragraph states that future use may include a hand grenade and light demolition range.	Add the word "Currently" to the beginning of the first sentence of the second paragraph (Currently, Demolition Area 2 is classified....)	
Pg 4, section 3.0	<u>Current and Future Land Use Section:</u> The text references Building 1501 as being identified on Figure 2-1. However, this feature is not denoted on the map.	Revise Figure 2-1 to be consistent with the text.	

Pg 4, section 3.0	<u>Current and Future Land Use Section:</u> The text references the current use of the RCRA unit for demolition of UXO from previous UXO removal activities.	Add to the text that ODA2 is also proposed for demolition of UXO encountered during current/future CERCLA investigations. Additionally, as the UXO is generally placed into pits for detonation, sub-surface soil will be encountered. This needs to be taken into account in the next sub-section.	
Pg 4, section 3.0	<u>Current and Future Land Use Section:</u> The text references future uses of the RCRA unit as a hand grenade familiarization range and as a light demo range. As such, there will be soldiers training in this area, as well as activities requiring a range maintenance worker. In order to reuse the RCRA unit as a hand grenade or light demo range, a construction worker or remedial worker will likely be exposed to soils during future construction projects necessary to convert land use.	Are these scenarios accounted for in the next sub-section? Will the training soldiers be in foxholes? (This would then allow for contact with sub-surface soils.)	



Pg 4, section 3.0	<u>Potentially Exposed Populations, Exposure Media and Exposure Pathways:</u> Given the comments above on the current and future uses, please clarify the issues identified; i.e. where the range maintenance worker fits in, future construction worker receptor, exposure to subsurface soil, etc..	Add this information to the revised text or substantiate why this is not an issue.	
Pg 4, section 3.0	<u>Potentially Exposed Populations, Exposure Media and Exposure Pathways:</u> The text indicates that surface water and sediment exposure will not be evaluated. Currently there are identified rounds in Sand Creek and the clearance/removal action of these and at "Rocket Ridge" would require that workers enter Sand Creek. Also will any clearance activities from future potential uses require exposure to surface water and sediment media?	Revise the text accordingly.	

<p>Page 7 Table 1 (comment applies to section 3.0 potentially exposed populations"</p>	<p>The text does not discuss exposure to soil through dermal contact.</p>	<p>Revise text to include a discussion on dermal exposure to soil by receptors such as construction workers, trainees, maintenance workers that are responsible for maintaining the landscape. These receptors potentially have dermal contact with contaminants in the soil. In addition, incidental ingestion can occur by hand to mouth transfer, therefore dermal contact potentially would be a complete pathway.</p>	
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State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

May 25, 2004

Mark Patterson  
Commander's Representative  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, OH 44266-9297

**RE: RAVENNA ARMY AMMUNITION PLANT (OH5-210-020-730); PORTAGE COUNTY;**  
**1. 2003 SUPPLEMENTARY ANNUAL REPORTING FORM; DATED FEBRUARY 23,**  
**2004; RECEIVED FEBRUARY 27, 2004**  
**2. TIER 1 DATA VALIDATION**

Dear Mr. Patterson:

The above report was submitted by the Army to document the ground water monitoring activities that were conducted at ODA-2 during 2003 as required by OAC 3745-54-75. Ground water at the site is monitored in accordance with OAC 3745-54-90 through 3745-55-01. Ohio EPA has reviewed the document and has the following comments. A Tier 1 data validation was performed on the data from the September 2003 sampling event.

**COMMENTS:**

1. The text in the second paragraph under "Statistical Assumptions" in the introductory material indicates that only the most recent five background observations were used during the year for statistical analyses. This is incorrect. The eight most recent background concentrations for each parameter are used in the statistical analyses. A corrected page should be submitted for insertion into the Annual Report.
2. RVAAP submits data from its sampling events to Ohio EPA for review on a quarterly basis. Therefore, the data submitted with the Annual Report was not reviewed again. However, a Tier 1 data validation was performed on the data from the September 2003 sampling event. A completed Tier 1 data validation form is included as Attachment A. The following items concern the Tier 1 data validation:
  - A. The QA/QC data package reported only the percent recovery and the recovery limits for the laboratory control samples for the metals and explosives data. Therefore, it is not possible to verify that the percent recoveries were accurately calculated. In the future, the QA/QC information should document the spike level and the actual results so that the calculation of the percent recovery can be verified.





Mark Patterson  
Ravenna Army Ammunition Plant  
May 25, 2004  
Page 2

- B. In the future, it is recommended that a sample receipt form be completed by the laboratory and submitted for review along with each data package. The sample receipt form should document the condition of the samples upon receipt at the laboratory. This form should include information concerning the sample temperatures, the pH of the samples, the preservatives used, the presence and condition of custody seals, the condition of the sample containers, whether there are discrepancies between the chain of custody and the samples actually received, and whether there were bubbles greater than 2 mm in any samples collected for VOC analyses.

### **CONCLUSIONS:**

The most recent eight background values are used in the statistical analyses. A replacement page should be submitted for insertion into the annual report.

In the future, the QA/QC information for the laboratory control sample should document the spike concentration and the actual results so that the calculation of the percent recovery can be verified. In addition, it is recommended that a sample receipt form be completed by the laboratory and submitted for review along with each data package.

If you should have any questions regarding this matter, please feel free to contact me at (330) 963-1189 or via e-mail at [greg.orr@epa.state.oh.us](mailto:greg.orr@epa.state.oh.us).

Sincerely,



Gregory Orr  
Environmental Specialist  
Division of Hazardous Waste Management

GO:cl

cc: Jeremy Carroll, DHWM, CO

ec: Natalie Oryshkewych, DHWM, NEDO  
Diane Kurlich, DDAGW, NEDO  
Eileen Mohr, DERR, NEDO  
Todd Fisher, DERR, NEDO

## **ATTACHMENT A**

# **Data Validation Plan Review Form** Tier I

This Plan Review Form is #		of		forms completed in the review of this closure plan.
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Facility Name	Riverside Army Ammun		Validator/DO	Diare Kurlish
ID Number	045-7 10-020-730		Date of Plan	2/23/04
Date Review of Plan Completed	5/20/04		Plan is: New, Amended, Revised	
Document Title:	2003 Annual Report			
Lab Name:	Media Type(s):	Analyses Requested:	Notes:	
SEVERN Trent	Ground Water	SW846-60108 SW846-8330		

Note: The criteria used in the Tier I Data Validation checklist are derived mostly from SW-846 methods and U.S. EPA's National Functional Guidelines (NFGs). Criteria from methods are considered preferable as they are specific to that procedure. Where the method is silent, criteria from the NFGs, or other sources when necessary, are adopted. For flashpoint (which uses ASTM methods dictated by the OAC rules), ASTM method criteria are used.

The Tier I data validation manual is the primary reference for this checklist. It explains and gives examples for the questions in this checklist. The Tier II methodology and terminology builds on that established in the Tier I checklist and its associated data validation manual. There is no Tier II manual, only the checklist and completed example checklists. Additional information is also available by referring to the specific methods.

Data Qualifiers and their meanings used throughout the Tier I Checklist	
J	Estimated
J+	Estimated High (results are likely reported higher than the true value)
J-	Estimated Low (results are likely reported lower than the true value)
R	Rejected
UJ	Undetected Estimated
NJ	Tentatively Identified, Quantitation Estimated

N/A = Not Applicable



**Section 1.0**  
**Report Completeness and Technical Holding Times**

<b>1.1 Sample Package Completeness and Deliverables</b>	
<b>Completeness</b>	
This section provides a checklist of important components of data reports. If the report is incomplete, it may be necessary to halt data validation procedures until all the missing information is provided. Please, refer to the Tier I data validation manual for additional assistance in completing the checklist.	
1.1.1 Describe any discrepancies between the Chain Of Custody (COC) record and submitted sampling data.  <i>Action: If there are discrepancies, contact the laboratory for any missing deliverables and/or an explanation.</i>	None
1.1.2 Is a signed statement from the laboratory present that attests to the validity of the data?  <i>Action: Take no further action and contact the facility and have the lab submit a valid data report. If no response, qualify all data as unuseable.</i>	Yes
1.1.3 Is a case narrative present that summarizes QA/QC discrepancies and/or other problems? <i>Action: No action is necessary, but this information is useful to focus data validation efforts.</i>	Yes
1.1.4 Are COC forms present for all samples? <i>Action: If not contact the facility for replacement of missing or illegible copies</i>	Yes
1.1.5 Do the COC forms, Sample Receipt form, or the Case Narrative indicate any problems with the sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?  <i>Action: Use the information to focus data validation efforts.</i>	No sample receipt form but lab receipt is <u>attached</u> to the case narrative under "Sample receiving"
1.1.6 Are Custody Seals present and intact?	UNK

### 1.1 Sample Package Completeness and Deliverables

- 1.7 Is a sample receipt form present? If so, does it contain information on condition of sample containers, proper preservatives used (cross-check with COC) and temperature of the cooler? Note any comments or abnormal conditions: Action may be taken for the following special conditions:
- A. For samples analyzed for volatiles that were not properly cooled (temperature more than 10°C), all positive results should be qualified as "J" and all non-detects qualified as "UJ."
  - B. For all Volatile Organic Compound (VOC) samples or vials with air bubbles (>2 mm), positive results should be qualified as "J" and non-detects as "UJ" or "R" depending on professional judgment (regarding other quality control information such as sample cooler receipt temperature and other site-specific data quality objectives).
  - C. If aqueous samples for VOCs were not preserved, check that technical holding times were met (see Technical Holding Times, Table 1). If not, qualify all associated sample results.
  - D. If liquid TCLP samples were preserved, qualify all associated results as "R."

No Sample Receipt forms. Case  
narrative indicates proper  
cooling Temp. COC indicates  
metals preserved w/ HNO<sub>3</sub>

VOCs not analyzed

✓

TCLP not analyzed



Sample ID	Lab ID	Matrix	Sample Date	Date Received by the Lab	Parameter	Extraction Date	Preparation Date	Analysis Date	QA/QC Data Present <sup>A</sup>	Batch ID#
DET-1B	152710301	FLW	7/23/03	9/12/03	Metals		10/02/03	10/06/03	Yes	3275123
DET-2	-002									
DET-3	-004									
DET-4	-003									
DET-1B					Explosive		7/23/03	7/23/03		3275123
DET-2										
DET-3										
DET-4										

A: Batch specific QA/QC requirements for Tier I data validation for Organic Data consists of Blank Data Matrix Spike/Matrix Spike Duplicate data, and surrogate data. For Inorganic Data the QA/QC data includes a Matrix Spike and it's duplicate and blank data. Additional QA/QC data may include ICP serial dilution results and post-digestion spike data.

Note: To fill out this table, list one sample ID# then list all sample parameters on one line each with their associated analysis dates, batch ID#s, etc. (e.g., put mercury on a separate line from the other metals since it will have its own prep. dates, analysis dates, and batch ID#s).

## 1.2 Technical Holding Times

Table 1

### Technical Holding Times for Volatile, Semi-Volatile, Metals and pH Samples

Technical holding time is the time, in days, from sample acquisition in the field to either laboratory preparation or analysis. Technical holding times are established from information contained in the laboratory report, chain of custody, and raw analytical bench sheets (if available). Technical holding times also depend upon whether samples were preserved. The recommended technical holding times for volatile compounds, semi-volatile compounds, metals, and TCLP analyses are listed below.

	Preserved	From field collection to extraction	from extraction to preparation	From extraction to analysis	Max Holding Times	Common preservative
VOCs (8260) (aqueous)	Yes	NA	NA	14 days	14 days	Cool to 4° C, HCl
VOCs (8260) (aqueous)	No	NA	NA	7 days	7 days	Cool to 4° C
VOCs (8260) (liquid waste)	No	NA	NA	14 days	14 days	Cool to 4° C
VOCs (8260) (solid/soil/waste)	No	NA	NA	NA	14 days	Cool to 4° C or no preservative
VOCs (EnCore) (5035/8260) (solid/soil/waste)	Yes	2 days	NA	12 days	14 days	Encore Sampler
SVOC(8270)	Yes	7 days	NA	40 days	47 days	Cool to 4° C
Total Metals (6010B/7000)	Yes	NA	NA	180 days	180 days	Nitric Acid (pH<2- aqueous); cool to 4° C - solid samples
Mercury (7470A)	Yes	NA	NA	28 days	28 days	Nitric Acid (pH<2- aqueous); cool to 4° C - solid samples
TCLP VOCs (1311/8260)	No	14 days	NA	14 days	28 days	no preservative
TCLP SVOCs (1311/8270)	No	14 days	7 days	40 days	61 days	no preservative
TCLP Metals (except mercury) (1311/6010B)	No	180 days	NA	180 days	360 days	no preservative

	Preserved	From field collection to extraction	from extraction to preparation	From extraction to analysis	Max Holding Times	Common preservative
TCLP mercury (1311/7470A)	No	28 days	NA	28 days	56 days	no preservative
pH (9040B)	No	24 hours	NA	NA	1 day	no preservative

## 1.2 Technical Holding Times

### Technical Holding Times

Technical holding times are an important component of assuring that data is valid and not biased from inappropriate handling procedures. Technical holding times are judged by assessing the lapsed time from field sampling to extraction and to analyses. There are specific technical holding time requirements for specific classes of compounds. In addition, holding times may vary due to the presence or absence of preservatives. The validator should refer to specific criteria for holding times listed in Table 1 and in the Tier I Data Validation Manual. Use information on sampling, extraction and analysis dates (examined in section 1.0) to determine whether technical holding times are in compliance with criteria listed in Table 1. Complete the following table to determine if any violations of technical holding time exist, and qualify all associated sampling data.

## 1.2 Technical Holding Times - Volatile Organic Compounds

1.2.1	Are samples properly preserved? Check preservation requirements, chain of custody, and sample receipt form for discrepancies.  <i>Action: Note improprieties and use the information to qualify results.</i>	List impropriety(-ies):  NA
1.2.2	If samples were improperly preserved, or unpreserved, and the technical holding times were exceeded, qualify all positive results for affected samples as "J" and all non-detected results as "UJ."	List sample ID(s):  1
1.2.3	If samples were properly preserved, but technical holding times were exceeded, qualify all positive results for affected samples as "J" and all non-detected results as "UJ."	List sample ID(s):  1
1.2.4	If technical holding times are greatly exceeded (> 2x the time requirement) upon analysis or re-analysis then the validator may use professional judgement to qualify all non-detected compounds as "R" and all positive results as "J."	List sample ID(s):  1



1.2 Technical Holding Times - <del>Semi-Volatile Organic Compounds</del> SW846-9330	
1.2.5 If technical holding times are exceeded (Table 1), qualify all positive results for affected samples as "J" and all non-detected results as "UJ."	List sample ID(s): N/A Holding times OK
1.2.6 If technical holding times are greatly exceeded (> 2x the time requirement), the validator may use professional judgement to qualify all non-detected compounds as "R" and all positive results as "J."	List sample ID(s): N/A ↓

1.2 Technical Holding Times - Inorganic Compounds	
1.2.7 Are samples properly preserved (4°C for solids; acid preservation for aqueous samples)? Check preservation requirements, chain of custody, and sample receipt form for discrepancies.  Action: Note any impropriety, and use the information to qualify results.	List impropriety(-ies): N/A Holding times OK Samples coded & Acidified
1.2.8 If samples were improperly preserved and the technical holding times were exceeded (Table 1), qualify all positive results for affected samples as "J" and all non-detected results as "UJ."	List sample ID(s):
1.2.9 If samples were properly preserved, but technical holding times exceeded, qualify all positive results for affected samples as "J" and all non-detected results as "UJ."	List sample ID(s):
1.2.10 If technical holding times are greatly exceeded (> 2x the time requirement), the validator may use professional judgement to qualify all non-detected compounds as "R" and all positive results as "J."	List sample ID(s):

1.2 Technical Holding Times - pH	
1.2.11 If technical holding times are exceeded the validator may use professional judgement to qualify data as "R" or "J."	List sample ID(s):

**Section 3.0**  
**SVOC Data Validation**

SW846-833D  
Explosives

<b>3.0 SVOC Analysis Data Validation</b>		
<b>3.1 Blank Data Summary Review - Semi-Volatile Compounds</b>		
<b>Blank Data</b>		
Laboratory blanks are used to assess whether contamination from the laboratory, reagents, or other samples exists and whether this contamination can bias sample results. The qualification of sample results will depend upon the magnitude of blank contamination.		
3.1.1	Is the method blank summary data present for each batch (method and matrix), including TCLP?  <i>Action: If not present, request information from the facility. If information exists that the required method blanks were not analyzed, then sample results <u>may</u> be qualified as "U," for positive results and "UU" for non-detected compounds. Qualification should take into account other QAIQC information.</i>	Yes
3.1.2	Is there an indication that samples, associated with that blank, were diluted?  <b>Note: The dilution factor can be found in the data report (a dilution factor of 1 indicates no dilution).</b>	List the dilution factor(s):  NO
3.1.3	Do any field/rinsate blanks have any positive results for any semi-volatile target analyte?  <b>Note: A list of samples associated with each of the contaminated blanks should be prepared. Field blank results should be used to qualify data. Trip blanks are used to qualify only samples based on shipment and are not required for non-aqueous matrices.</b>  <i>Action: Follow the directions in the table below to qualify sample results due to contamination. Use the largest value from all of the associated blanks. If any blanks are grossly contaminated, all data associated should be qualified as "R."</i>	NO
3.1.4	Do any method blanks for SVOCs have positive results for any semi-volatile target analytes? Follow the directions in the table below.  <b>Note: When applied, the contaminant concentration in these blanks are multiplied by the same dilution factor and corrected for % moisture if necessary.</b>	NO
	<b>For Common Semi-Volatile Contaminants: Phthalate esters</b>	<b>Action:</b>
	Sample Conc. > Detection Limit but < 10x Blank Result	Identify the sample result "U" undetected
	Sample Conc. < Detection Limit & < 10x Blank Result	Report the detection limit and qualify result "UJ" estimated undetected



For Common Semi-Volatile Contaminants: Phthalate esters	For Other Contaminants:	Action:
Sample Conc. > Detection Limit & > 10x Blank Result	Sample Conc. > Detection Limit & > 5x Blank Result	No qualification is necessary

<b>3.2 Semi-Volatile Data Review - Laboratory Control Sample (LCS)</b>															
<b>Laboratory Control Sample</b>															
<p>An LCS should be included with each batch of samples (approx. 20). The LCS consists of an aliquot of a clean (control) matrix similar to the matrix type of the sample and at the same weight or volume. The LCS is spiked with the same analytes at the same concentration as the matrix spike. When the results of the matrix spike indicate a potential problem due to the sample matrix itself, the LCS verifies that the laboratory can perform analyses in a clean matrix (Method 8270C).</p>															
<p>3.2.1 Was an LCS prepared, extracted, analyzed and reported once per group of 20 samples (per batch)?</p> <p><b>Note:</b> This information should be included in the QA/QC package provided by the lab. If not, contact the laboratory and request that the information be submitted to the agency.</p> <p><i>Action: If LCS information is not present, consult the facility for re-submission of the data package. If LCS information is not available, qualify all positive results as "J." If warranted, the Data Validator may reject all results.</i></p>	Yes														
<p>3.2.2 Does the LCS contain the following semi-volatile target compounds in addition to the required surrogates?</p> <table border="0"> <tr> <td><u>Base/Neutrals</u></td> <td><u>Acids</u></td> </tr> <tr> <td>1,2,4-Trichlorobenzene</td> <td>Pentachlorophenol</td> </tr> <tr> <td>Acenaphthene</td> <td>Phenol</td> </tr> <tr> <td>2,4-Dinitrotoluene</td> <td>2-Chlorophenol</td> </tr> <tr> <td>Pyrene</td> <td>4-Chloro-3-methylphenol</td> </tr> <tr> <td>N-Nitroso-di-n-propylamine</td> <td>4-Nitrophenol</td> </tr> <tr> <td>1,4-Dichlorobenzene</td> <td></td> </tr> </table> <p><b>Note:</b> Method 8270C calls for base/neutral compounds to be spiked at 100 µg/L and acid compounds to be spiked at 200 µg/L. However, for waste samples the concentration should be 5 times higher.</p>	<u>Base/Neutrals</u>	<u>Acids</u>	1,2,4-Trichlorobenzene	Pentachlorophenol	Acenaphthene	Phenol	2,4-Dinitrotoluene	2-Chlorophenol	Pyrene	4-Chloro-3-methylphenol	N-Nitroso-di-n-propylamine	4-Nitrophenol	1,4-Dichlorobenzene		<p>Not - Explosive not</p> <p>typical SVOCs analyzed</p>
<u>Base/Neutrals</u>	<u>Acids</u>														
1,2,4-Trichlorobenzene	Pentachlorophenol														
Acenaphthene	Phenol														
2,4-Dinitrotoluene	2-Chlorophenol														
Pyrene	4-Chloro-3-methylphenol														
N-Nitroso-di-n-propylamine	4-Nitrophenol														
1,4-Dichlorobenzene															

### 3.2 Semi-Volatile Data Review - Laboratory Control Sample (LCS)

3.2.3 Do the percent recoveries (%R) meet the QC limits provided by the lab?

*Action: If the LCS recovery is greater than the upper acceptance limit, then positive sample results for the affected compound(s) should be qualified as "J."*

*If the mass spectral criteria are met, but the LCS recovery is less than the lower acceptance limit, then the associated detected target compounds should be qualified as "J," and the associated non-detected target compounds should be qualified as "R."*

*If more than half of the compounds in the LCS are not within the recovery criteria, then all of the associated detected target compounds should be qualified as "J," and all associated non-detected compounds should be qualified "R."*

List compounds and sample IDs that do not meet QC limits:

Yes

3.2.4 Verify the calculations for at least one %R.

$$\%R = \text{found}/\text{true} \times 100$$

*Action: If the %R is not calculated correctly, verify the other %R calculations and/or contact the lab for re-submission. If the recalculated %R values fall within the QC limits, the Data Validator should use professional judgement to determine if the lab should be contacted for re-submission or the data should be flagged.*

Only % recovery reported  
cannot verify

### 3.3 Quality Assurance Summary Review - Matrix Spike/Matrix Spike Duplicates, SVOC

#### Matrix Spike/Matrix Spike Duplicates

Matrix spike and matrix spike duplicates are performed to assess method precision for VOC and SVOC analyses. Matrix spikes and duplicates are required for every batch of samples (every 20 - 30 samples). The validator should be aware that the MS/MSD are batch specific, not sample specific. For example, the MS/MSD information may be any sample in the batch, but not necessarily a sample being validated. Because of this, matrix spike and matrix spike duplicate data alone usually aren't used to qualify results, but the information is used with other QA/QC data to qualify data.

<p>3.3.1 Is matrix spike/matrix spike duplicate recovery data present?</p> <p><i>Action: If any matrix spike data is missing, the laboratory</i></p>	<p style="text-align: center;">s h o u l d b e c o n t a c t e d f o r a r e - s u b m i t t a l.</p> <p style="font-size: 2em; text-align: center;">YES</p>
<p>3.3.2 How many SVOC spike recoveries are outside the QC limits?</p>	<p>Record the spike recovery and control limits:</p> <p style="text-align: center;">NONE</p>
<p>3.3.3 How many RPDs for matrix spike and matrix spike duplicate recoveries are outside the QC limits for SVOCs?</p> <p><b>Note: The MS/MSD results may be used in conjunction with other QC criteria to determine the need for data qualification. Outliers should be identified.</b></p>	<p>Record the recovery data out of criteria and control limits. Review surrogate and LCS data to determine if qualifiers are necessary:</p> <p style="text-align: center;">NONE</p> <p style="text-align: center;">110 Data Spike - needed</p>



### 3.4 SVOC Surrogate Recovery

#### SVOC Surrogate Compound Recovery

Surrogate compounds are spiked compounds of known composition that are added to samples and blanks. The recovery of surrogate compounds allows an assessment of matrix interference. SVOC analyses include compounds that can be divided into two classes: acid compounds and base/neutral compounds. Each class has a specific assigned set of surrogate compounds. The list of compounds can be found in the data validation guidance manual or SW-846, Method 8270. Data validation is also based upon the type of compound being analyzed. SVOC surrogate recoveries also are used to justify re-analysis to confirm matrix interference, but the number of surrogate compounds out of compliance will justify qualification. Specific examples are listed in the data validation guidance document.

<u>Surrogate Compound</u>	<u>Fraction</u>
phenol-d <sub>6</sub>	Acid
2-fluorophenol	Acid
2,4,6-tribromophenol	Acid
nitrobenzene-d <sub>5</sub>	Base/Neutral
2-fluorobiphenyl	Base/Neutral
p-terphenyl-d <sub>14</sub>	Base/Neutral

3.4.1 Are the surrogate recovery data present for each batch (method and matrix), including TCLP?

**Note:** Samples may be included in separate sample batches and separate surrogate recoveries should be provided.

*Action:* If no, contact the laboratory for explanation and re-submittals.

Yes

3.4.2 Were any outliers marked correctly?

*Action:* Mark, circle or highlight the suspected outliers.

List the sample ID(s), matrix(-ces) and parameter(s):

No outliers

3.4.3 If any TWO surrogate compounds in either the acid or base/neutral classes were out of compliance, was re-analysis performed to confirm a matrix interference?

**Note:** Check the report narrative for an indication of re-analysis.

*Action:* If no information is present, request information from the facility.

List sample ID(s) for surrogate compounds out of compliance and criteria:

NA

3.4.4 If any ONE surrogate compound has a recovery of less than 10% in either the acid or base/neutral classes, check for indications that re-analysis was performed to confirm a matrix interference?

**Note:** Check the report narrative for an indication of re-analysis.

List sample ID(s) for surrogate compounds out of compliance and criteria:

NA

### 3.4 SVOC Surrogate Recovery

3.4.5 Based on the findings, qualify data in either the acid or base/neutral classes with the following criteria:

**Note:** Qualification may not be appropriate for TCLP data. Best professional judgement may be used to qualify data.

*Action: If TWO surrogates in a particular class are above the upper control limit, all positive results, for that fraction, in that class should be qualified as "J." Results listed as non-detected should not be qualified.*

*If any TWO surrogates in a particular class have recoveries less than the lower criteria, but the recovery is greater than or equal to 10%, all detected compounds, for that fraction, should be qualified as "J" and all non-detected compounds as "UJ."*

*If any surrogates in a particular class have recoveries less than 10%, all detected compounds, for that fraction, should be qualified as "J" and all non-detected compounds as "R."*

List the ID(s) of the affected sample(s):

No Qualifiers  
needed

#### **Section 4.0**

#### **Metals Data Validation**



<b>4.0 Metals Analysis Data Validation</b>	
<b>4.1 Blank Data Summary Review - Metals Data</b>	
<b>Blank Data</b>	
Laboratory blanks are used to assess whether contamination from the laboratory, reagents, or other samples exists and whether this contamination can bias sample results. The qualification of sample results will depend upon the magnitude of blank contamination.	
<p>4.1.1 Is the method/prep blank summary data present for each batch (method and matrix), including TCLP?</p> <p><i>Action: If not present, request information from the facility. If the required method blanks were not analyzed, sample results may be qualified as "J" for positive results and "UJ" for non-detected compounds. Qualification should take into account other QA/QC information.</i></p>	Yes
<p>4.1.2 If metals are detected in the blank, record the IDs of the affected samples and those metals detected above the detection limit in the blank and all positive results from the samples. Attach this summary page to this checklist.</p> <p><i>Action: Positive sample results that are greater than the detection limit but less than 5 X the blank results should be qualified as "UJ." If the blank is severely contaminated, the corresponding positive sampling results may be qualified as "R."</i></p>	None detected
<b>Blanks- Mercury</b>	
<p>4.1.3 Was a Method blank included per batch and were the results below the reporting limit or the CRDL (for CLP labs)?</p>	Yes
<p>4.1.4 Did any Method Blanks contain concentrations of mercury above reportable levels? Were these flagged?</p> <p><b>Note: If mercury is discovered in the method blank above the reporting limit, the lowest concentration of any sample in that batch must be 10 times the method blank concentration. If this is not the case, all samples in that batch should have been re-digested and re-analyzed.</b></p> <p><i>Action: Review the blank data. If the sample results are positive but less than 5 times the concentration in the blank, the results should be qualified as "U".</i></p> <p><i>If the sample results are positive and greater than 5 times the blank concentration, but less than 10 times the blank concentration, the results should be qualified as "J".</i></p>	No

<b>4.2 Metal Spike Recovery</b>	
<p style="text-align: center;"><b>Metal Spike Recovery</b></p> <p>Spikes are elements of known composition that are added to blanks and to samples that measure accuracy and precision of the analyses. At least one spike (termed a matrix spike or prep spike) should be included for each batch of samples. Spike recovery criteria listed in this section are determined from U.S. EPA's National Functional Guidelines for Inorganic Data Review. The criteria applied by an individual laboratory may vary. The laboratory should be consulted and it's QA/QC criteria supplied to the validator.</p>	
<p>4.2.1 Confirm that at least one pre-digestion spiked sample was analyzed per batch, matrix type and concentration or sample delivery group?</p> <p><i>Action: If not present, contact the facility for re-submittal.</i></p>	OK
<p>4.2.2 Are all spike recoveries (except Hg and Ag) within control limits (e.g., 75% to 125%)?</p> <p><b>Note: When the spike sample result is less than the instrument detection limit, the percent recovery calculation should use a value of zero (not the detection limit) for the sample result.</b></p> <p><i>Action: Is the sample concentration <math>\geq 4</math> times the spiked concentration? If yes, disregard spike recoveries for analytes whose concentrations in samples are <math>&gt; 4</math> times the spike added. If no, circle those analytes whose concentration is <math>&lt; 4</math> times the spike added.</i></p>	<p>List those elements out of control:</p> <p style="text-align: center; font-size: 1.5em;">Yes</p>
<p>4.2.3 Based on the results of 4.2.2, if the sample results were <math>&lt; 4x</math> the spike amount and spike recoveries were out of criteria, a post-digestion spike should be analyzed.</p> <p><b>Note: Post-digestion spikes are not required for Ag or Hg, however, one typically is run if the LCS was out of control. The post digestion spike confirms a matrix interference and should not be used for qualification</b></p> <p><i>Action: Contact the facility/laboratory for an explanation if a post-digestion spike was not analyzed. If none are available, use professional judgement to qualify sample results.</i></p>	NA
<p>4.2.4 Were concentrations in the digestate reported in ug/L for aqueous samples and mg/kg on the basis of dry weight for soil samples?</p>	Yes

4.2 Metal Spike Recovery	
<p>4.2.5 Are any <b>aqueous</b> spike recoveries (pre and post digestion):</p> <ol style="list-style-type: none"> <li>1. Less than 30%?</li> <li>2. Between 30% and 74%?</li> <li>3. Between 126% and 150%?</li> <li>4. Greater than 150%?</li> </ol> <p><b>Note: The TCLP extract should be handled as an aqueous sample.</b></p> <p><i>Action: If &lt; 30%, and the sample results are below the detection limit, all data should be qualified as "R."</i></p> <p><i>If between 30% and 74%, qualify all positive data as "J" and non-detected data as "JJ."</i></p> <p><i>If between 126% and 150%, qualify positive as "J." All undetected compounds are acceptable.</i></p> <p><i>If &gt; 150% note for possible positive bias. Evaluator may qualify data "R" based on professional judgement and the eventual end use of the data.</i></p>	NO
<p>4.2.6 Are any <b>soil/solid/waste</b> spike recoveries (pre and post digestion):</p> <ol style="list-style-type: none"> <li>1. Less than 10%?</li> <li>2. Between 10% and 74%?</li> <li>3. Between 126% and 200%?</li> <li>4. Greater than 200%?</li> </ol> <p><i>Action: If &lt; 10%, those elements out of control limits should be qualified as "R."</i></p> <p><i>If between 10% and 74%, qualify those elements out of control limits as "J."</i></p> <p><i>If between 126% and 200%, qualify positive data, for those elements out of control limits, as "J."</i></p> <p><i>If &gt; 200%, qualify all positive data, for those elements out of control limits, as "R."</i></p>	NA
<p>4.2.7 If the pre-digestion spike was outside the QC limits for <b>Atomic Adsorption furnace analysis</b> (e.g., SW-846 methods in the 7000 series), was a post-digestion spike performed?</p> <p><i>Action: Samples should not be qualified based on post-digestion spike results. The results are used to confirm a matrix interference. If a post-digestion spike was not prepared, the data validator may reject the data.</i></p>	NA
<p>4.2.8 Based on the results from 4.2.7, were the post-digestion spike recoveries within the quality control range (75% to 125%)?</p> <p><i>Action: If &gt; 125%, qualify all positive data as "J." If &lt; 75%, qualify both positive and non-detect data as "J."</i></p>	NA



#### 4.3 Quality Assurance Data Review - Inorganic Analysis - AA Analysis

##### Graphite Furnace Atomic Adsorption QC

Atomic Adsorption analyses require specialized QA/QC procedures that may be different than Inductively Coupled Plasma (ICP) Emission Analysis. Commonly, AA analysis is performed for mercury and selenium. Mercury analysis data validation is specifically detailed in the Inorganics Section of the Tier II Checklist. The Tier I Data Validator is directed to the Agency's Data Validation Review Manual and to specific methods detailed in SW-846. In general, external calibration procedures are commonly required by the method. In addition, duplicate injections and multiple concentration post-digestion spikes are required to establish precision and accuracy data.

4.3.1 Were duplicate injection of samples performed and if so, were the duplicates within  $\pm 20\%$  RPD for samples with concentrations above the detection limit?

**Note: Results are reported based upon the average of duplicate injections. If the acceptance criteria is not met, the sample should have been re-analyzed (i.e., with at least two additional injections).**

*Action: If RSD criteria is not met or the sample was not rerun, qualify all positive data as "J."*

List sample IDs and appropriate method and calculated RPD:

NA ICP used

4.3.2 If the samples were re-analyzed (i.e., 2 more injections), do the duplicate injections agree within 20% RSD?

*Action: If the RSD criteria is not met, qualify all positive results as "J."*

No. \_\_\_\_\_

Yes. \_\_\_\_\_. List sample IDs and appropriate method and calculated RSD.

4.3.3 Were Matrix Spike/Matrix Spike Duplicates analyzed at a rate of 1 in 20 or per batch?

*Action: If no MS/MSD were analyzed, qualify all positive results as "J" and all undetected results as "UJ."*



#### 4.4 Spikes - Mercury Analysis

<p>4.4.1 Was a Matrix Spike analyzed at required frequency (one pre-digestion for each group of samples with a similar matrix type and concentration or sample delivery group) and within limits?</p> <p><b>Note:</b> Post-digestion spikes are not required for Mercury. However one typically is run if the LCS was out of control in order to show matrix interference.</p> <p><i>Action: If the spike recovery is greater than 125 % and the sample results are below the detection limit, the data is acceptable.</i></p> <p><i>If the spike recovery is greater than 125% or less than 75%, and the sample results are greater than the detection limit, then the positive data should be qualified as "J."</i></p> <p><i>If the spike recovery falls within the range of 30 to 74%, all non-detected data should be qualified as "UJ."</i></p> <p><i>If the spike recovery is less than 30% and the sample results are below the detection limit, qualify these results as "R."</i></p>	<p>Yes</p>
<p>4.4.2 If the analyte concentration in the original sample is a factor of 50 above the IDL, was a serial dilution analysis performed and did it agree within a 10% difference of the original determination after correction for dilution?</p>	<p>NA</p>
<p>4.4.3 Was an LCS analyzed per batch and within QC limits (80 to 120%)? (An LCS is not required for aqueous samples of Mercury.)</p> <p><b>Note:</b> The results for solid LCS should always be within the control limits. The laboratory should terminate the analysis, correct the problem, and the samples should be re-digested and re-analyzed for mercury.</p> <p><i>Action: If the LCS is outside of the control limit, qualify all positive results as "J."</i></p> <p><i>If the LCS results are higher than control limits and the sample results are below the detection limit, the results are acceptable.</i></p> <p><i>If the LCS result is below the lower control limit, qualify all results below the detection limit as "UJ."</i></p>	<p>Yes</p>



State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE: (330) 963-1200 FAX: (330) 487-0769  
[www.epa.state.oh.us](http://www.epa.state.oh.us)

Bob Taft, Governor  
Jennette Bradley, Lieutenant Governor  
Christopher Jones, Director

October 6, 2004

Mr. Mark Patterson  
Commander's Representative  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, OH 44266-9297

RE: RAVENNA ARMY AMMUNITION PLANT (OH5-210-020-730); PORTAGE COUNTY; APRIL 15, 2004, GROUND WATER MONITORING WELL SAMPLING EVENT, OPEN DETONATION AREA 2 (ODA-2); DATED JUNE 30, 2004; RECEIVED AUGUST 5, 2004

Dear Mr. Patterson:

The above report was submitted by the Army to document the ground water monitoring event that was conducted at ODA-2 on April 15, 2004. Ground water at the site is monitored in accordance with OAC 3745-54-90 through 3745-55-01. The site is in compliance monitoring in accordance with OAC 3745-54-99.

Ohio EPA has the following comment regarding the document:

**COMMENT**

The laboratory cooler receipt form indicates that the three amber bottles for DET-4 were empty when received at the laboratory. This should be explained and, since there are data for DET-4, the way this issue was resolved should be documented. This information should be submitted to Ohio EPA for review.

Please address the abovementioned comment within thirty (30) days upon receipt of this letter. Documentation should be sent to Ohio EPA's Northeast District Office, to my attention.

If you should have any questions regarding this matter, please feel free to contact me at (330) 963-1189 or via e-mail at [greg.orr@epa.state.oh.us](mailto:greg.orr@epa.state.oh.us).

Sincerely,

Gregory Orr  
Environmental Specialist  
Division of Hazardous Waste Management

GO:pb

cc: Natalie Oryshkewych, Ohio EPA, DHWM, NEDO  
Diane Kurlich, Ohio EPA, DDAGW, NEDO  
Connie McCambridge, Ohio EPA, DDAGW, NEDO  
Eileen Mohr, Ohio EPA, DERR, NEDO  
Todd Fisher, Ohio EPA, DERR, NEDO  
Gregory Orr, Ohio EPA, DHWM, NEDO





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Bob Taft, Governor  
Jennette Bradley, Lieutenant Governor  
Christopher Jones, Director

**December 9, 2004**

Mr. Mark Patterson  
Commander's Representative  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, OH 44266-9297

**RE: RAVENNA ARMY AMMUNITION PLANT (OH5-210-020-730); PORTAGE COUNTY; ~~OPEN~~  
~~DETONATION AREA 2~~; RESPONSE TO COMMENTS INCLUDED IN AN OCTOBER 6,  
2004, OHIO EPA LETTER**

Dear Mr. Patterson:

The comment included in the October 6, 2004, Ohio EPA letter has been adequately addressed. No further action is required at this time concerning this comment.

If you should have any questions regarding this matter, please feel free to contact me at (330) 963-1189 or via e-mail at [greg.orr@epa.state.oh.us](mailto:greg.orr@epa.state.oh.us).

Sincerely,

Gregory Orr  
Environmental Specialist  
Division of Hazardous Waste Management

GO:pb

ec: Natalie Oryshkewych, Ohio EPA, DHWM, NEDO  
Diane Kurlich, Ohio EPA, DDAGW, NEDO  
Eileen Mohr, Ohio EPA, DERR, NEDO  
Todd Fisher, Ohio EPA, DERR, NEDO  
Gregory Orr, Ohio EPA, DHWM, NEDO



State of Ohio Environmental Protection Agency

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2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

February 24, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
~~WINKLEPECK BURNING GROUNDS~~  
PHASE III RI

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR) and Division of Drinking and Ground Waters (DDAGW), have received and reviewed the document entitled: "Preliminary-Draft, Phase III Remedial Investigation Report for the Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated January 2004 and received at Ohio EPA, NEDO, on February 2, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) Louisville District by Science Applications International Corporation (SAIC), under contract number DACA62-00-D-0001, delivery order CY08.

The enclosed table reflects a compilation of comments from DERR and DDAGW. Please note that this document was not reviewed by risk assessment personnel, as the text of the report indicated that any discussion of risk assessment would be deferred to the Feasibility Study (FS).

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,

Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

enclosure

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Laurie Moore, Ohio EPA, OFFO, SWDO  
Brian Tucker, Ohio EPA, CO, DERR  
LTC Tom Tadsen, OHARNG  
JoAnn Watson, AEC

Glen Beckham, USACE Louisville  
John Jent, USACE Louisville  
MAJ Kim O'Keefe, NGB  
Kevin Jago, SAIC

ec: Mike Eberle, Ohio EPA, NEDO, DERR

Todd Fisher, Ohio EPA, NEDO, DERR





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Bob Taft, Governor  
Christopher Jones, Director

May 26, 2004

COL William Zieber  
United States Property and Fiscal Officer for Ohio  
2825 West Dublin-Granville Road  
Columbus, OH 43235-2789

**Re: Ravenna Army Ammunition Plant Transfer of ~~Winklepeck Burning Ground~~**

Dear COL Zieber:

The purpose of this letter is to document the Ohio Environmental Protection Agency's (Ohio EPA) position concerning the early transfer of the Winklepeck Burning Grounds (WBG) Area of Concern (AOC) at the Ravenna Army Ammunition Plant (RVAAP), from the U.S. Army, BRAC- Hampton Roads, to the National Guard Bureau (NGB). Ohio EPA understands that the NGB needs to assume control over the former AOC, prior to completion of the remedy, in order to be eligible for funding necessary to re-develop this AOC as a range. The NGB plans to develop the property occupied by WBG as a Mark 19 Grenade Machine Gun Range.

Winklepeck Burning Grounds is identified in the Installation Restoration Program as AOC # RVAAP-05. It is approximately a 200-acre site at the RVAAP, used from 1948 through 1998 for the open burning of various munitions, scrap explosives, and explosive-contaminated materials. The major contaminants of concern at this site include explosives, propellants, metals, and semi-volatile organic compounds (SVOCs). Risk assessments that were developed utilizing a National Guard receptor preliminarily indicate that there are eight pads (38, 45, 58, 60, 61, 66, 67, 68) that will most likely require remediation from a chemical perspective, in order to safeguard the health of the OHARNG trainee and range maintenance worker. In addition to the chemical contaminants present, there is also the potential for munitions and explosives of concern (MEC) to be present at WBG. The pads containing MEC that pose safety issues to OHARNG personnel will need to be cleared of safety hazards (including the MEC contaminated pad in the northwestern portion of the AOC that was recently identified and not included in the draft scope of work). The issue of explosive safety will be evaluated by the Department of Defense Explosives Safety Board (DDESB) and the Ohio Army National Guard (OHARNG)/NGB. Several of the pads that pose safety issues from MEC are also pads that pose human health risk issues from chemical contamination.

The current status of this AOC is that the Remedial Investigation (RI) report has been finalized. However, a Feasibility Study (FS) has not yet been submitted to Ohio EPA and other stakeholders for evaluation and approval, which would detail potential remedial options and depths of remediation for this AOC. In accordance with the Directors Final Findings and Orders between the Department of Army and Ohio EPA for the Ravenna Army Ammunition Plant (signed by the Army on May 10, 2004), Ohio EPA must approve FS workplans and reports, as well as the Remedial Designs (RD) and the Remedial Action (RA) work plans, before the remedial action can be implemented. Additionally, there needs





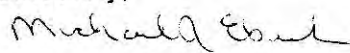
COL WILLIAM ZIEBER  
UNITED STATES PROPERTY AND FISCAL OFFICER FOR OHIO  
MAY 26, 2004  
PAGE 3

development and installation. At that time, residual contamination (including UXO) present at the range would have to be evaluated, to determine if additional cleanup actions consistent with the new reuse would be required.

Ohio EPA also understands that the NGB will not re-develop WBG until the Army's remediation is completed. Until the planned remedy is implemented, the NGB agrees to ensure access to the site is controlled, such that the site does not pose a risk. In addition, NGB will ensure that both the Army and their contractors are provided access to the WBG, so that the planned remediation activities can be completed.

If you have any questions regarding the contents of this letter, or the recommendations contained herein, please do not hesitate to contact me at (330) 963-1221.

Sincerely,

  
~ FOR ~

Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Mark Patterson, RVAAP  
JoAnn Watson, AEC  
LTC Tom Tadsen, OHARNG  
MAJ Kim O'Keefe, NGB

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR



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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

July 7, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
PRELIMINARY DRAFT  
FOCUSED FEASIBILITY STUDY  
~~WINKLEPECK BURNING GROUNDS~~

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document entitled: "Preliminary Draft, Focused Feasibility Study for the Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated June 2004 and received at Ohio EPA on June 3, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) Louisville District by Science Applications International Corporation (SAIC), under Contract No. DACA62-00-D-0001, Delivery Order No. CY08. The following comments were generated from the review of this document:

**GENERAL COMMENTS**

Comment # 1: The preferred alternative for the site is the removal of contaminated soils above remediation goals concurrent with removal of munitions and explosive constituents for re-development of the site as a Mark 19 range. Though Ohio EPA feels this approach is the most appropriate remedial action for this site, both actions (the MEC removal and the polyaromatic hydrocarbon/explosives contaminated soils removal) must occur for the remedial response to be complete. The feasibility study is written so that the alternative proposed for evaluation is the comprehensive approach of removing both MEC and contaminated soil outside of the MEC removal zone, but then only evaluates the soil removal using the nine criteria under the National Contingency Plan. In addition, the ARARs listed are written in such a manner that it seems to indicate that these rules only apply to contaminated soils, when the same ARARs will apply to both actions. For example, excavation and removal of soil only and excavation/removal/sifting of soil for MEC will require similar mitigation measures, to ensure air and surface water impacts are prevented. In addition, since both actions are proposed for the same area, the location specific ARARs also apply to both the soil removal and to the proposed MEC action as well. Lastly, if hazardous waste must be shipped offsite, the same rules apply to both, whether the waste is contaminated soils or explosive fragments. Though we recognize that the Army may have limitations in how the two projects are





MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
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funded, this alternative is not feasible, if the actions cannot occur concurrently. In addition, several of the cost savings in time, effort, and overall coordination are not realized, if these activities are not proposed as one comprehensive remedial approach for the site. We, therefore, feel that the FFS should be revised to include both components (MEC and soil removal) as the comprehensive remedial action for the site, and incorporate any additional requirements (the Defense Explosives Safety Submittal) as one additional requirement that must be met only for the MEC portion of the site.

- Comment # 2: The FFS evaluation does not discuss how MEC (if discovered during the soils removal) will be handled. The Administrative Orders on Consent between the Army and Ohio EPA for the Ravenna Army Ammunition Plant (June 10, 2004) provide for an exemption to treat MEC at Open Detonation Area 2, or to detonate MEC in place, if it cannot be safely transported to OD # 2. This should be discussed in the text, especially if both operations (the MEC and the soils removal) occur as one comprehensive remedy for the site.
- Comment # 3: Though the FFS discusses confirmatory soil sampling being completed to demonstrate RGOs have been met, confirmatory soil sampling may also be required, if any MEC must be detonated in place, due to safety concerns. Contingencies should be included in the costs to provide for this sampling.
- Comment # 4: There should be an evaluation of an alternative that would allow for not restricting the use of the property, either due to the presence of contamination, UXO, or both. This would be in accordance with DoD guidance. However, it is acknowledged that it won't be really practical to implement a remedy at WBG and have three operating ranges without having some sort of land use controls in place.

#### **SPECIFIC COMMENTS**

- Comment # 5: Summary of Ecological Risk and Remedial Goal Option Development, page xiv: Revise line 32 to state that many of the recalculated HQ s are less than 1 and remove the phrase "mostly under 30," since there are several HQs that are greater than 30 by looking at Table 2-14 on page 2-39.
- Comment # 6: Executive Summary, page xvi, lines 29-34: The Army should consider an approach to move forward on the remediation, if funding for UXO clearance is not available in the future and remediation funding is available. This should be discussed to address the concern that remediation should not be postponed, due to funding issues associated with a different program. Therefore, the FS should provide a discussion for a plan to move remediation forward, if UXO removal money goes away (in the future) and has to be put on hold.



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
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- Comment # 7: Section 1.2.1, RVAAP Facility Description, page 1-5, lines 3-12: This section of the text describes activities from 1992 to the present. Please add text dealing with storage of strategic minerals (DLA stockpiles).
- Comment # 8: Figure 1-8, Proposed Mark 19 Range, WBG, page 1-8: Please add "Wet Storage Area" to the bottom left hand corner of figure.
- Comment # 9: Section 1.3.1, Munitions and Explosives of Concern, Clearance and Construction Activities, page 1-9 lines 8-12: How will the one multi-incremental sample that is collected from each pad be evaluated and used for decision making?
- Comment # 10: Section 1.3.1, Munitions and Explosives of Concern, Clearance and Construction Activities, page 1-9, lines 14-16: The text in this section states that "all excavated soils that are determined to be unsuitable for use as backfill will be temporarily stockpiled at a location on RVAAP for later treatment and/or disposal. Proper erosion control methods will be employed to prevent soil erosion from the stockpile." Erosion and sedimentation control measures should be conducted in accordance with "Rainwater and Land Development - Ohio's Standards for Storm Water Management, Land Development, and Urban Stream Protection," Ohio Department of Natural Resources, Natural Resources Conservation Service, and Ohio Environmental Protection Agency, 1996. Please make the appropriate changes to the text.
- Comment # 11: Section 1.3.1, Munitions and Explosives of Concern, Clearance and Construction Activities, page 1-9 lines 16-17: The text states that "all areas disturbed by construction activities will be seeded with a grass seed mix." The seed mix should conform with "RVAAP Approved Seed Mix for Temporary Cover and Final Site Closures." Please modify the text to indicate that an approved seed mix will be used.
- Comment # 12: Section 1.3.3, Site Access Control, page 1-10, line 2: The text states that "The Mark 19 range will be fenced completely with a gated chain link fence." Will the Mark 19 range be completely fenced as stated in the text? In the last meeting with Ohio EPA, OHARNG, and RVAAP, it was stated that this may not be the case. It was mentioned that openings may exist within the fence to allow free movement of wildlife. Please verify with OHARNG that the area will be completely fenced.
- Comment # 13: Section 2.1.1.1, Chemical of Potential Concern Screening Process, page 2-4 lines 22-27: Remove the portion of the text that starts with "...a WOE approach is used to determine if a chemical is site-related. The magnitudes and locations (clustering)..... through line 27." This discusses evaluating the clustering of detections as potential screening approaches, which is not typically part of the screening process, per the FWHHRAM. It is true that chemicals that are detected infrequently, or less than 5% of

the time, are not considered COPCs, however, the locations of these detections are not used as screening criteria to remove potential chemicals from consideration as COPCs.

Comment # 14: Figure 1-4, Proposed Mark 19 Range, WBG, page 2-8: The legend depicts a key for the areas that exceed RGO's. Please include these areas on the figure.

Comment # 15: Table 2-4: Exposure Parameters for National Guard Mark 19 Range Maintenance Soldier, page 2-13: Since WBG is going to be converted to a Mark 19 firing range, we have a new receptor called the "National Guard Mark 19 Range Maintenance Soldier." This receptor is a modification of the ONG Trainee that is found in the LL1 Supplemental RI report and the FWHHRAM for Ravenna.

The differences between these two receptors are found in the assumptions for exposure time, frequency, and inhalation rate. Specifically, the National Guard Mark 19 Range Maintenance Soldier is assumed to be exposed six hours/day for 85 days/year, with an inhalation rate of  $27.6 \text{ m}^3/\text{day}$ , whereas, the ONG Trainee is assumed to be exposed 24 hours/day for 39 days/year, with an inhalation rate of  $44.4 \text{ m}^3/\text{day}$ .

Ohio EPA has the following questions:

- a. What is this Mark 19 Soldier doing for the other 18 hours that are left in the day (24 hours/day - six hours per day = 18 hours)?
- b. Why is the Mark 19 Soldier at the training facility for 46 more days than the average ONG Trainee (85 days per year - 39 days per year = 46 days difference)?
- c. Why is the inhalation rate for the Mark 19 Soldier different than the inhalation rate for the ONG Trainee?
- d. Is the Mark 19 Soldier also a ONG Trainee? If so, then how do you look at the overall exposure that a ONG Trainee would be expected to receive from participating in all training activities (both normal training reflected in ONG Trainee assumptions and also the Mark 19 training activities)?
- e. The exposure scenarios developed thus far should be used for most, if not all, AOCs at RVAAP. This was one of the main reasons for developing the generic National Guard receptor for the facility-wide human health risk assessors manual. These previously developed scenarios were to be specific to the possible future uses and should have been generic enough to account for most exposures that future receptors may encounter. One of the things we do not want to get into is the development of site or activity specific receptors and RGOs at every AOC, depending upon the current use proposal at the time. If it is found that the current exposure scenarios are not protective, then it would be recommended that the



scenarios are either adjusted or additional scenarios are developed. The ONG Trainee was designed to be protective of all likely exposures, but the introduction of this Mark 19 Soldier receptor seems to indicate that the ONG Trainee is no longer protective. How does this Range Maintenance soldier fit in with the already-developed exposure scenarios in the facility-wide risk assessor's manual? Is the range maintenance soldier expected to be a full or part time employee vs. a trainee?

- f. How do risk managers and property owners manage all of these exposures and assumptions for the full spectrum of activities expected by the ONG receptors?

- Comment # 16: Section 2.1.2.1, Land use and potential receptors, page 2-11, lines 15-17: Explain how the exposure time of six hours was determined? The text states that there will be four hours before use and eight hours after use, so this is 12 hours at a minimum.
- Comment # 17: Section 2.1.2.1, Land use and potential receptors, page 2-11, lines 20-21: Explain where the assumption of four days/year for 12 hours/day for training originated.
- Comment # 18: Section 2.1.2.2, Exposure Pathways, page 2-12, line 19-22: Even though exposure to groundwater is not expected and, therefore, not evaluated as an exposure pathway, please identify groundwater COPCs.
- Comment # 19: Table 2-4: Exposure Parameters for National Guard Mark 19 Range Maintenance Soldier, page 2-13: Revise the citation for the adherence factor. The dermal guidance, RAGS part E, is now available and can be used as the reference.
- Comment # 20: Table 2-8: Winklepeck Burning Grounds Deep Surface Soil Calculations of Blood Lead Concentrations, page 2-23: Use consistent terminology when discussing surface soil. It's recommended to use the term "Deep Surface Soil" throughout this report when referring to the 0-3' soil interval. This will help the reader to distinguish this interval from the 0-1' soil interval that has been called "surface soil" in past reports.
- Comment # 21: Table 2-12: Human Health Risk-based RGO's for Mark 19 Range Maintenance Soldier Exposed to Surface Soil, page 2-31: Make sure to evaluate the proposed RGO's, to ensure that the levels of residual contamination will not migrate to groundwater at unacceptable levels.
- Comment # 22: Section 2.2.4, Overview of Ecological Risk Assessment and Biological Ground-Truthing Findings, page 2-38 through 2-42: Considering that the premise of Section 2.2 is to provide the rationale for why ecological RGO's are not needed, the report should remove Section 2.2.4 through Section 2.2.4.3. Since the information on the ecological risk assessment and field truthing effort is available in other reports, simply add a sentence or two to



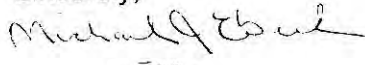
MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
JULY 7, 2004  
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direct the reader to those reports for details on the ecological risk assessment and conclusions.

- Comment # 23: Section 3.1, Introduction, Applicable or Relevant and Appropriate Requirements, page 3-2, line 14: Please change text to indicate that the RVAAP Findings and Orders were signed on June 10, 2004.
- Comment # 24: Section 3.2.2, Surface Water, page 3-2, lines 32-37: Please add ORC 6111 citation to the text which deals with "Water of the State."
- Comment # 25: Appendix A, Table A-2, Page A-18: In the second row, it states that ground water monitoring is not required, because only soils meeting RGOs will be returned to the excavation. The FFS text states that the RGOs were developed to meet risk based standards for the Range Maintenance Worker, but it does not discuss whether these standards would also prevent leaching of contaminants to ground water. In addition, though the alternative proposed is only for soils, contamination has been detected in a few monitoring wells at Winklepeck, which would indicate that this ARAR may be relevant and appropriate. Please revise.

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

Sincerely,

  
- FOR -

Todd R. Fisher  
Project Coordinator  
Division of Emergency and Remedial Response

TRF/kss

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September 8, 2004

Mr. Mark Patterson  
Environmental Program Manager  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, Oh 44266

Re: Comment Responses; Preliminary Draft Focused Feasibility Study; Winklepeck  
Burning Grounds; Ravenna Army Ammunition Plant

Dear Mr. Patterson:

On August 4, 2004, Ohio EPA received the Army's response to Ohio EPA's comments on the Preliminary Draft Focused Feasibility Study (FFS) for the Winklepeck Burning Grounds (WBG) at the Ravenna Army Ammunition Plant (RVAAP). One of Ohio EPA's major concerns about the FFS was that the Army's preferred remedial action consisted of two separately funded activities - one action to address the residual explosives contamination in soils and a second action to remove the munitions and explosives of concern (MEC) at the site. Ohio EPA's July 2, 2004 comments on the preliminary draft FFS for WBG stated that we preferred that the FFS be revised to reflect "one comprehensive remedial approach" that would address both the MEC and residual contamination at this site. On August 11, 2004, a conference call between the Army and Ohio EPA was held to try to resolve this difference. The Army agreed to add language to the FFS to provide additional details about the MEC response action to try to address Ohio EPA comments. However, the Army stated that it could not revise the FFS to include an evaluation of the MEC response because the Army feels MEC cannot be addressed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The purpose of this letter is to clarify Ohio EPA's position concerning this issue, so that the proposed alternative for WBG will be drafted to include actions to address both the MEC and the residual explosives in soil.

Ohio EPA's regulatory role at the RVAAP includes ensuring that contamination associated with past military activities at the installation does not pose a risk to human health or the environment. At those areas of concern (AOCs) where contamination may pose a risk, Ohio EPA's role includes ensuring that contamination is remediated to standards appropriate for future use, in this case, by the Ohio Army National Guard (OHRANG). Since this cleanup standard does not allow for unrestricted reuse of the RVAAP, land use controls (LUCs) will be necessary to ensure that unacceptable uses are prohibited.



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Bob Taft, Governor  
Jennette Bradley, Lt. Governor  
Christopher Jones, Director



The RVAAP has been under environmental investigation since 1989. Removal actions have been implemented at several AOCs. Ohio EPA and the Army now have enough data to select the appropriate remedial action for the WBG, an AOC that was used for the open burning of bulk explosives and explosive contaminated materials. Though the WBG was primarily used for this purpose, the AOC is also contaminated with MEC, probably due to kick outs from the former Open Demolition Area 2. At WBG, the presence of MEC poses more of an explosive hazard than a risk due to long-term exposure from any residual chemical contamination present. However, due to the nature of MEC, this hazard cannot be quantified to determine an appropriate clean up standard similar to clean up goals established to prevent risk from chemical contamination. Therefore, the Army has proposed an objective for MEC for the WBG based on safety concerns, and does not intend to address all MEC material present at WBG. MEC will only be cleared from areas at WBG where exposure is likely to occur (surface areas and areas where excavation will occur for the construction of the Mark 19 range).

Because a numerical cleanup goal cannot be established for the MEC at WBG, it is Ohio EPA's understanding that the Army feels that actions to address MEC are safety issues, and therefore cannot be part of a remedy evaluated and implemented under the CERCLA. Ohio EPA disagrees with this approach. Though it is true that the remediation goal for MEC at WBG differs from cleanup goals established for chemical hazards at this AOC, the overall goal is the same - to complete appropriate actions to ensure that the WBG is safe for its intended reuse. If both components (MEC removal and chemical contamination remediation) are not completed, the WBG will not be suitable for its intended reuse.

This position is consistent with Ohio EPA's May 16, 2004 letter to the Ohio Army National Guard (copy attached) concerning the transfer of the WBG to the National Guard Bureau (NGB). In that letter, Ohio EPA stated that the final action(s) chosen to remediate WBG must ensure that the threats to human health and/or safety posed by contamination are eliminated. The letter further stated that, once these actions were completed, no further remedial action would be required by Ohio EPA until such time as the NGB proposes to close or no longer use this area as a Mark 19 range, or until other planned co-located ranges are scoped for development and installation. At that time, residual contamination (including MEC) present at the range would have to be evaluated to determine if additional clean up actions, consistent with the new reuse, would be required.

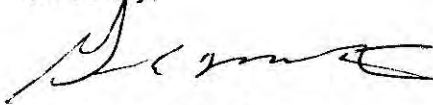
Ohio EPA understands the Army's overall strategy for clearing MEC from only those areas at WBG where exposure is likely to occur (e.g. within surface areas proposed for reuse). Ohio EPA also understands that MEC clearance activities are expensive, and since WBG is expected to be transferred to the NGB for military use, the Army feels it may not be a wise use of resources to completely clear MEC from WBG at this time. Therefore, land use controls (LUCs) will be necessary at WBG to ensure that the types of activities that do occur are limited to those areas where MEC has been cleared, so that potential exposure to MEC is prevented.



Ohio EPA feels that necessary LUCs for MEC at WBG will need to be maintained, monitored, and enforced using the same mechanisms as those to be implemented to prevent risk from chemical exposures caused by unacceptable uses of the AOC. Ohio EPA therefore feels that LUCs necessary for MEC at WBG should be included in the Record of Decision (ROD) addressing chemical contamination at WBG and incorporated into the same comprehensive land use control plan designed to address chemical concerns at the RVAAP. In addition, MEC LUCs should also be incorporated into the same standard operating procedures the OHRANG is drafting to ensure that soldiers are protected from unacceptable chemical exposures during training. One additional benefit of including both types of LUCs in one document is that, since there are requirements under CERCLA for reviewing actions to ensure they continue to be protective, it would reduce the possibility of necessary MEC LUCs being lost or forgotten in the future.

I hope this letter serves to clarify Ohio EPA's position regarding this issue. We look forward to discussing this issue at the September 22, 2004 meeting between Ohio EPA, the Army and the Ohio Army National Guard. Should you have any questions in this regard, please feel free to call me, at (937) 284-6018.

Sincerely,



Graham Mitchell, Chief  
Office of Federal Facilities Oversight

CC: Bonnie Buthker, OFFO  
Mark Navarre, Legal/CO  
Eileen Mohr, DERR/NEDO  
Todd Fisher, DERR/NEDO  
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Bob Taft, Governor  
Christopher Jones, Director

September 15, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
PHASE I MEC DENSITY SURVEY - WBG

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

Dear Mr. Patterson:

On August 11, 2004, the Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), received the following document: "Work Plan for the Phase I MEC Density Survey of Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant." This document, dated August, 2004, was prepared by MKM Engineers, Inc. for the United States Army Technical Center for Explosives Safety.

On August 10, 2004, Mr. Todd Fisher (Ohio EPA) was invited, via e-mail, to attend a "kick-off" meeting on August 12, 2004 for Winklepeck Burning Grounds (WBG). While at the meeting, Mr. Fisher was informed that the vast majority of the Phase I MEC density survey had already been completed, despite the fact that Ohio EPA had only received the workplan for these activities on the previous day. Under the terms of the Director's Final Findings and Orders for the Ravenna Army Ammunition Plant, which were journalized on June 10, 2004, Ohio EPA has forty-five (45) days for the review of submitted documents as specified in Section XVIII(39). Clearly, what occurred with respect to this submitted document is not in compliance with the Order.

Given the above facts, Ohio EPA will not be reviewing the Phase I MEC Workplan. However, Ohio EPA will review the workplan for the Phase II MEC clearance at WBG, which was received on September 10, 2004. Comments are scheduled to be back to the Army on October 26, 2004. Please do not initiate any clearance activities until the workplan is final.

As the Phase II activities are partially predicated upon what was determined during Phase I, and the fact that Ohio EPA was not a part of the Phase I activities, please be advised that Ohio EPA may not be in a position to provide concurrence with the conclusions drawn from the Phase I study and/or the proposed scope of activities for the Phase II clearance and response. Additionally, as of this date, Ohio EPA has not received an After Action Report (AAR) for the Phase I study. Please provide Ohio EPA with a projected date for the receipt of this AAR. It would be helpful to have this information in hand while reviewing the Phase II workplan.





MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
SEPTEMBER 15, 2004  
PAGE 2

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

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JoAnn Watson, AEC  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville  
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Mark Lamb, MKM  
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ec: Mike Eberle, Ohio EPA, DERR, NEDO  
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Bob Taft, Governor  
Christopher Jones, Director

September 15, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
PHASE I MEC DENSITY SURVEY  
HASP ~~WBG~~

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

Dear Mr. Patterson:

On August 13, 2004, the Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), received the following document: "Site Safety and Health Plan for the Phase I MEC Density Survey of Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant." This document, dated August 11, 2004, was prepared by MKM Engineers, Inc. for the United States Army Tank-Automotive and Armaments Command.

On August 10, 2004, Mr. Todd Fisher (Ohio EPA) was invited, via e-mail, to attend a "kick-off" meeting on August 12, 2004 for Winklepeck Burning Grounds (WBG). While at the meeting, Mr. Fisher was informed that the vast majority of the Phase I MEC density survey had already been completed, despite the fact that Ohio EPA had not yet received the health and safety plan (HASP). Although Ohio EPA does not have regulatory jurisdiction over HASPs, it has been customary for the Agency to review such documents and provide comments to the Army and contractor. In this instance, given that the work was substantially complete by the time the HASP was received, Ohio EPA will not review the above-referenced document.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,

Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

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State of Ohio Environmental Protection Agency

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Bob Taft, Governor  
Christopher Jones, Director

**October 14, 2004**

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
AFTER ACTION REPORT FOR MEC  
AT **WBG**

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the following document: "Phase I MEC Density Survey, Winklepeck Burning Grounds, Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated September 24, 2004 and received at Ohio EPA, NEDO, on October 04, 2004, was prepared by MKM Engineers, Inc. for the U.S. Army Tank-Automotive and Armaments Command (TACOM).

Ohio EPA, NEDO, DERR, has the following comments on the submitted document:

**General Comments on the Entire Submission:**

1. Representatives from the Army Environmental Center (AEC), Army Base Realignment and Closure (BRAC) - Hampton Field Office, National Guard Bureau (NGB), Ohio Army National Guard (OHARNG), Ohio EPA, and Ravenna Army Ammunition Plant (RVAAP) met in Columbus, OH, on September 22, 2004, to discuss numerous issues including Land Use Controls (LUCs), and Munitions and Explosives of Concern (MEC). During the meeting, the BRAC representative indicated that current Army thinking was to conduct an Engineering Evaluation/Cost Analysis (EE/CA) at the Winklepeck Burning Grounds (WBG). Currently, no specific details regarding the EE/CA have been presented. However, the conducted work and other related documents need to be consistent with the approach outlined in the EE/CA.
2. The draft Scope of Work (SOW) for this project was received on March 04, 2004, and Ohio EPA provided comments on this SOW on March 06, 2004. Ohio EPA did not receive any response to comments, nor was a revised SOW received, until the Phase II workplan and this After Action Report (AAR) were received. As such, it is incumbent upon the Army and the contractor to ensure that any pertinent comments on the draft SOW were addressed and incorporated into the revised SOW. The final SOW, which appears as Appendix A of this report, will not be reviewed by Ohio EPA.
3. The Agency had received the workplan for this Phase I effort on August 11, 2004, the day before the "kick-off" meeting for the project. During the meeting, Ohio EPA was informed that the vast majority of the Phase I MEC density survey had already been completed. Given this



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
OCTOBER 14, 2004  
PAGE 2

information, Ohio EPA declined to review the Phase I workplan, and sent correspondence to the Army regarding this position on September 15, 2004. Please note that comments on the AAR have the potential to impact upon the proposed work to be conducted in Phase II.

4. In future document submissions, please number the lines of the text for ease of review and comment.
5. Please follow the convention used at RVAAP regarding the designation of documents. Specifically, that the terms draft or final (workplans); or preliminary-draft, draft, final (reports) are used at RVAAP, not revision numbers.
6. When referring specifically to the WBG, please use the terminology "Area of Concern " or AOC, rather than the term "site."

**Specific Comments on the AAR Main Text:**

7. On the acronym list (page iii), please revise the CWM entry to read: "Chemical Warfare Materiel."
8. In sections 1.1 and 1.2 on page 1, there are references made to the SOW for this initiative. Please refer to Ohio EPA general comment # 2 detailed above. (This comment is also applicable to page 8, section 2.3; page 9, section 3.1.)
9. In section 1.2 on page 1, the text indicates that WBG is "approaching remedial completion status." This is not correct. WBG has a final (approved) Remedial Investigation (RI) and a draft Focused Feasibility Study (FFS) in place. Remedial activities have not commenced at this AOC. Revise the text. (Comment also applicable to section 1.5 on page 5.)
10. Revise the text on page 4 (section 1.4, first paragraph) to read: "... as well as storing finished...."
11. Revise the text on page 4 (section 1.4, third paragraph) to read: "Burning is known to have occurred along Road D."
12. In section 1.4 on page 4, the text indicates that during previous investigations at the WBG that fully fuze 40 mm grenades were found, and that they most likely resulted as kick-outs from Open Demolition Area # 2 (ODA # 2). It is not likely that the 40 mm grenades found in the vicinity of Pad # 60, during brush-hogging activities at WBG, resulted from kick-outs from ODA # 2. Add revised text to this section.
13. The text in section 1.4 (page 4, third paragraph, last sentence), indicates that RVAAP was "closed" in 1992. Please provide clarification in the revised text. Was this specific to the burn trays that were closed under RCRA? If so, the date is not correct.
14. Please clarify the text on page 5 (section 1.4) to indicate that the scope of this project was to address the former burn pads that fall within the firing point area and the target arrays. As



currently written, the text seemingly indicates that all of the burn pads within the footprint of the Mark 19 range were to be addressed, which is not the case.

15. The text in section 1.5 (page 5, first full paragraph) indicates that the Deactivation Furnace Area (DFA) is being transferred to the CERCLA program. Revise the text to indicate that the DFA has been transferred to the CERCLA program.
16. Revise the text on page 5 (section 1.5) to read: "...as well as remediate eight environmental pads and five sampling areas where COCs were greater than the RGOs."
17. Revise the text on page 5 (section 1.6) to read: "...marked the extent of the eight environmental burn pads..."
18. Section 2.5 on page 8 describes the obstacles presented by the wetlands. What, if any, MEC clearance will be conducted in the various wetland areas? Will surface clearance be conducted? What is the OHARNG position with respect to this, given that in the future they will be responsible for the range maintenance and clearance? (This comment is also applicable to section 9.0 on page 18.)
19. Section 2.6 on page 8 indicates that a total of three MEC items were located and reported to the RVAAP facility manager. Were these MEC items just flagged or were they destroyed? (Also applicable to page 10, section 6.0; page 18, section 8.0.) Additionally, there should be a mention in this section of the 40 mm rounds that were identified near Pad 60.
20. The text on page 11 (section 7.0) indicates that the presence of 40 mm grenades at the berm located at pad 60 infers that there may be more 40 mm rounds buried within this berm, and also within the berms located at pads 58 and 61. The text further indicates that this means that MKM may need to further evaluate remedial options. Change "may" to "will" in the revised text.
21. The figures provided in the AAR were compared with the map provided in the WBG Focused Feasibility Study (FFS), and it is noted that they are similar, but do not agree, especially with respect to pads impacted by target arrays and firing lanes. Please clarify which figures are correct. (This comment is also applicable to page 19, section 9.0.)
22. In the revised document (before Figure 2-1), either provide another map which shows the footprint of the Mark 19 range with respect to the WBG, or cross reference Figure 3-1 which appears in Appendix C.
23. In Figures 2-1 through 2-6, please clarify whether or not all the streams are perennial, if not, they should be labeled as intermittent. An alternative to revising the figures would be to make a notation in the revised text (at an appropriate place) that several of the streams are intermittent in nature.
24. In section 8.0 (page 18), please confirm that it is seven pads that are crossed by the target arrays and firing point areas. In cross referencing the maps provided in this document, it

appears that it may be eight pads: pad 43 (firing point area); pad 18 (400 m target array); pads 7 and 48 (600 m target array); pad 35 (800 m target array); pad 67 (1100 m target array); and pads 26 and 70 (1500 m target array).

This comment is also applicable to section 19.0 on page 18, where the text should indicate that the 1100 m target array line crosses pad 67.

25. In section 8.0 (page 18), the text indicates that two burn pads that are assumed to cross the target arrays and firing point area could not be defined from the data. Identify the two burn pads by number.
26. The text on page 19 (section 9.0) indicates that under the current SOW, there is a 12,000 cubic yard limitation of soil that can be removed. In the event that a greater volume of soil needs to be removed, there *must* be an increase in funding for this project, so that the required amount of soil that needs to be removed in order to meet the OHARNG's range construction objective is achieved. Additionally, the environmental burn pads and sampling points that have been identified in previous reports must be excavated, in order to safeguard the health of the OHARNG trainee and range maintenance worker.
27. Provide the date of the referenced SAIC figures. (Section 9.0 on page 19)
28. Add Ohio EPA and OHARNG to the list of Agencies contacted in the event it is determined that the MEC is removed prior to the proposed excavation depth. This is especially pertinent in areas where there is co-located MEC and environmental COCs. (Page 19, section 9.0.)

**Specific Comments on Appendix A:**

29. Appendix A was not reviewed by Ohio EPA. Refer to general comment number 2 above.

**Specific Comments on Appendix B:**

30. Provide a footnote to indicate what is meant by "no contact."

**Specific Comments on Appendix C:**

31. Revise the text on page 1 (section 1.3, second paragraph) to read: "... as well as storing finished...."
32. Revise the text on page 1 (section 1.3, fourth paragraph) to read: "Burning is known to have occurred along Road D."
33. In section 1.3 on page 2, the text indicates that during previous investigations at the WBG that fully fuzed 40 mm grenades were found, and that they most likely resulted as kick-outs from Open Demolition Area # 2 (ODA # 2). It is not likely that the 40 mm grenades found in the vicinity of Pad # 60, during brush-hogging activities at WBG, resulted from kick-outs from ODA # 2. Add revised text to this section.



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
OCTOBER 14, 2004  
PAGE 5

34. The text in section 1.3 (page 2, first full paragraph, last sentence) indicates that RVAAP was "closed" in 1992. Please provide clarification in the revised text. Was this specific to the burn trays that were closed under RCRA? If so, the date is not correct.
35. The text in section 1.3 (page 2, third full paragraph) indicates that the DFA is being transferred to the CERCLA program. Revise the text to indicate that the DFA has been transferred to the CERCLA program.
36. On Table 2-2 (page 5), provide an explanation for why the 105 mm projectile was not used in the as-built geophysical prove-out (GPO).
37. On Table 2-2 (page 5), provide an explanation for the negative depth specified for the M48 Fuze (item 14). It is assumed that this fuze is partially exposed at the surface.
38. Section 2.7 (page 6) indicates that the idealized GPO is superimposed on the map. The footnote for Figure 2-1 indicates that it is the as-built GPO that is superimposed on the map. Correct the discrepancy by either revising the footnote or text.
39. The second bullet on page 9 indicates that the 90 mm projectile was not detected at a depth of 2.6 feet. Confirm that any areas excavated to a depth of four feet will be excavated in one foot lifts, with a Schonstedt sweep conducted after each lift is removed.
40. On Figures 3-1 and 3-7 through 3-12, please clarify whether or not all the streams are perennial. If not, they should be labeled as intermittent. An alternative to revising the figures would be to make a notation in the revised text (at an appropriate place) that several of the streams are intermittent in nature.
41. On page 19 (section 3.6, fourth bullet), the text indicates that: "Bad data points, such as spikes, were removed from the EM data." Provide the criteria utilized for determining if a data point was "bad."
42. On Figures 3-11 and 3-12, please provide an explanation for the blank areas that appear in the EM-61 data lines.
43. The text on page 26 indicates that: "Complete dig lists can be found in Appendix F." Please clarify what is meant by a "dig list."

**Specific Comments on Appendix D:**

No comments.

**Specific Comments on Appendix E:**

No comments.



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
OCTOBER 14, 2004  
PAGE 6

**Specific Comments on Appendix F:**

No comments.

**Specific Comments on Appendix G:**

44. During future field efforts, please ensure that the daily field notes are completely and accurately filled out. For example, in this appendix, it is noted that: the standard protocol for making corrections was not followed; there was no indication as to whether or not there was back-up equipment on-site ("GPS bad"); forms are not filled in completely (for example, end voltages are missing); only the initials of team members are noted instead of full names, etc..

**Specific Comments on Appendix H:**

45. In Figures 2-1 through 2-6, and 3-7 through 3-11, please clarify whether or not all the streams are perennial, if not, they should be labeled as intermittent. An alternative to revising the figures would be to make a notation in the revised text (at an appropriate place) that several of the streams are intermittent in nature.
46. On Figures 3-8, 3-11, and 3-12, please provide an explanation for the blank areas that appear in the EM-61 data lines.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
JoAnn Watson, AEC  
Randy Nida, NGB  
LTC Tom Tadsen, RTLS  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville  
Bill Ingold, BRAC  
Rick Callahan, MKM  
Mark Lamb, MKM

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR



State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

June 3, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
DRAFT **LOAD LINE 1** SUPPLEMENTAL  
BASELINE HHRA  
PORTAGE/TRUMBULL COUNTIES

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "Draft, Supplemental Baseline Human Health Risk Assessment for Load Line 1 Alternative Receptors at the Ravenna Army Ammunition Plant, Ravenna, Ohio, April 2004." This document, dated April 2004 and received at Ohio EPA on April 29<sup>th</sup>, was prepared by Shaw under Contract No. # DACA45-03-D-0026 and Delivery Order 0001. The following comments were generated from the review of the above-referenced document:

General Comment:

Comment # 1: The methods used in the document closely followed the Facility-wide Human Health Risk Assessors Manual (USACE 2004) and, therefore, minimal comments are needed for this report. The report is well written and clear. Below are a few specific comments that should be addressed in the Final baseline risk assessment report.

Specific Comments:

Comment # 2: Table ES-1 - Table ES-1 should be revised to bold locations that exceed an excess lifetime cancer risk level of 1E-5. The table presently identifies areas that exceed a 1E-6 and 1E-4 (in bold) risk level. In fact, it would be helpful to only identify areas and compounds that exceed a 1E-5 risk and hazard quotient or hazard index of 1.

Comment # 3: Load Line 1 Soil Aggregates, Figure 2-2 - Figure 2-2 identifies the aggregates used in the baseline risk assessment of LL1. Ohio EPA agrees with the use and locations of the aggregates. It should be pointed out in the report that the field-screening results were used in the determination of the boundaries of the aggregates. Section 2.1 identifies that field screening information was not included in the quantitative risk evaluation process. However, it may be helpful to note that the field-screening information was used to help delineate the extent of contamination.





- Comment # 4: Section 2.0, Data Evaluation - Lines 1 through 6 of page 2-3 identify that samples taken from the railroad beds were not included in the risk assessment. Additional information should be given regarding these data. Line 2 states that the samples are more representative of slag rather than soil. Is this based on physical properties or chemical characteristics? In addition, the sampling results should be presented in the document. Regardless of remedial/management issues surrounding slag, the soil or area around the railroad beds or under the slag should be characterized and evaluated analytically, to determine if contamination is present from a past spill, etc. This should be evaluated in the risk assessment, to provide information to risk managers for decision making. The railroad beds may make up a significant area and may be considered as their own exposure unit, as needed. Figure 2-2 identifies the railroad tracks as its own area of 2.2 acres and no information is presented on the aggregate in table ES-1 or other areas of the report. Risk estimations of the soils beneath the slag or the slag itself would be useful for future decision making for LL1. In addition, if the slag is acting as a source of contamination (e.g., potential source of metals), then this information is needed. Please revise the document to include an evaluation of the railroad beds.
- Comment # 5: Table 3-2, Parameters Used to Quantify Exposures for Each Medium and Receptor at Load Line 1 - Several values are given in bold in the resident subsistence farmer child column. These appear to be inadvertently placed in the table. Please remove the bold or clarify the reason for highlighting these values.
- Comment # 6: Section 5.2.1, Groundwater Results - Section 5.2.0, page 5-4, discusses potential risks associated with "background" concentrations of arsenic in ground water. Please note that the footnote of the table on page 5-4 is incorrect. The background values for groundwater were calculated using a 95% UTL, not UCL, as given in the text. In addition, please provide a reference to the source for background information/data on groundwater. Please tell the reader where to find the details on how background in groundwater was established at Ravenna - this could be done by including another footnote under the table on page 5-4.
- Comment # 7: Section 5.2.4, Summary of Chemicals of Concern for all Media and Receptors - Section 5.2.4 discusses risk management concepts related to "acceptable risks and hazards." Section 5.2.4 uses the 1E-4 risk level to define COCs with "large risks." Generally, the risk assessment report does not interject risk management concepts into the presentation of the risk assessment results. In addition, and given that the risk goal has been identified as a cumulative 1E-5, it would be better to identify compounds with an excess lifetime cancer that exceeds 1E-5 as being of concern, rather than those reaching a 1E-4 risk level. Please revise the table 5-8 and any



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
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PAGE 3

others that use the 1E-4 excess lifetime cancer risk level and revise accordingly.

Comment # 8: Section 6.0, Remedial Goal Options, page 6-2 - The end of this section should discuss how to account for multiple chemical exposures [for example, in cases where there are more than ten contaminants of concern (COC's) for a specific receptor], in order to ensure that the 1E-5 risk goal is applied cumulatively.

If you have any questions regarding these comments, 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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

cc: Eileen Mohr, Ohio EPA, DERR, NEDO  
Laurie Moore, Ohio EPA, OFFO, SWDO  
Brian Tucker, Ohio EPA, DERR, CO  
Bonnie Buthker, Ohio EPA, OFFO, SWDO  
David Cobb, Shaw  
Glen Beckham, USACE, Louisville  
David Brancato, USACE, Louisville  
John Jent, USACE, Louisville

ec: Mike Eberle, Ohio EPA, DERR, NEDO



State of Ohio Environmental Protection Agency

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

June 24, 2004

RE: RAVENNA ARMY AMMUNITION PLANT,  
PORTAGE/TRUMBULL COUNTIES,  
DRAFT PHASE II REMEDIAL  
INVESTIGATION REPORT FOR

LOAD LINE 2

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), and Risk Assessment personnel, Office of Federal Facilities Oversight (OFFO), Southwest District Office (SWDO), have received and reviewed the document: "Draft Phase II Remedial Investigation Report for Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated May 2004 and received at Ohio EPA, NEDO, on June 1, 2004, was prepared for the U.S. Army Corps of Engineers, Louisville District, by Shaw Environmental and Infrastructure (Shaw) under contract number DACA45-03-D-0026.

The above document was reviewed compared to the April 14, 2004 "Comment Response Table for Load Line 2 Preliminary Draft Phase II RI Report, May 2003." The document was revised in accordance with Ohio EPA comments, including risk related issues, and is approved. Please submit the final document to Ohio EPA.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1207.

Sincerely,

Vicki Deppisch  
Project Coordinator  
Division of Emergency and Remedial Response

VD/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Laurie Moore, Ohio EPA, SWDO, OFFO  
Brian Tucker, Ohio EPA, DERR, CO  
Eileen Mohr, Ohio EPA, DERR, NEDO  
Glen Beckham, USACE Louisville  
David Brancato, USACE Louisville

LTC Tadsen, RVAAP  
JoAnn Watson, AEC  
Paul Zorko, USACE Louisville  
John Jent, USACE Louisville  
Kevin Jago, SAIC  
Dave Cobb, Shaw

ec: Mike Eberle, Ohio EPA, DERR, NEDO







State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

August 2, 2004

RE: RAVENNA ARMY AMMUNITION  
PLANT, PORTAGE/TRUMBULL  
COUNTIES, FINAL PHASE II  
REMEDIAL INVESTIGATION  
REPORT FOR LOAD LINE 2

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received the document "Final Phase II Remedial Investigation Report for Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated July 2004 and received at Ohio EPA, NEDO, on July 30, 2004, was prepared for the U.S. Army Corps of Engineers, Louisville District, by Shaw Environmental and Infrastructure (Shaw), under contract number DACA45-03-D-0026. The text version has been revised and revised cover and title pages have been provided for the appendix volume, as no text changes were made to this portion of the document. An electronic copy was also provided.

Ohio EPA's letter, dated June 24, 2004, and most recent correspondence regarding the "Draft Phase II Remedial Investigation Report for Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio" had been revised and was approved by Ohio EPA. The "Final Phase II Remedial Investigation Report for Load Line 2 at Ravenna Army Ammunition Plant, Ravenna, Ohio" is also approved.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1207.

Sincerely,

Vicki Deppisch  
Project Coordinator  
Division of Emergency and Remedial Response

VD/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Brian Tucker, Ohio EPA, DERR, CO  
JoAnn Watson, AEC  
Paul Zorko, USACE Louisville  
David Brancato, USACE Louisville  
Dave Cobb, Shaw

Laurie Moore, Ohio EPA, SWDO, OFFO  
LTC Tadsen, RVAAP  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville  
Kevin Jago, SAIC  
Eileen Mohr, Ohio EPA, DERR, NEDO

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Bob Taft, Governor  
Christopher Jones, Director

June 24, 2004

RE: RAVENNA ARMY AMMUNITION  
PLANT, PORTAGE/TRUMBULL  
COUNTIES, DRAFT PHASE II  
REMEDIAL INVESTIGATION  
REPORT FOR ~~LOAD LINE 3~~

Mr. Mark Patterson, Env. Program Mgr.  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, OH 44266

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR); and Risk Assessment personnel, Office of Federal Facilities Oversight (OFFO), Southwest District Office (SWDO), have received and reviewed the document: "Draft Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated June 2004 and received at Ohio EPA, NEDO, on June 4, 2004, was prepared for the U.S. Army Corps of Engineers, Louisville District, by Shaw Environmental and Infrastructure (Shaw) under contract number DACA45-03-D-0026.

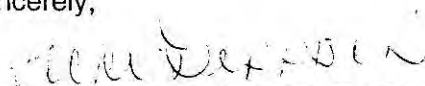
The above document was reviewed compared to the April 14, 2004 "Comment Response Table for Load Line 3 Preliminary Draft Phase II RI Report, May 2003." The document was revised in accordance with Ohio EPA comments, including risk related issues, and is approved. Please submit the final document to Ohio EPA.

Please note, for all future investigations:

- (1) Use one of the backup PIDs during drilling when the initial PID fails; and
- (2) Record turbidity readings on the development logs.

If you have any questions concerning this correspondence, please call me at (330) 963-1207.

Sincerely,

  
Vicki Deppisch, Project Coordinator  
Division of Emergency and Remedial Response

VD/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Brian Tucker, Ohio EPA, DERR, CO  
JoAnn Watson, AEC  
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David Brancato, USACE Louisville  
Dave Cobb, Shaw  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

August 2, 2004

RE: RAVENNA ARMY AMMUNITION  
PLANT, PORTAGE/TRUMBULL  
COUNTIES, FINAL PHASE II  
REMEDIAL INVESTIGATION  
REPORT FOR **LOAD LINE 3**

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received the document "Final Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated July 2004 and received at Ohio EPA, NEDO, on July 30, 2004, was prepared for the U.S. Army Corps of Engineers, Louisville District, by Shaw Environmental and Infrastructure (Shaw), under contract number DACA45-03-D-0026. The test version has been revised and revised cover and title pages have been provided for the appendix volume, as no text changes were made to this portion of the document. An electronic copy was also provided.

Ohio EPA's letter, dated June 24, 2004, and the most recent correspondence regarding the "Draft Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio" had been revised and was approved by Ohio EPA. The "Final Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio" is also approved.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1207.

Sincerely,

Vicki Deppisch  
Project Coordinator  
Division of Emergency and Remedial Response

VD/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Brian Tucker, Ohio EPA, DERR, CO  
JoAnn Watson, AEC  
Paul Zorko, USACE Louisville  
David Brancato, USACE Louisville  
Dave Cobb, Shaw

Laurie Moore, Ohio EPA, SWDO, OFFO  
LTC Tadsen, RVAAP  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville  
Kevin Jago, SAIC  
Eileen Mohr, Ohio EPA, DERR, NEDO

ec: Mike Eberle, Ohio EPA, DERR, NEDO







State of Ohio Environmental Protection Agency

**Northeast District Office**

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

July 2, 2004

RE: RAVENNA ARMY AMMUNITION PLANT,  
PORTAGE/TRUMBULL COUNTIES, DRAFT  
PHASE II REMEDIAL INVESTIGATION  
REPORT FOR **LOAD LINE 4**

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

Dear Mr. Patterson:

Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), and Risk Assessment personnel, Office of Federal Facilities Oversight (OFFO), Southwest District Office (SWDO) have received and reviewed the document "Draft Phase II Remedial Investigation Report for Load Line 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated June 2004 and received at Ohio EPA, NEDO, on June 8, 2004, was prepared for the U.S. Army Corps of Engineers, Louisville District, by Shaw Environmental and Infrastructure (Shaw) under contract number DACA45-03-D-0026.

The above document was reviewed compared to the April 22, 2004 "Comment Response Table for Load Line 4 Preliminary Draft Phase II RI Report, May 2003." Although the document was revised in accordance with many of Ohio EPA comments, there are still some outstanding comments that need to be addressed. Specific risk related comments generated by OFFO, beginning on page 27 of the Comment Response Table, were all adequately addressed. The following comments from the Comment Response Table, Ohio EPA DERR - NEDO 6/26/03, still need to be addressed before Ohio EPA document approval:

**Specific comments needing additional information/response:**

1. Comment # 7 General

The response indicates the "Use of Phase I RI is also presented in Section 4.1" has been added in the uncertainty section of the HHRA. This could not be located. Please provide line and page numbers.

2. Comment # 23, page 1-10, line 3:

Response indicates "text has been revised to indicate that OHARNG - RTLS training is restricted to areas outside of AOCs. No OHARNG-RTLS training is conducted within Load Line 4." The text change could not be located. Please provide page and line numbers.

3. Comment # 31, page 3-2, table 3-1, areas 18, 19, and 21:

Response indicates "Sampling rationale for Areas 18, 19, and 21 has been revised to read, "Define the extent of contamination outside of the building slabs in soil and obtain soil data from beneath the floor slab." The text changes were not located for Areas 19 and 21. Area 18 was changed. Please revise table 3-1.

4. Comment # 46, figures 4-4 thru 4-13, figures 4-18 thru 4-27, figures 4-18 thru 4-27:

The response did not address the recommendation "Figures 4-18 through 4-27 do not present





Mr. Mark Patterson  
Ravenna Army Ammunition Plant  
July 2, 2004  
Page 2

much usable information considering the paucity of subsurface data. Refer to the general comment above (# 45) regarding whether or not the vertical extent of contamination has been determined." Please provide a response to this portion of the recommendation.

5. Comment # 60, page 4-150, line 19:

The response indicates "This information has been added as requested and in Chapter 6.0." The information could not be located. Please provide page and line numbers.

6. Comment # 118, Appendix C

The comment response is regarding turbidity and LL4mw-197 and LL4mw-198 development logs. The response paragraph should be added to the text at the appropriate location.

7. Comment # 124, Appendix H:

The response provides clarification regarding laboratory difficulties. This paragraph should be added to the text at the appropriate location.

#### **General Comments:**

1. Comment # 5, 51, 52, 71, 100 and 103:

These comments regard data gaps. Shaw has indicated they will be preparing a white paper outside of the RI report process to plan and outline additional characterization needs to fill subsurface soil data gaps at Load Line 4 which should address the above comments.

2. Comment # 10, 45, and 63:

These comments regard re-thinking the approach for using the Jenkins field method to guide sampling activities. Future discussions should address the above comments.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1207.

Sincerely,



Vicki Deppisch  
Project Coordinator  
Division of Emergency and Remedial Response

VD/ams

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Laurie Moore, Ohio EPA, SWDO, OFFO  
Brian Tucker, Ohio EPA, DERR, CO  
LTC Tadsen, RVAAP  
JoAnn Watson, AEC  
Glen Beckham, USACE Louisville  
Paul Zorko, USACE Louisville

John Jent, USACE Louisville  
Dave Cobb, Shaw  
Eileen Mohr, Ohio EPA, DERR, NEDO  
David Brancato, USACE Louisville  
Kevin Jago, SAIC

ec: Mike Eberle, Ohio EPA, DERR, NEDO



State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

September 13, 2004

RE: RAVENNA ARMY AMMUNITION  
PLANT, PORTAGE /TRUMBULL  
COUNTIES, FINAL PHASE II  
REMEDIAL INVESTIGATION  
REPORT FOR LOAD LINE 4

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document "Final Phase II Remedial Investigation Report for Load Line 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated September 2004 and received at Ohio EPA, NEDO, on September 7, 2004, was prepared for the U.S. Army Corps of Engineers, Louisville District, by Shaw Environmental and Infrastructure (Shaw) under contract number DACA45-03-D-0026.

The above document was reviewed compared to the revised July 26, 2004 "Comment Responses Draft Phase II Remedial Investigation Report for Load Line 4." All comment responses were adequately addressed and the document is approved.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1207.

Sincerely,

Vicki Deppisch  
Project Coordinator  
Division of Emergency and Remedial Response

VD/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Laurie Moore, Ohio EPA, OFFO, SWDO  
Eileen Mohr, Ohio EPA, DERR, NEDO  
Todd Fisher, Ohio EPA, DERR, NEDO  
Paul Zorko, USACE Louisville  
David Brancato, USACE Louisville  
Kevin Jago, SAIC

Brian Tucker, Ohio EPA, DERR, CO  
Glen Beckham, USACE Louisville  
LTC Tadsen, RVAAP  
JoAnn Watson, AEC  
John Jent, USACE Louisville  
Dave Cobb, Shaw

ec: Mike Eberle, Ohio EPA, DERR NEDO







State of Ohio Environmental Protection Agency

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Bob Taft, Governor  
Christopher Jones, Director

January 28, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
~~LOAD LINE 12 DRAFT FINAL~~  
PHASE II RI REPORT

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the two-volume document entitled: "Draft Final, Phase II Remedial Investigation Report for the Load Line 12 at the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated October 2003 and received at Ohio EPA on October 7, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District by Science Applications International Corporation (SAIC), under contract number DACA62-00-D-0001, delivery order number CY06.

This document, as well as the Response to Comments (RTC) Table, was reviewed by personnel from Ohio EPA's Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR); and Division of Drinking and Ground Waters (DDAGW); and the Office of Federal Facilities Oversight, Southwest District Office (OFFO/SWDO).

Ohio EPA has determined that all requested changes to the text have been made, and finds the associated responses to comments acceptable. Please proceed with the issuance of the Final Remedial Investigation (RI) Report.

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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

cc: Eileen Mohr, Ohio EPA, NEDO, DERR  
Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Laurie Moore, Ohio EPA, SWDO, OFFO

Paul Zorko, USACE, Louisville  
Kevin Jago, SAIC, Oak Ridge  
Glen Beckham, USACE, Louisville

ec: Mike Eberle, Ohio EPA, NEDO, DERR







State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

March 25, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
LOAD LINE 12 DRAFT FINAL  
PHASE II RI REPORT

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the two-volume document entitled: "Final, Phase II Remedial Investigation Report for the Load Line 12 at the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated March 2004 and received at Ohio EPA on March 15, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District, by Science Applications International Corporation (SAIC), under contract number DACA62-00-D-0001, delivery order number CY06.

Ohio EPA has determined that all requested changes to the text have been made and considers this report and the entire Phase II Remedial Investigation complete.

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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

cc: Eileen Mohr, Ohio EPA, NEDO, DERR  
Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Laurie Moore, Ohio EPA, SWDO, OFFO  
Paul Zorko, USACE, Louisville  
Kevin Jago, SAIC, Oak Ridge  
Glen Beckham, USACE, Louisville

ec: Mike Eberle, Ohio EPA, NEDO, DERR



State of Ohio Environmental Protection Agency

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TELE: (330) 963-1200 FAX: (330) 487-0769  
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Bob Taft, Governor  
Bruce Johnson, Lieutenant Governor  
Joseph P. Koncelik, Director

March 07, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
PRELIMINARY ~~DRAFT FUZE AND~~  
~~BOOSTER RI REPORT~~

Mr. Mark Patterson  
Environmental Program 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 two-volume document entitled: "Draft, Fuze and Booster Quarry Ponds (AOC-16), Phase I/Phase II Remedial Investigation of the Fuze and Booster Quarry Landfill/Ponds, Ravenna Army Ammunition Plant, Ravenna, Ohio." (Please note that this report should have been identified as a Preliminary-Draft, not Draft report.) This document, dated January 2004, and received at Ohio EPA, Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR) on January 28, 2005, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District by SpecPro, under contract number DAAA09-01-G-009, delivery order number 0012.

This document was reviewed by Ohio EPA personnel in NEDO's DERR and NEDO's Division of Drinking and Ground Waters (DDAGW), and the enclosed comment table represents a compilation of comments from all reviewers.

The contractor is responsible for ensuring that the comment response table (CRT) that is submitted in response to these comments provides specific verbiage that will be utilized in the revised document. Responses such as "text will be changed" or "acknowledged," etc., are no longer acceptable. If the RTC matrix is submitted without specific language changes included, the matrix will not be reviewed by Ohio EPA, and a letter will be submitted to your attention and to all recipients of this correspondence indicating that fact. This approach was recently agreed upon by the Army, USACE, and Ohio EPA.

This area of concern (AOC) is being rolled into a high priority performance-based contract (PBC). It is Ohio EPA's understanding that this contract will be awarded to the selected bidder in the very near future. As agreed during recent milestone and project management meetings, the milestone date under the Orders for the final report issuance will be determined by the approval (by Ohio EPA) of the schedule in the project management plan for the



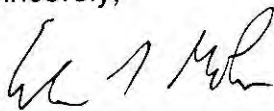


MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
MARCH 7, 2005  
PAGE 2

selected PBC contractor. Be advised that target dates for this project would be having set up a comment resolution meeting (if needed) within fifteen (15) calendar days and a revised document (draft) into Ohio EPA within thirty (30) calendar days of receipt of this correspondence.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

enclosure

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Laurie Moore, Ohio EPA, SWDO, OFFO  
Conni McCambridge, Ohio EPA, NEDO, DDAGW  
LTC Tom Tadsen, OHARNG RTLS  
MAJ Ed Meade, OHARNG, RTLS  
MAJ Kim O'Keefe, NGB  
Randy Nida, NGB  
JoAnn Watson, AEC  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville  
Paul Zorko, USACE Louisville  
Dave Brancato, USACE Louisville  
Chantelle Carroll, SpecPro

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR

**PHASE I/PHASE II REMEDIAL INVESTIGATION OF THE FUZE AND BOOSTER QUARRY/LANDFILL PONDS  
RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO  
REVIEWERS: EILEEN T. MOHR AND CONNI McCAMBRIDGE  
DATE: MARCH 07, 2005**

<b>Cmt #</b>	<b>Line/ Page #</b>	<b>Comment</b>	<b>Recommendation</b>	<b>Response</b>
1	General	The date of the report is listed as January 2004.	Revise to read January 2005.	
2	General	Given that this report does not contain fate and transport analyses nor human health and ecological risk assessments, in some senses this document does not represent a RI, and is more like an ESI.	It is Ohio EPA's understanding that this AOC will be rolled into a PBC contract and that the selected PBC contractor will be required to finalize the RI. As such, the selected contractor should also prepare the fate and transport, and human health and ecological risk assessments.	
3	General	Thanks for numbering the lines. It really helps.	No text change required.	
4	General	For reports at RVAAP, the first iteration of a report is "preliminary-draft", not draft.	The next version of the report should be stamped "draft." In the future, all first round reports need to be stamped "preliminary-draft." Preliminary-draft and final reports are milestones under the Orders.	
5	General	The report does not contain an executive summary (ES).	Please provide an ES that is consistent with the main body of the text.	
6	General	Please ensure that the correct spelling of "fuze" is utilized throughout the text.	Replace "fuse" with "fuze" where necessary.	



7	General	Several acronyms used in the text of the report did not appear on the acronym list, for example: NPDES, CSM, SESOIL, and OSHA.	Please ensure all acronyms used in the text appear in the acronym list.	
8	Pg 5, lines 38-41	This section describes the general boundaries of the installation.	Add an eastern boundary to the description.	
9	Pg 6, line 19	The text references the storage of bulk explosives at RVAAP.	Either remove this from the text or reference the date that all bulk explosives were removed from the installation.	
10	Pg 10, fig 1-4	There are several dark circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	
11	Pg 11, line 30	The text references the fuze and booster RCRA unit.	Remove "RCRA" from the revised text.	
12	Pg 12, lines 9-10	The text indicates that the AOC boundaries are shown on Figure 1-4. However, in cross-referencing the figure, this does not appear to be the case.	If the areas delineated on figure 1-4 actually represent the AOC boundaries, this should be stated in the figure's legend.	
13	Pg 14, lines 35-36	The text indicates that this is a Phase II RI report.	Please revise to read: Phase 1/Phase II RI report.	
14	Pg 16, fig 2-1	The presented map is entitled: "Glacial Geology of RVAAP."	Please provide the source for this map.	
15	Pg 17, line 6	The text references the Kent Till.	Should this read Lavery Till?	
16	Pg 17, line 8	The text references the Cuyahoga Formation.	Change to Cuyahoga Group.	

17	Pg 17, line 13	The text references the Cuyahoga Formation.	Change to Cuyahoga Group.	
18	Pg 18, fig 2-2	The presented map is entitled: "Bedrock Geology of RVAAP."	Please provide the source for this map.	
19	Pg 18, fig 2-2	The legend box references the Cuyahoga Formation.	Change to Cuyahoga Group.	
20	Pg 19, fig 2-3	The presented figure is entitled: "Bedrock Stratigraphy of RVAAP."	Please provide the source for this figure.	
21	Pg 20, lines 17-18	The text indicates that a generalized geologic cross-section from west to east is presented in figure 2-4.	A map illustrating the location of the cross section within the boundaries of the AOC should be included.	
22	Pg 20, line 33	The text indicates that monitoring well FBQmw-169 has 4 feet of sand. However, this sand layer is not depicted on the cross section in figure 2-4.	Rectify the disconnect.	
23	Pg 22, line 7	Should monitor well FBQmw-169 be added to the list of wells that did not encounter bedrock?	Add FBQmw-169 to this list after the well log is consulted to ensure that bedrock was not encountered.	
24	Pg 23, lines 6-7	The text indicates that the "... highest yields come from the true quartz-pebble conglomerate facies..."	Change the text to read: "... highest yields come from the quartzite pebble conglomerate facies..."	
25	Pg 24, section 2.4.2	The text indicates that laboratory analyses were performed on several representative Shelby tube samples. The location of the laboratory analytical data sheets containing information on these samples was not provided in the text.	Provide text references for the location of the laboratory results within the report.	



26	Pg 25, table 2-1	The table indicates that laboratory hydraulic conductivities were determined for the sandstone in FBQmw-172, FBQmw-173 and FBQmw-174.	Please clarify how this was determined.	
27	Pgs 25-26, table 2-1	There are no footnotes to this table which indicate what is meant by "K" or "N/A."	Provide an explanation in the revised text.	
28	Pg 27, fig 2-5	The groundwater elevations at FBQmw-176 were reported to be 1,123 and 1,124 feet. However, the 1,120 foot contour line is very close to this well.	Please check water table elevations in all monitoring wells and the contour values in the potentiometric map to ensure that they are consistent. Make the appropriate adjustments in the text.	
29	Pg 27, fig 2-5	This figure represents the groundwater elevation contours of wells installed in both unconsolidated materials and in bedrock. Combining water table elevations from monitoring wells in unconsolidated sediments and bedrock, to generate a single potentiometric map was not explained in the text.	The combined use of unconsolidated and bedrock elevations should be clarified.	
30	Pg 27, fig 2-5	This figure does not contain any arrow on the map to illustrate the inferred groundwater flow direction.	Add arrow(s) to illustrate the inferred groundwater flow direction.	
31	Pg 27, fig 2-5	The figure did not contain information as to what month/day/time that the data represented.	Add this information to the revised figure.	
32	Pg 27, fig 2-5	There are several grey circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	

33	Pg 28, table 2-2	The table does not indicate whether any of the monitor well(s) characterize the quality of groundwater in an upgradient direction from the AOC. This issue was also not clarified in the rest of the report (although it is touched on in table 3-3).	Provide clarification in the revised text.	
34	Pg 28, table 2-2	This table contains groundwater data. No information appears in the 11/19/03 depth to water and groundwater elevation cells for monitor well FBQmw-169.	Please provide an explanation in an appropriate portion of the text and add a footnote to the revised table.	
35	Pg 28, line 13	The text references Phase II RI field work.	Please revise to read: Phase 1/Phase II RI fieldwork.	
36	Pg 29, lines 9-10	This portion of the text discusses installation fencing and security patrols. Although this may currently be the situation, it has been made clear in recent discussions that the perimeter fence and road patrols may not always be maintained.	The text should be revised to indicate that this is the current situation, but that in all likelihood, this will not remain the case in the future.	
37	Pgs 31-32, table 2-3	This table contains information on state endangered, threatened, potentially threatened, etc., species.	This is not the most up to date list. Please contact Tim Morgan (RTLS) and ODNR for the most recent listings. For example, this table still lists the river otter which was de-listed a couple of years ago.	
38	Pg 33, line 35	The text states that "very limited hydrogeologic and analytical data existed for groundwater for the Fuze and Booster Quarry Landfill/Ponds AOC prior to this investigation." The text did not discuss what information was previously available.	Please clarify in the revised text, what, if any hydrogeologic data was available prior to this investigation.	



39	Pg 35, lines 18-19	The text indicates that 100 soil samples were collected throughout the Fuze and Booster Quarry AOC.	Distinguish between the number of samples taken at the fuze and booster AOC and the number of samples obtained at the 40 mm range.	
40	Pg 35, lines 32-33	The text indicates that field conditions prevented the collection of Shelby tube samples at 6 locations.	Please provide additional information in the revised text as to what prevented the collection of these samples.	
41	Pg 36, fig 3-1	There are several dark circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	
42	Pgs 37-43, table 3-1	This table delineates the samples obtained during the Fuze and Booster Phase I/Phase II RI. During this effort, samples were also collected at the adjacent 40 mm range.	In the revised table, add a notation in the first column (where applicable) if the sample was collected from the 40 mm AOC.	
43	Pg 47, fig 3-2	There are several dark circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	
44	Pg 51, line 18	The text indicates how the sediment samples will be collected.	Revise the text to indicate past tense.	
45	Pg 52, line 1	The text essentially indicates that surface water samples were obtained to evaluate if surface water is acting as a secondary source of contamination for surface water.	Remove the second reference to surface water that appears on pg 52, line 1.	
46	Pg 54, fig 3-3	There are several dark circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	
47	Pg 55, fig 3-4	There are several dark circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	

48	Pg 61, lines 28-31	The text in this section references an "excess number" of QA/QC samples that were collected, relative to the original specifications of this project.	This portion of the text is not clear. In addition to providing clarification, please indicate what impact this may have had on the project.	
49	Pg 66, lines 25-26	The text indicates that additional qualification of the data may be required based upon the validation process. However, in the text just prior to this there is the indication that the validation process has been completed. As such, it should have been clear as to whether or not additional validation was required.	Please rectify the apparent disconnect.	
50	Prior to table 4-3	Please prepare a summary table of analytical results that is independent of whether or not the results are above the installation-wide background. This table should contain all detected results. Additionally, if the reported concentrations were below the analytical detection limit, the result should be reported as < xx; and not be represented by an empty cell.	Please make requested revisions.	
51	Pgs 74-99, table 4-3	This table, if retained in the revised document, should have non-detected analytes being reported as < xx, rather than being represented by an empty cell.	Please make the requested revisions.	
52	Pgs 74-99, table 4-3	The footnote qualifiers appear on the second page of this table.	Please place qualifiers at the end of the table.	
53	Pgs 74-99, table 4-3	The qualifier "JP" is not defined.	Provide a definition for "JP."	



54	Pg 101, fig 4-1	There are several grey circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	
55	Pg 101, fig 4-1	Please clarify how it was determined that the explosives and propellant compounds would be depicted as they are. It is not clear what the significance of the groupings represent.	Please clarify.	
56	Pg 101, fig 4-1	This figure would provide more information if there were text boxes associated with the various sample locations and the concentrations of the various compounds listed.	Please revise.	
57	Pg 102, fig 4-2	There are several grey circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	
58	Pg 102, fig 4-2	Please clarify how it was determined that the inorganic compounds would be depicted as they are. It is not clear what the significance of the groupings represent.	Please clarify.	
59	Pg 102, fig 4-2	Why were only inorganics which exceeded installation-wide background depicted on this figure?	Please clarify and revise.	

60	Pg 102, fig 4-2	This figure would provide more information if there were text boxes associated with the various sample locations and the concentrations of the various compounds listed (and not just those which were greater than background). If this would produce a figure that would be too cluttered, select (and justify the selection) of various analytes to represent on the figure.	Please revise.	
61	Pg 104, lines 27-34	The text in this section discusses the prevalence of VOC detection. It is noted that some of the listed compounds like methylene chloride and acetone that were frequently detected are common laboratory contaminants.	Contact the lab and discuss with them the issue of consistently finding lab contamination in the environmental samples. This is not acceptable.	
62	Prior to table 4-5	Please prepare a summary table of analytical results that is independent of whether or not the results are above the installation-wide background. This table should contain all detected results. Additionally, if the reported concentrations were below the analytical detection limit, the result should be reported as < xx; and not be represented by an empty cell.	Please make requested revisions.	
63	Pgs 108-123, table 4-5	This table, if retained in the revised document, should have non-detected analytes being reported as < xx, rather than being represented by an empty cell.	Please make the requested revisions.	
64	Pgs 108-123, table 4-5	The footnote qualifiers appear on the second page of this table.	Please place qualifiers at the end of the table.	



65	Pg 125, fig 4-3	There are several grey circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	
66	Pg 125, fig 4-3	Please clarify how it was determined that the explosives and propellant compounds would be depicted as they are. It is not clear what the significance of the groupings represent.	Please clarify.	
67	Pg 125, fig 4-3	This figure would provide more information if there were text boxes associated with the various sample locations and the concentrations of the various compounds listed.	Please revise.	
68	Pg 125, fig 4-3	The legend box indicates that there were several sample locations where sub-surface samples were not obtained.	Expand the footnote to indicate that the text contains information as to why the samples were not obtained; or provide a cross-reference to the appropriate table in the revised text.	
69	Pg 126, fig 4-4	There are several black circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	
70	Pg 126, fig 4-4	Please clarify how it was determined that the inorganic compounds would be depicted as they are. It is not clear what the significance of the groupings represent.	Please clarify.	
71	Pg 126, fig 4-4	Why were only inorganics which exceeded installation-wide background depicted on this figure?	Please clarify and revise.	

72	Pg 126, fig 4-4	This figure would provide more information if there were text boxes associated with the various sample locations and the concentrations of the various compounds listed (and not just those which were greater than background). If this would produce a figure that would be too cluttered, select (and justify the selection) of various analytes to represent on the figure.	Please revise.	
73	Pg 126, fig 4-4	The legend box indicates that there were several sample locations where sub-surface samples were not obtained.	Expand the footnote to indicate that the text contains information as to why the samples were not obtained; or provide a cross-reference to the appropriate table in the revised text.	
74	Pg 127, lines 17-27	The text in this section discusses the prevalence of VOC detection. It is noted that some of the listed compounds like methylene chloride and acetone that were frequently detected are common laboratory contaminants.	Contact the lab and discuss with them the issue of consistently finding lab contamination in the environmental samples. This is not acceptable.	
75	Pg 127, lines 43-45	This portion of the text describes the analytical suite for sediment samples. It is noted that grain size is not listed.	Please clarify whether or not grain size analyses were conducted on the sediment samples.	
76	Pg 130, table 4-6	The table indicates that manganese was eliminated as a SRC based upon an essential nutrient screen. This is not correct.	Please revise the table to indicate that manganese is a SRC.	



77	Prior to table 4-7	Please prepare a summary table of analytical results that is independent of whether or not the results are above the installation-wide background. This table should contain all detected results. Additionally, if the reported concentrations were below the analytical detection limit, the result should be reported as < xx; and not be represented by an empty cell.	Please make requested revisions.	
78	Pgs 132-146, table 4-7	This table, if retained in the revised document, should have non-detected analytes being reported as < xx, rather than being represented by an empty cell.	Please make the requested revisions.	
79	Pgs 132-146, table 4-7	The footnote qualifiers appear on the third page of this table.	Please place qualifiers at the end of the table.	
80	Pgs 132-146, table 4-7	The qualifier "JP" is not defined.	Provide a definition for "JP."	
81	Pg 148, fig 4-5	There are several black circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	
82	Pg 148, fig 4-5	This figure would provide more information if there were text boxes associated with the various sample locations and the concentrations of the various compounds listed.	Please revise.	
83	Pg 150, fig 4-6	There are several black circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	

84	Pg 150, fig 4-6	Please clarify how it was determined that the inorganic compounds would be depicted as they are. It is not clear what the significance of the groupings represent.	Please clarify.	
85	Pg 150, fig 4-6	Why were only inorganics which exceeded installation-wide background depicted on this figure?	Please clarify and revise.	
86	Pg 150, fig 4-6	This figure would provide more information if there were text boxes associated with the various sample locations and the concentrations of the various compounds listed (and not just those which were greater than background). If this would produce a figure that would be too cluttered, select (and justify the selection) of various analytes to represent on the figure.	Please revise.	
87	Pg 152, lines 16-25	The text in this section discusses the prevalence of VOC detection. It is noted that some of the listed compounds like methylene chloride and acetone that were frequently detected are common laboratory contaminants.	Contact the lab and discuss with them the issue of consistently finding lab contamination in the environmental samples. This is not acceptable.	
88	Pg 152, lines 27-29	The text indicates that in July 2004, several sediment samples were collected and analyzed for perchlorate.	Please provide additional clarification in the revised text as to how and why this decision was made.	
89	Pg 154, fig 4-7	There are several black circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	



90	Pg 154, fig 4-7	Please clarify how it was determined that the SVOCs, VOC, pesticides and PCBs would be depicted as they are. It is not clear what the significance of the groupings represent.	Please clarify.	
91	Pg 154, fig 4-7	This figure would provide more information if there were text boxes associated with the various sample locations and the concentrations of the various compounds listed.	Please revise.	
92	Pg 155, lines 13-15	The text in this section indicates that two surface water samples were obtained for perchlorate analyses in June 2004. Page 164 lines 36-37 present the results. The text on page 152, lines 27-29 and pg 178 lines 31-33 indicate that sediment samples were obtained in July 2004 for perchlorate analyses. It is not clear as to whether the sediment samples were collected as a response to the detections in the surface water. If they were, it is not clear why additional surface water samples were not obtained and analyzed for perchlorate.	Please provide an explanation. Additional perchlorate sampling may need to be conducted.	
93	Prior to table 4-9	Please prepare a summary table of analytical results that is independent of whether or not the results are above the installation-wide background. This table should contain all detected results. Additionally, if the reported concentrations were below the analytical detection limit, the result should be reported as < xx; and not be represented by an empty cell.	Please make requested revisions.	

94	Pgs 158-161, table 4-9	This table, if retained in the revised document, should have non-detected analytes being reported as < xx, rather than being represented by an empty cell.	Please make the requested revisions.	
95	Pgs 158-161, table 4-9	The footnote qualifiers appear on the second page of this table.	Please place qualifiers at the end of the table.	
96	Pg 162, fig 4-8	There are several black circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	
97	Pg 162, fig 4-8	Please clarify how it was determined that the SRCs in surface water would be depicted as they are. It is not clear what the significance of the groupings represent.	Please clarify.	
98	Pg 162, fig 4-8	This figure would provide more information if there were text boxes associated with the various sample locations and the concentrations of the various compounds listed.	Please revise.	
99	Pgs 166-167, table 4-10	The table indicates that the summary statistics were only compared with the site background criteria. This data was not compared to MCLs.	Revise the table to ensure that MCLs are listed in addition to the installation background criteria.	
100	Pgs 166-167, table 4-10	The table should also have a footnote that indicates that analytes may have been eliminated as SRCs because they are less than the installation background.	Please provide a footnote.	



101	Prior to table 4-10	Please prepare a summary table of analytical results that is independent of whether or not the results are above the installation-wide background. This table should contain all detected results. Additionally, if the reported concentrations were below the analytical detection limit, the result should be reported as < xx; and not be represented by an empty cell.	Please make requested revisions.	
102	Pgs 168-169, table 4-11	This table, if retained in the revised document, should have non-detected analytes being reported as < xx, rather than being represented by an empty cell.	Please make the requested revisions.	
103	Pgs 168-169, table 4-11	The footnote qualifiers appear on the first page of this table.	Please place qualifiers at the end of the table.	
104	Pg 170, fig 4-9	There are several black circles that appear on the figure, with no corresponding explanation in the legend.	Either provide an explanation for this symbol, or remove from the figure.	
105	Pg 170, fig 4-9	This figure would provide more information if there were text boxes associated with the various sample locations and the concentrations of the various compounds listed.	Please revise.	
106	Pg 170, fig 4-9	Please clarify how it was determined that the SRCs would be depicted as they are. It is not clear what the significance of the groupings represent.	Please clarify.	
107	Pg 171, line 4	Heading is unclear.	Revise heading to read: "Wells Screened in Unconsolidated Materials."	

108	Pg 171, line 12	Heading is unclear.	Revise heading to read: "Wells Screened in Bedrock."	
109	Pg 171, line 36	Text revision requested.	Revise line to read: "...collected from monitor wells screened in unconsolidated materials and bedrock."	
110	Pg 171, line 38	Heading is unclear.	Revise heading to read: "Wells Screened in Unconsolidated Materials."	
111	Pg 172, line 1	Heading is unclear.	Revise heading to read: "Wells Screened in Bedrock."	
112	Pg 172, line 12	Heading is unclear.	Revise heading to read: "Wells Screened in Unconsolidated Materials."	
113	Pg 172, lines 19-26	The text in this section discusses the prevalence of VOC detection. It is noted that some of the listed compounds like methylene chloride and acetone that were frequently detected are common laboratory contaminants.	Contact the lab and discuss with them the issue of consistently finding lab contamination in the environmental samples. This is not acceptable.	
114	Pg 172, line 31	Heading is unclear.	Revise heading to read: "Wells Screened in Bedrock."	
115	Pg 172, lines 38-41	The text in this section discusses the prevalence of VOC detection. It is noted that some of the listed compounds like methylene chloride and acetone that were frequently detected are common laboratory contaminants.	Contact the lab and discuss with them the issue of consistently finding lab contamination in the environmental samples. This is not acceptable.	
116	Pg 180, line 8	Heading is unclear.	Revise heading to read: "Wells Screened in Unconsolidated Materials."	
117	Pg 180, line 37	Heading is unclear.	Revise heading to read: "Wells Screened in Bedrock."	



118	Pg 182, line 10	Land use controls will be required at this AOC.	Remove "if required" from the sentence.	
119	Pg 182	Additional testing in the surface water and groundwater for perchlorate needs to be conducted.	Add an additional bullet to the recommendation section.	
120	Appendix C	Make sure all required changes to the field logs are indicated by a one line strike out and initialed.	No changes required to these field notes. Adhere to this protocol in future projects.	
121	Appendix C	Not all records were signed by the data recorder or QA checked.	Ensure that this is done in future projects.	
122	Appendix C	Final documented turbidity readings of >5 NTUs were noted on the following field logs: FBQmw-166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176 and 177.	Please provide a discussion concerning these elevated turbidity readings and what procedures were implemented to obtain a representative groundwater sample.	
123	Appendix D	Make sure all required changes to the field logs are indicated by a one line strike out and initialed.	No changes required to these field notes. Adhere to this protocol in future projects.	
124	Appendix D	Many of the sketch maps provided would make it next to impossible to determine the relative position of the obtained samples because there are no defining landmarks, or only one pond is depicted and the pond is not labeled.	In future projects, provide more detailed sketch maps.	
125	Appendix D	Some of the field logs are almost illegible.	Have field crews write more legibly in future projects.	
126	Appendix D	Blank pages are noted.	If these were intentionally left blank, this should be stated on the page.	
127	Appendix D	Some field logs only contain the first name of the person conducting the work.	Provide full names in all future projects.	

128	Appendix D	Notations such as "same as a/a" appear in the logs.	Avoid the use of undefined acronyms. Logs should be specific.	
129	Appendix D	Completion dates do not appear on many of the HTRW drilling logs.	All information should be filled in on drilling logs.	
130	Appendix E	IDW report.	Concur with disposal selection.	
131	Appendix F	Not all logs are QA checked.	Ensure that this is done in future projects.	
132	Appendix F	Signatures are missing on the HTRW logs.	All information should be filled in on drilling logs.	
133	Appendix H	Chain of Custody (COC) reports were not provided.	Provide the COCs	
134	Appendix H	All data should be included in this section, even rejected data.	Revise the data tables so that all data is reported.	
135	Appendix H	On page 3 of 212, qualifiers are defined. However, it is noted that the "J" qualifier does not appear.	Ensure that all qualifiers used in the report are defined.	
136	Appendix H	Some units are incorrect. For example for both surface water (pg 173) and groundwater (pg 199) the units used are ug/kg. This is not correct, as it should be ug/L.	Check all the units used in the data tables	
137	Appendix J	The report does not have an indication as to who was the author.	Provide the author.	
138	Appendix J	The report details the rejected data.	Provide a discussion as to the impact of the rejected data on the project.	

139	Appendix J	The text on page 16 of 25 references "high concentrations of hexavalent chromium in the project matrix."	A discussion of the elevated hexavalent chromium in the project matrix did not appear in the main text to the best of our recollection. Please provide.	
140	Appendix J	There is an indication in this appendix that PQLs were not reported by the lab.	Please provide an explanation. These should be reported.	





State of Ohio Environmental Protection Agency

**Northeast District Office**

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Bob Taft, Governor  
Bruce Johnson, Lieutenant Governor  
Joseph P. Koncelik, Director

**March 23, 2004**

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
PRELIMINARY DRAFT  
**MUSTARD AGENT REPORT**

Mr. Mark Patterson  
Environmental Program 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: "Preliminary-Draft, Suspected Mustard Agent Burial Site (RVAAP-28), Report on the Groundwater Monitoring Well Installation and Groundwater Sampling at the Suspected Mustard Agent Burial Site." This document, dated February 2005 and received at Ohio EPA, Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR) on February 18, 2005, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District by SpecPro, under contract number W912QR-04-0116.

This document was reviewed by Ohio EPA personnel in NEDO, DERR, and NEDO's Division of Drinking and Ground Waters (DDAGW), and the enclosed comment table represents a compilation of comments from both reviewers.

The contractor is responsible for ensuring that the comment response table (CRT), which is submitted in response to these comments, provides specific verbiage that will be utilized in the revised document. Responses, such as "text will be changed" or "acknowledged," etc., are no longer acceptable. If the RTC matrix is submitted without specific language changes included, the matrix will not be reviewed by Ohio EPA, and a letter will be submitted to your attention and all recipients of this correspondence indicating that fact. This approach was recently agreed upon by the Army, USACE, and Ohio EPA.

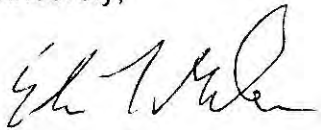
Be advised that target dates for this project would be having set up a comment resolution meeting (if needed) within fifteen (15) calendar days, and a revised document (draft) into Ohio EPA within thirty (30) calendar days of receipt of this correspondence.



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
MARCH 23, 2005  
PAGE 2

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

enclosure

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Laurie Moore, Ohio EPA, SWDO, OFFO  
Conni McCambridge, Ohio EPA, NEDO, DDAGW  
LTC Tom Tadsen, OHARNG RTLS  
MAJ Ed Meade, OHARNG, RTLS  
MAJ Kim O'Keefe, NGB  
Randy Nida, NGB  
JoAnn Watson, AEC  
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Paul Zorko, USACE Louisville  
Dave Brancato, USACE Louisville  
Chantelle Carroll, SpecPro

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR

**"PRELIMINARY - DRAFT, SUSPECTED MUSTARD AGENT BURIAL SITE (RVAAP-28), REPORT ON THE GROUNDWATER MONITORING  
WELL INSTALLATION AND GROUNDWATER SAMPLING at the SUSPECTED MUSTARD AGENT BURIAL SITE"**

**REVIEWERS: EILEEN T. MOHR and CONNI McCAMBRIDGE**

**DATE: MARCH 23, 2005**

<b>Cmt #</b>	<b>Line/ Page #</b>	<b>Comment</b>	<b>Recommendation</b>	<b>Response</b>
1	General	There is no executive summary (ES) in the report.	Please provide an ES that is consistent with the body of the text.	
2	Pg 4, fig 1-3	This figure shows the location of the suspected mustard agent burial area.	Please add the approximate AOC boundaries to the revised figure.	
3	Pg 5, line 22	The text indicates that a suspected mustard agent burial site was excavated in 1969 within ODA#1. Please confirm that the location was within ODA1 as it is currently identified. If the location was west of NACA, it is also west/southwest of ODA#1.	Make corrections to the text as necessary.	
4	Pg 5, lines 30-32	The text indicates that the suspected site was fenced and marked, but that only remnants of the fence remain.	While this is correct, please provide information as to whether or not the area is currently marked with Seibert stakes.	
5	Pg 5, line 36	Text revision.	Change the text to read: "... due to the potential hazards..."	
6	Pg 6, line 30	Text revision.	Change text to read: "...background criteria for metals in filtered groundwater..."	



7	Pg 7, line 25	The text references limited hydrogeologic and analytical data. Other than the limited soil sampling conducted by USACHPPM, it is unclear as to whether or not there is additional data from this area, especially with respect to groundwater.	Please clarify this statement and also provide the hydrogeologic and analytical data that were available for this AOC prior to this investigation.	
8	Pg 7, lines 33-34	Monitoring wells were to be installed at this AOC so that a minimum of two wells would be downgradient, and preferably three.	It is recommended than an additional two wells be installed in a downgradient direction to more completely delineate the groundwater flow at this AOC.	
9	Pg 7, lines 45-46	The text indicates that the burial of the mustard agent may have been within the old demolition grounds.	Please clarify the location in the revised text. If the excavated area and the suspected are west of the NACA area, they would also be west/southwest of the demolition area.	
10	Pg 8, lines 1-2	The text indicates that the suspected site was fenced and marked, but that only remnants of the fence remain.	While this is correct, please provide information as to whether or not the area is currently marked with Seibert stakes.	
11	Pg 9, line 2	Monitoring wells were to be installed at this AOC so that a minimum of two wells would be downgradient, and preferably three.	It is recommended than an additional two wells be installed in a downgradient direction to more completely delineate the groundwater flow at this AOC.	
12	Pg 9, line 6	Text revision.	Change text to read: "One of the downgradient wells was analyzed for the RVAAP-defined full suite of constituents."	
13	Pg 12, fig 2-1	The presented map is entitled: "Glacial Geology of RVAAP."	Please provide the source of this map.	

14	Pg 12, fig 2-1	Page 11 of the text (line 7) states that "bedrock at RVAAP is overlain by deposits of the Wisconsin-ages Lavery Till in the western portion of the facility..." However, the Lavery Till is not represented on figure 2-1.	Please revise the figure to include the Lavery Till.	
15	Pg 12, fig 2-1	This figure references the Kent Till. It is unclear why the Kent Till was included in the figure.	Please revise the figure to remove any reference to the Kent Till.	
16	Pg 13, line 24	The text references the Kent Till.	This should this read Lavery Till.	
17	Pg 13, line 25	The text references the Cuyahoga Formation.	Change to Cuyahoga Group.	
18	Pg 13, line 30	The text references the Cuyahoga Formation.	Change to Cuyahoga Group.	
19	Pg 14, fig 2-2	The presented map is entitled: "Bedrock Geology of RVAAP."	Please provide the source of this map.	
20	Pg 15, fig 2-3	The figure illustrates the Cuyahoga Formation.	Please revise to read: Cuyahoga Group.	
21	Pg 17, lines 44-45	The text references two different monitor wells and also indicates "slug in" and "slug out." This meaning of this information is not clear.	Provide clarification in the revised text.	
22	Pg 20, fig 2-4	This figure does not contain any boundary lines to illustrate the extent of the suspected burial site.	Add AOC estimated boundaries to the revised map.	

23	Pg 20, fig 2-4	<p>At the time of this report, only one set of groundwater levels had been obtained. Additional water elevations may be needed to determine the following:</p> <ul style="list-style-type: none"> <li>a. Any seasonal or yearly variations in the groundwater flow direction at/near the AOC.</li> <li>b. Whether the locations of the existing monitoring wells are suitable to evaluate the conclusions of the report, for example, the evaluation of the relative locations of "upgradient" and "downgradient" monitoring wells with respect to the suspected source area.</li> <li>c. The direction of potential migration of contaminants with respect to the potential source area.</li> </ul>	<p>Although the groundwater flow direction (based on one set of water level data) may give a general idea of the groundwater flow direction in the area of the suspected burial site, there could be localized variations in flow that have not been recognized due to the limited groundwater level data. Groundwater flow direction based upon only one set of data should be, at best, considered a "rough" estimate of groundwater flow direction in the suspected burial site and should be viewed with caution.</p> <p>Additional rounds of groundwater elevation data should be collected to determine what, if any, seasonal variations in groundwater flow directions may exist in this area.</p>	
24	Pg 21, lines 28-29	The text indicates that due to field conditions two Shelby tube samples could not be collected at MBS-002 and MBS-003 (one each).	Provide additional information in the revised text as to what precluded these samples from being obtained.	
25	Pg 21, lines 38-39	The text references limited hydrogeologic and analytical data. Other than the limited soil sampling conducted by USACHPPM, it is unclear as to whether or not there is additional data from this area, especially with respect to groundwater.	Please clarify this statement and also provide the hydrogeologic and analytical data that were available for this AOC prior to this investigation.	
26	Pg 21, line 48	Text revision.	Revise text to read: "...and filtered TAL metals..."	



27	Pg 22, line 35	The log of MBS-003 indicates that this well was improperly grouted during well construction. No information was provided in the text concerning this information.	Provide additional information in the revised text and document that the proper procedures were followed during the repair of this well.	
28	Pg 23, line 14	The text states that "...well development was stopped after bailing MBS-003 dry." It is not clear how long this well was allowed to recover before development continued and/or groundwater sampling was conducted.	Provide additional information.	
29	Pg 23, line 21	The date of the groundwater sampling event is unclear.	Please revise the text to include the date of the groundwater sampling event.	
30	Pg 31, table 4-2	The table does not indicate whether any monitoring well(s) will characterize the quality of groundwater upgradient (background) from the AOC. This is also not clear in the rest of the document.	Please provide additional details concerning this issue.	
31	Pg 31, table 4-2	The date of the groundwater sampling event is unclear.	Please revise the table to include the sampling date.	
32	Pg 31, line 10	Text revision.	Revise text to read: "... filtered TAL metals..."	
33	Pg 31, line 13	Text revision.	Revise text to read: "... filtered TAL metals..."	
34	Pg 31, table 4-3	No units are presented.	Indicate the units for the propellant and explosives analyses.	
35	Pg 32, line 4	Text revision.	Revise text to read: "... filtered TAL metals and unfiltered cyanide analyses..."	

36	Pg 32, table 4-4	Table revision requested.	Add another column to the table that contains the applicable MCLs.	
37	Pg 35, lines 21-26	This section contains the OE avoidance summary. However, there is no cross reference to an appendix that would contain the specific information logged by the UXO tech, including the types of detectors used (etc.) both with respect to MEC as well as CWM.	Provide an expanded summary in the revised document in this section, and add the field notes kept by the UXO technician as a separate appendix to this document.	
38	Pg 36, line 1	Text revision.	Revise text to read: "... filtered TAL metals and unfiltered cyanide analyses..."	
39	Pg 36, line 6	Clarification requested.	Revise the text to indicate that the sample was obtained from MBS-001.	
40	Pg 36, line 10	Clarification requested.	Revise the text to indicate that the sample was obtained from MBS-001.	

41	Pg 38, lines 3-37	Ohio EPA concurs with the overall conclusions and recommendations presented in the report. However, three minor adjustments to the text are requested.	<p>1. The results of the first and second bullets could lead to the installation of one or more additional monitor wells in an optimum downgradient direction. Add this information to an appropriate place in the revised text.</p> <p>2. Add verbiage to the second bullet that any water samples obtained from geoprobe borings would represent screening conditions. The absence of mustard agent breakdown products from samples obtained from geoprobes would not definitely indicate the absence of mustard agent and/or breakdown products, and any concentration (if) detected would be used to represent a minimum concentration present in the unconsolidated materials.</p> <p>3. In lines 33-34, please add additional verbiage as to why a more detailed investigation is not recommended.</p>	
42	Appendix A	This section contains previous information obtained at this AOC.	Add in the USACHPPM RRSE data.	
43	Appendix B	The COCs are not presented in this Appendix.	Please provide in the revised document.	
44	Appendix C	Nice job overall on the log sheets. THANKS!	No changes noted, except as below.	



45	Appendix C	The log on page 7 of 74 indicates that MBS-01 was initially grouted improperly.	In an appropriate section of the revised text, please provide documentation that all improper grout was removed, that the annular space contained no voids after re-grouting, and that the integrity of the well was not compromised during these activities.	
46	Appendix C	In the "remarks" section of the HTRW drilling logs, there are notations such as "UXO rdg = 0." It is not clear as to whether this is referring to Schonstedt information or the CWM detectors used on site.	Append the UXO technician's field notes to this document.	
47	Appendix C	Please ensure that all changes made to field notes follow the one line strike-out/initial protocol.	Be aware for future projects.	
48	Appendix C	On page 74 of 74, there is the notation that there were two damaged drums.	Please provide additional information.	
49	Before Appendix E	There isn't an appendix with the analytical data in this report.	Add another appendix with all of the analytical data.	
50	Appendix E	This appendix contains the QA summary report.	Provide the author of the report.	
51	Appendix E	The text references rejected data for VOCs and SVOCs.	Provide a discussion as to the impact of the rejected data on the conclusions presented in the report.	
52	Appendix E	The text on page 7 of 13 indicates that method blanks and trip blanks contained methylene chloride and/or TCE.	Provide an explanation.	

53	Appendix F	Previously reviewed by Ohio EPA.	No additional comments	
54	Appendix H	This appendix contains chain of custody forms. However there is no signature as to what person/entity gained control of the samples after it left SpecPro custody.	Please provide the waybill and any other relevant information so that the receipt at the lab can be documented (date, time, recipient, cooler temperature, etc.).	
55	Appendix H	Provide dates of receipt of samples, extraction dates and analysis dates so that it can be determined that the laboratories met the required holding times.	Please provide this information in the revised document.	
56	Appendix H	Final documented turbidity readings of > 5 NTUs were noted on the following field logs: MW-001, MW-003, MW-003.	Provide a discussion concerning the reason(s) for the elevated turbidity readings. What procedures were implemented to obtain a representative groundwater sample?	



State of Ohio Environmental Protection Agency

Northeast District Office

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Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

September 27, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
DRAFT MUSTARD AGENT  
GROUNDWATER  
WORKPLAN

Mr. Mark Patterson  
Environmental Program Manager  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, Ohio 44266

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR) and Division of Drinking and Ground Waters (DDAGW), have received and reviewed the document entitled: "Draft, Work Plan and Sampling and Analysis Plan Addenda for the Groundwater Monitoring Well Installation and Groundwater Sampling at the Suspected Mustard Agent Burial Site (AOC-28), Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated August 2004 and received at Ohio EPA, NEDO, on August 27, 2004, was prepared by SpecPro for the U.S. Army Corps of Engineers, Louisville District, under contract number W912QR-04-0116.

Enclosed to this correspondence, please find Ohio EPA's comments regarding the above-referenced workplan.

If you have any questions concerning this correspondence or the enclosed comments, please do not hesitate to contact me at (330) 963-1221.

Sincerely,

Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

enclosure

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Laurie Moore, Ohio EPA, SWDO, OFFO  
Glen Beckham, USACE Louisville  
Connie McCambridge, Ohio EPA, NEDO, DDAGW

LTC Tom Tadsen, RTLS  
JoAnn Watson, AEC  
Chantelle Carroll, SpecPro  
John Jent, USACE Louisville

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR





**DRAFT WORKPLAN AND SAMPLING AND ANALYSIS PLAN ADDENDA FOR THE GROUNDWATER MONITORING WELL INSTALLATION  
AND GROUNDWATER SAMPLING AT THE SUSPECTED MUSTARD AGENT BURIAL SITE (AOC-28)**

**REVIEWERS: EILEEN T. MOHR AND CONNI McCAMBRIDGE, OHIO EPA**

**DATE: SEPTEMBER 27, 2004**

**WORKPLAN AND SAMPLING AND ANALYSIS PLAN**

<b>Cmt. #</b>	<b>Page # Line #</b>	<b>Comment</b>	<b>Recommended Revision</b>	<b>Response</b>
1	General	Please confirm that USACE Huntsville has been contacted and that it has been determined that they do not want or plan to be involved with this effort.	Add this to the text in an appropriate location.	
2	General	Thank you for numbering the lines of text. It is very helpful!	No revision needed.	
3	General	In Ohio EPA comments on the SOW, it was noted that a representative of AEC recommended that chloroform also be added to the analytical list. It is recommended that AEC be contacted to determine whether or not this is still the case.	Please confirm whether or not AEC was contacted as recommended.	
4	Table of Contents, pg I	There is no section 4.3 in the table of contents or in the draft workplan; i.e., it skips from section 4.2 to 4.4.	Revise the headings in both locations, or provide a section 4.3.	
5	Acronym List, pg ii	Correct the spelling for a portion of the definition of NTU.	Revise the spelling to nephelometric.	

6	Pg 1, lines 6-10	The text states that the lack of mustard agent breakdown products in the uppermost water bearing unit will determine whether or not there is mustard agent present in the suspected area. This is not entirely correct. For example, there could be mustard agent present in glass vials (as in test kits). Because there would not be a breakdown of the glass container like there would be in a metal container (a drum, for example), the mustard agent could still be present and viable, however, there would be no breakdown products in the groundwater, because the integrity of the glass container has not been breached.	Revise the text to be less definitive.	
7	Pg. 1, line 16	A bullet detailing information on the analysis of a groundwater sample collected from a downgradient well for explosives, propellants, TAL metals (filtered), cyanide, VOCs, SVOCs, pesticides, and PCBs is needed in this section.	Please add an additional bullet to cover the information requested.	
8	Pg. 1, line 16	It is unclear as to whether or not recommendations for further investigative activities will be proposed after reviewing the results of the groundwater sampling.	Please clarify this issue and revise the objectives list if necessary.	

9	Pg 2, lines 21-22	Please clarify the location of the previous excavation activities conducted in the vicinity of the current suspected mustard agent burial area. For example, the location was at the end of the runway located at the NACA Test Area, and not at ODA # 1.	Revise the text accordingly.	
10	Pg 2, lines 21-22	Open Demolition Area # 1 is not now known at NACA Test Area, as the text states. ODA # 1 is located within the NACA Test Area AOC. Additionally, NACA was operational from 1947 - 1953.	Revise the text accordingly	
11	Pg 2, line 28	Typographical error.	Revise "Hinkle" to read "Hinckley."	
12	Pg 2, at the end of the text.	The history and site description makes no mention of the geophysical studies conducted by SAIC at this AOC.	Please add this information and a general summary of the geophysical study findings to the revised text.	
13	Fig 1-2, pg 4	In the legend of sites, the Winklepeck Burning Grounds AOC is misidentified.	Revise the identifier to indicate that this is a CERCLA AOC, not a RCRA AOC.	
14	Fig 2-1, pg 7	The QAPP indicates that USACE's QA lab is to be STL.	Change the TBD designation to STL on this figure.	
15	Fig 2-2, pg 8	The schedule will need to be revised.	Revise the schedule to indicate that Ohio EPA has a 45 day review cycle in accordance with the Director's Findings and Orders.	
16	Pg 9, line 12	Typographical error.	Change "FFacility" to "Facility."	
17	Pg 9, fifth bullet, lines 22-24	It is unclear whether moisture content, specific gravity, pH, grain size, and hydraulic conductivity will be analyzed from samples obtained from the Shelby tubes.	Please clarify this issue and add the additional analyses, if necessary.	



18	Pg 9, after line 28	If bedrock is encountered, then coring must occur. This was indicated in Ohio EPA comments dated 04/14/04 on the SOW.	Please add an additional bullet to the revised text.	
19	Pg 9, within line 29	It is unclear as to whether or not recommendations for further investigative activities will be proposed after reviewing the results of the groundwater sampling.	Please clarify this issue and revise the objectives list if necessary.	
20	Pg 10, lines 7 - 13	The text previous to this section indicates that it is assumed that the groundwater flow mimics the topography. As such, it is unclear in lines 7-13 why the monitor wells are spaced as described. What does the topo map for this area indicate? Generally, in an area where 4 monitoring wells are proposed, the intent is to have 1 monitor well that is upgradient and 3 that are downgradient. This allows for a better characterization of the groundwater with respect to both upgradient and downgradient conditions.	Please clarify. The investigation should attempt to install 3 downgradient and 1 upgradient well. At a minimum, there needs to be two downgradient wells. Refer to the 2 foot topo maps prepared for the installation to assist in monitoring well locations.	
21	Pg 10, lines 18-19	Please clarify the location of the previous excavation activities conducted in the vicinity of the current suspected mustard agent burial area. For example, the location was at the end of the runway located at the NACA Test Area, and not at ODA # 1.	Revise the text accordingly.	

22	Pg 10, lines 36-40	The text indicates that the presence or absence of mustard agent breakdown products will determine if additional investigative activities are needed.	Be advised, if there is only one or two down-gradient wells, and/or if the mustard agent is contained in glass containers, that this investigation may not provide enough information to determine whether or not additional investigations are needed.	
23	Pg 11, lines 25-34	In an area where 4 monitoring wells are proposed, the intent is to have 1 monitor well that is upgradient and 3 that are downgradient. This allows for a better characterization of the groundwater with respect to both upgradient and downgradient conditions.	The investigation should attempt to install 3 downgradient and 1 upgradient well. At a minimum, there needs to be two downgradient wells. Refer to the 2 foot topo maps prepared for the installation to assist in monitoring well locations.	
24	Pg 11, lines 31-33	The text indicates that the monitoring well locations were "far enough outside the suspected burial area" so that there would not be safety concerns.	On what basis was the distance determined? Were the previous geophysical studies consulted? Please add clarification to the revised text.	
25	Pg 12, lines 21-22, section 4.1.1.1	The text indicates that the screened interval will be installed so that the water table is within the screen where possible.	Remove the phrase "where possible." The water table should be within the screened interval.	
26	Pg 12, lines 22-25, section 4.1.1.1	The text indicates that if the water table is less than 20 feet bgs, that a 5 foot screen will be utilized.	Be advised that there were other steps that were to be taken prior to the installation of a five foot screen. The installation of a five foot screen is not the first point of resolution of this issue. For example, some of the bentonite and grout layers can be shortened. Ohio EPA must be consulted prior to installing a well, if it looks like various layers may need to be shortened, or if a five foot screen is proposed for utilization.	

27	Pg 12, section 4.1.1.1	If bedrock is encountered, coring is required.	Add a reference to coring in this section.	
28	Pg 14, section 4.1.2.1	This section in lines 16-30 describes drilling methods and references back to section 4.1.1.1.	Please revise the text in this section to reflect the three comments immediately previous to this one regarding coring, the location of the water table, and the potential use of five foot screens.	
29	Pg 15, line 14	It appears that a word might be missing.	Should the word "installation" appear after "monitor well?"	
30	Pg 15, line 25	This sentence references back to section 4.1.1.1.	Please refer to previous Ohio EPA comments on section 4.1.1.1 and revise the text, if needed.	
31	Pg 15, lines 30-33	The text discusses coring, without indicating the number of core samples that are to be obtained. For example, if all four wells are installed in bedrock, Ohio EPA will not require that all 4 wells be cored if certain requirements are met (for example, that the complete stratigraphic sequence is represented).	This can be discussed during the comment resolution meeting.	
32	Pg 16, line 24	Correct the spelling for a portion of the definition of NTU.	Revise the spelling to nephelometric.	
33	Pg 17, lines 27-28	The meaning of the first sentence in this section is unclear.	Please revise the text to read: "Filtered groundwater samples will be collected for dissolved TAL metals analyses only as per Section 4.3.5 of the facility-wide SAP."	
34	Pg 19, lines 14, 16, 17, 19	These lines should also reference CWM avoidance.	Add CWM references to this section.	



35	Pg 20, lines 15, 17, 21, 22	These lines should also reference CWM avoidance.	Add CWM references to this section.	
36	Pg 19, lines 44-46	It is unclear whether moisture content, specific gravity, pH, grain size, and hydraulic conductivity will be analyzed from samples obtained from the Shelby tubes.	Please clarify this issue and add the additional analyses, if necessary.	
37	Pg 20, lines 33-38	This portion of the text should also have a brief description of the M256 chemical agent detector kit that will be utilized, frequency of sampling, etc.	Add this information to the revised text.	
38	Pgs 20 - 21	The text on these pages goes from section 4.2.6 to 4.4. There is no section 4.3, nor is there one listed in the Table of Contents.	Please provide a section 4.3 or change the heading numbers.	
39	Pg 20, line 34	The text references the collection of a soil sample at the 0 - 1 foot interval.	Please confirm that this is correct.	
40	Pg 21, lines 6-7	The text indicates that the monitoring well locations will be located outside the suspected burial area site.	On what basis was the distance from the AOC determined? Were the previous geophysical studies consulted? Please add clarification to the revised text.	
41	Pg 21, line 16	The text indicates that one of the wells should be downgradient of the suspected burial site. Please refer to previous comments regarding the need for more than one downgradient well at this AOC.	No text change required.	
42	Pg 23, fig 5-1	This table should be revised to reflect the samples that will be collected at the suspected mustard agent AOC. Specifically, this list is too broad.	Revise the figure accordingly.	

43	Pg 27, lines 1-3	This text indicates that letter reports regarding the IDW will be submitted to USACE and RVAAP.	Add Ohio EPA to the notification list.	
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**APPENDIX A: QUALITY ASSURANCE PROJECT PLAN (QAPP) ADDENDUM**

<b>Cmt. #</b>	<b>Page # Line #</b>	<b>Comment</b>	<b>Recommended Revision</b>	<b>Response</b>
44	Pg A-7, Table 1-1	There are no entries in the MS/MSD column which contradicts the text in the SAP on page 17, section 4.1.1.3.	Please rectify the apparent discrepancy. There should be MS/MSD samples.	
45	Pg A-7, Table 1-1	Refer back to General Question # 3 regarding the potential for chloroform analyses.	If chloroform analyses are recommended, please adjust this table accordingly.	
46	Pg A-9, line 10	MS/MSD samples are referenced and should be collected. There are disconnects between this text, table 1-1, and the text on page 17, section 4.1.1.3.	Please rectify the apparent discrepancy. There should be MS/MSD samples.	
47	Pg A-9, lines 26-27	The text indicates that program and project reporting levels are identified in Tables 3-1 to 3-9 in the facility-wide QAPP. Please be advised that the FW QAPP does not contain reporting levels for the breakdown products of mustard agent.	Please add the methods and detection limits for the mustard breakdown products to the revised AOC QAPP. Detection limits must be as low as possible.	
48	Pgs A-12 to A-13	The analytical procedures section of the AOC-specific QAPP does not contain the SOP(s) for the method(s) proposed to be utilized for the analysis of mustard agent breakdown products.	Add this information to the revised QAPP.	

49	Pg A-14, lines 29-30	The text indicates that MS/MSD samples will be collected at a frequency of 5%. Reference previous comments regarding the inconsistent language with respect to MS/MSD samples.	Correct the discrepancies.	
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#### **APPENDIX B: SITE HEALTH AND SAFETY PLAN (HASP)**

Although Ohio EPA does not have regulatory jurisdiction over HASPS, the following comments are offered for your consideration:

	<b>Page # Line #</b>	<b>Comment</b>	<b>Recommended Revision</b>	<b>Response</b>
50	General	Please ensure that the selected hospital (Robinson) is equipped to deal with potential emergencies regarding mustard agent.	Add this information to an appropriate section of the text.	
51	Pg B-6, lines 10-12	The sentence in the draft text is incomplete.	Complete the sentence by providing citations to the USACE manuals/pamphlets, etc.	



52	Pg B-6, lines 27-31	The text states that the lack of mustard agent breakdown products in the uppermost water bearing unit will determine whether or not there is mustard agent present in the suspected area. This is not entirely correct. For example, there could be mustard agent present in glass vials (as in test kits). Because there would not be a breakdown of the glass container like there would be in a metal container (a drum for example), the mustard agent could still be present and viable, and there would be no breakdown products in the groundwater, because the integrity of the glass container has not been breached.	Revise the text to be less definitive.	
53	Pg B-6, line 43	The text in this section indicates that potential hazards posed by the planned task includes exposure to explosives.	Please clarify whether or not there is any historical information that indicates that explosives may be present in this area.	
54	Pg B-8, lines 3-4	Open Demolition Area # 1 is not now known at NACA Test Area as the text states. ODA # 1 is located within the NACA Test Area AOC. Additionally, NACA was operational from 1947 - 1953.	Revise the text accordingly	
55	Pg B-8, lines 15-17	The text indicates that Table 1-2 includes contaminants that are commonly found throughout old demolition grounds at RVAAP. The suspected mustard agent burial area is not located within ODA # 1.	Revise the text accordingly and, if necessary, revise Table 1-2 to reflect the contaminants that may be encountered.	

56	Pg B-9, Table 1-2	This table details "other" COPCs that may be found at the mustard agent burial area.	Add mustard agent and the breakdown products to this table.	
57	Table 2-2, Hazards Analysis	Throughout table 2-2, if there is a hazard task analysis that involves potential exposure to mustard agent, there should be a discussion in the controls section detailing what mustard agent test kits are to be utilized.	Add this information to the revised text.	
58	Table 2-3, Potential Exposures	This table does not contain information regarding mustard agent breakdown products.	Please add this information, if available.	
59	Table 2-3, Potential Exposures	This table does not contain information regarding treatment protocols.	Add treatment information to this table, or provide in a readily available table in another section of the HASP.	
60	Pg B-22, Section 7.0	The text does not contain any information about mustard agent monitoring.	Add this information to the revised text.	
61	Pg B-23, table 7-1	In the column entitled "limit," there is no indication as to which mustard agent test kit will be utilized.	Add this information to the revised text.	
62	Pg B-24, lines 34-36	The text indicates that emergency information in the FW HASP will be verified during mobilization. This information should be verified prior to mobilization.	Revise the text accordingly.	
63	Pg B-24, lines 33-34	The text should be more specific with respect to emergency procedures/evacuation, etc., in the event that mustard agent is encountered.	In the revised text, add information such as notification/contacts, controls that will be established, so that no one enters the area, etc.	

64	Pg C-3, section 1.2, after the third bullet	There is no reference in the bulleted list regarding the air sampling for mustard agent using test kits.	Add a bullet to the text in this section that describes the air sampling.	
65	Pg C-4, lines 33-36	The text seemingly indicates that the M256 Chemical Agent Detector Kit is another tool (other than an auger) utilized in the collection of soil samples.	The text should more clearly indicate that the kit is used for detection of potential CWM, not in the drilling process.	
66	Pg C-4, lines 33-36	Appendix D also references M8 and M9 detector papers. Will these be utilized during this project?	Please provide clarification in the revised text.	
67	Pg C-6, lines 42-43	The text indicates that cell phones will be the primary method of communication. There are a number of "dead spaces" at RVAAP with respect to cellular reception.	Please confirm that there will be adequate cell phone reception at the mustard agent area.	
68	Pg C-7, lines 21-23	This sentence lacks clarity.	Please revise the sentence to clearly indicate the intent.	
69	Pg C-7, lines 42-43	The text indicates that First Aid will be administered on-site prior the arrival of emergency personnel. However, the first aid procedures are "buried" in the MSDS for mustard agent.	At some appropriate place in the revised HASP, there should be readily accessible and clear first aid procedures, in the event that there is an exposure to mustard agent.	
70	Pg C-9, section 5.0	The activity hazards analysis in this section is weak.	The text should be revised to resemble table 2-2 in the main text of the HASP.	
71	Pg C-9, line 4	Typographical error.	Change "sued" to "used."	



72	Pg C-9, lines 16-18	The text indicates that the SpecPro project manager will be notified daily of all located UXO. This is not acceptable.	Revise this portion of the text to indicate that the SpecPro Project Manager will be immediately notified if UXO/CWM is encountered. Also, follow the rest of the notification procedure (ex., RVAAP environmental project manager, etc.).	
73	Pg C-37, lines 13-16	What concentration of CWM (and specifically mustard agent) must be present in order for a reaction to occur?	Add this information in the revised text.	
74	Pgs C-37 - C-39	What is the detection limit for the M256 Chemical agent Detector kit?	Provide this information in the revised text.	



State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

December 20, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
REVISED MUSTARD AGENT  
WORKPLAN

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document entitled: "Final Work Plan Containing: Final Sampling and Analysis Plan Addendum, Final Quality Assurance Project Plan Addendum, Final Site Safety and Health Plan Addendum No. 1, Final UXO and Explosives Avoidance Plan for the Groundwater Monitoring Well Installation and Groundwater Sampling at the Suspected Mustard Agent Burial Site (AOC-28), Ravenna Army Ammunition Plant." This document, dated November 2004 and received at Ohio EPA, NEDO, DERR, on December 16, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) by SpecPro under contract number W912QR-04 -M -0116.

The revised document was compared to the draft workplan; the comment response table, received October 19, 2004; and a comment resolution meeting, held on October 20, 2004.

Ohio EPA has the following comments on the revised document:

1. Page 2 references the SAIC geophysical survey that was conducted in 1998. This letter report was to be provided as an appendix to the revised report, however, it was not included in the final workplan. Please provide.
2. The schedule in the revised workplan indicates that a draft report is to be submitted this week. Is this correct? If not, a revised schedule should be provided.
3. Ohio EPA comment # 20 was only partially addressed. In the revised workplan, the text still contains verbiage that at least one monitoring well will be located in a downgradient direction. At a minimum, there should be two downgradient wells, and preferably three. Please remove the language that indicates that at least one of the wells will be downgradient. This comment is also applicable to Ohio EPA comment # 23.
4. Original Ohio EPA comment # 26 dealt with the potential use of a five foot screen in the monitoring wells. The text in the revised workplan, although it references that in





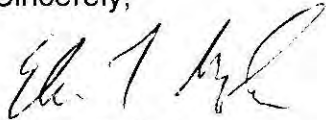
MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
DECEMBER 20, 2004  
PAGE 2

making design changes that Ohio EPA will be consulted and concur, still contains verbiage about the use of a five foot screen. The use of a five foot screen is a last resort, and should either be stricken from the text or moved down to the portion of the text where construction sequences are detailed, so that it has lesser prominence.

5. In the revised text (section 4.1.2.1 on page 15), there is a reference to a "water bearing zone 9." Please clarify, or fix typographical error.
6. The text in response to Ohio EPA comments # 34, 35, and 36 were not reflected in the revised text. Please revise.
7. In Ohio EPA comment # 39, the question was raised as to whether or not a 0-1 foot soil interval was correct. The response to the comment indicated that it was correct, yet the new text states 0 - 2 feet. Please provide clarification.
8. Ohio EPA comment # 68 was not addressed in the revised health and safety plan.

Please provide replacement pages for the final workplan that address the above issues. If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

- cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Conni McCambridge, Ohio EPA, NEDO, DDAGW  
JoAnn Watson, AEC  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville  
Paul Zorko, USACE Louisville  
LTC Tom Tadsen, OHARNG RTLS  
Chantelle Carroll, SpecPro
- ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR





State of Ohio Environmental Protection Agency

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

May 28, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE / TRUMBULL COUNTIES  
~~DRAFT UPPER AND LOWER COBBS~~  
POND  
HHRA WHITE PAPER

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

Dear Mr. Patterson:

Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "White Paper Human Health Risk Assessment Approach for the Upper and Lower Cobb's Pond Remedial Investigations, Ravenna Army Ammunition Plant, Ravenna, Ohio, Rev. 0." This document, dated April 20, 2004 and received at Ohio EPA on April 22<sup>nd</sup>, was jointly prepared by MKM Engineers and Tetra Tech Nus, Inc. The following comments were generated from the review of the above-referenced document:

**COMMENTS**

- Comment #1: General comment - Upper and Lower Cobbs Pond are being evaluated as a single EU. Is this the way they should be approached? How was this determined?
- Comment #2: General comment/Introduction -The white paper was clearly written and thoroughly illustrated how the FWHHRAM will be applied at these AOCs. The author did a good job pointing out where there are deviations from the risk manual and explaining why these deviations are recommended.
- Comment #3: Section 1.0, Background, page 1, line 20 - The text states that "Cobb's Ponds is located in the east-central area." The subject and verb should agree. Please change "is" to "are."
- Comment #4: Section 1.0, Background, page 1, line 21 - The text referencing "unlined surface water" is unclear. Is the intent of this text to indicate that the ponds are unlined? If so, please revise the text accordingly.
- Comment #5: Section 1.0, Background, page 1, line 23-24 - It is not clear as to why the production of ammonium nitrate is referenced. Was there a spill during the cited operational history times that impacted upon Cobbs Ponds? If there was a spill, this should be cited in the revised text. If not, either this should be removed or the operational history of Load Line 3 should be expanded.



MR. MARK PATTERSON, ENVIRONMENTAL PROGRAM MANAGER  
RAVENNA ARMY AMMUNITION PLANT  
MAY 28, 2004  
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- Comment #6: Section 2.0, Data Evaluation, page 1 line 31 through page 2 line 7 - At an appropriate portion of the text that describes the various screens utilized, there should be additional language that all explosives and propellant detections are carried forward regardless of the screens.
- Comment #7: Section 2.0, Data Evaluation, page 2, line 9 - The proposed surrogates for 1,2-dichloroethene (total) and endosulfan II are acceptable. Ohio EPA recommends using the Region 9 PRG for benzo(a)pyrene as the surrogate for phenanthrene, and benzo(g,h,i)perylene. This approach is consistent with past practices.
- Comment #8: Section 2.0, Data Evaluation, page 2, line 19 - Please change "RVAPP" to "RVAAP."
- Comment #9: Section 2.0, Data Evaluation, page 2, lines 20-21 - Please provide the citation for the final WBG Phase II RI report.
- Comment #10: Section 2.0, Data Evaluation, page 2, lines 26-31 - A discussion on how COPCs and COCs are chosen has been made, however, it is unclear how this guidance fits in. In any event, the consultant's risk assessor would need to clear this with Ohio EPA prior to proceeding.
- Comment #11: Section 3.0, Current and Future Land Use, page 3, line 14 - Please add the word "hunting" after the word "waterfowl."
- Comment #12: Section 3.0, Dismounted Training by Ohio Guard Soldiers - No Digging Allowed, page 3, lines 17-23 - This section does not address surface water usage. How does this scenario include surface water usage? Also, will OHARNG personnel also be allowed to catch and consume fish? Please clarify.
- Comment #13: Section 3.0, Potentially Exposed Populations, Exposure Media, and Exposure Pathways, page 4/ line 36, page 4 / line 5 - Without seeing the rest of the data/information (etc.), one would expect that the VOCs detected and listed in this section are lab artifacts.
- Comment #14: Section 3.0, Potentially Exposed Populations, Exposure Media, and Exposure Pathways, page 5 lines 16-19: Ohio EPA agrees that the hypothetical future land use exposure by the security guard/maintenance worker is most likely limited to soil only. However, this receptor reflects exposure of a maintenance worker who could have contact with surface water and sediment during erosion control activities, natural resource management/sampling, or any future construction that may impact this AOC.



MR. MARK PATTERSON, ENVIRONMENTAL PROGRAM MANAGER  
RAVENNA ARMY AMMUNITION PLANT  
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- Comment # 15: Section 3.0, Potentially Exposed Populations, Exposure Media, and Exposure Pathways, page 5 lines 21-31 - Ohio EPA agrees that the future land use scenario should include the national guard trainer/resident receptor. This receptor was originally presented in the LL 1-4 HHRA. Ohio EPA recommends that this receptor be presented in the main text of the report along with the other receptors evaluated per this white paper. Therefore, the inclusion of this receptor does not have to be limited to the uncertainty section.
- Comment #16: Section 3.0, Inhalation Rate for National Guard Trainee, page 6, lines 33-35 - Ohio EPA recommends using the inhalation rate that is listed in the FWHHRAM for this receptor. The assumptions in the FWHHRAM were developed by Ohio EPA and USACE to be site-specific and protective of current and future exposures. This value was partly based on the Voluntary Action Program standard default assumptions for a construction worker.
- Comment #17: Section 3.0, Exposure Time for National Guard Trainee Exposed to Surface Water, page 7, lines 9-12 - While it seems reasonable that the national guard trainee would not be sleeping in surface water and thus, it's reasonable to assume that this receptor's surface water exposure time is less than 24 hours/day. However, please provide the basis or justification for recommending a 2 hour/day exposure time since this rationale is not presented.
- Comment #18: Section 3.0, Fish Ingestion Rate for Farmer Resident, page 7, lines 18-24 - Ohio EPA recommends using the fish ingestion rate that is listed in the FWHHRAM for this receptor. The assumptions in the FWHHRAM were developed by Ohio EPA and USACE to be site-specific and protective of current and future exposures.
- Comment #19: Section 3.0, Fish Ingestion Rate for Hunter/Fisher Recreator, page 7, lines 26-31 - Ohio EPA recommends using the fish ingestion rate that is listed in the FWHHRAM for this receptor. The assumptions in the FWHHRAM were developed by Ohio EPA and USACE to be site-specific and protective of current and future exposures.
- Comment #20: Section 3.0, Particulate Emission Factor, page 8, lines 1-13 - It is true that the PEF presented in the FWHHRAM is conservative. This value was calculated to be conservative due to uncertainty regarding the type and nature of future training activities by the Ohio National Guard. Current events in Iraq have caused some people to question whether or not our reserve troops are adequately trained and prepared for war. People have questioned whether or not our troops would be impacted by the differences in terrain and weather since they had not experienced these conditions during training.



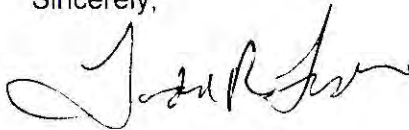
MR. MARK PATTERSON, ENVIRONMENTAL PROGRAM MANAGER  
RAVENNA ARMY AMMUNITION PLANT  
MAY 28, 2004  
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Therefore, Ohio EPA recommends using the PEF value as presented in the FWHHRAM, since future training activities may include the simulation of desert like conditions.

Comment #21: Section 3.0, Conversion Factor for Ingestion of Soils/Sediment Exposures for the Security Guard, the National Guard Dust/Fire Control Personnel, and the Recreator, page 8, lines 19-23: While it is true that the security guard and the recreator are unlikely to be exposed to soils/sediments/dust while sleeping, it is likely that the National Guard Dust/Fire Control Personnel may be a troop who sleeps in a tent on the ground. Therefore, for this receptor, Ohio EPA recommends following the FWHHRAM recommendations

If you have any questions regarding these comments, 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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/ams

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John Jent, USACE, Louisville  
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ec: Mike Eberle, Ohio EPA, DERR, NEDO



State of Ohio Environmental Protection Agency

Northeast District Office

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

March 19, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
FINAL, REMEDIAL DESIGN/REMOVAL  
ACTION REPORT, SAND CREEK  
DUMP, PORTAGE/TRUMBULL  
COUNTIES

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document entitled: "Remedial Design / Removal Action, Final Report for Sand Creek Dump, Ravenna Army Ammunition Plant, Ravenna, Ohio," dated January 2004. This document was prepared by MKM Engineers, Inc. for the U.S. Army Joint Munitions Command (JMC), under Contract and Delivery Order DAAA09-02-C-0072. Ohio EPA received this document on February 17, 2004. The following comments were generated from the review:

**GENERAL COMMENTS**

Comment # 1: The title of this report indicates that it is a "Final" document. This is the first time Ohio EPA has had an opportunity to review this document. The document should be considered a "Preliminary Draft." In a previous meeting, which included representatives from the USACE, the Ravenna Army Ammunition Plant (RVAAP), and Ohio EPA, it was decided to change the terminology utilized to describe the various reports which are submitted by the contractor. The following terminology is to be utilized for future submissions:

Old Terminology

Draft  
Draft-Final  
Final

New Terminology

Preliminary Draft  
Draft  
Final

The documents which are to be submitted to the information repositories in Newton Falls and Ravenna are the draft and final versions of the reports.



It is anticipated that for work plans, the format which the project team has been utilizing will remain in place. That is, there will be a draft work plan and, subsequent to comment resolution (matrices and meetings), the work plan will be revised and submitted as a final work product.

- Comment # 2: Hard copies of the Chain of Custodies have been omitted from the report. Even though they are included electronically in Appendix G, Ohio EPA requests that hard copies of all Chain of Custodies be provided for this report and all future submittals. Laboratory Analytical Reports included in electronic form may save time, money, and resources, however, they can prohibit review by the public.
- Comment # 3: Ohio EPA understands that the use of "Remedial Action / Remedial Design" terminology by the contractor was mandated by the U.S. Army Joint Munitions Command (JMC). It should be clarified that Ohio EPA considers this report an "Interim Action Report" only, and that the removal action performed should in no way be construed as a final remedy.
- Comment # 4: Cobalt is consistently spelled incorrectly throughout Section 4 (e.g., both text and tables) of this document. Please change all instances of "cobolt" to "cobalt."

### **SPECIFIC COMMENTS**

- Comment # 5 : Section 1.3, Summary of RD/RA Activities, page 1-6, 2<sup>nd</sup> paragraph - The text in this paragraph makes no mention of debris volume. Please add text to this section indicating the volume of debris removed.
- Comment #6 : Section 2.3, Previous Investigations, page 2-2, line 12 - The text states that "since Sand Creek is the habitat for state-endangered species (Mountain Brook Lamprey and the river otter), the Relative Risk Site Evaluation for this AOC was scored HIGH." Please be advised that the river otter is no longer listed as a state-endangered species.
- Comment # 7: Section 4.1.1.1, TAL Metals, page 4-3, lines 1 and 2 - Please change "SS-017-0001-SO" and "SS-018-0001-SO" to "SCSS-017-0001-SO" and "SCSS-018-0001-SO," respectively.



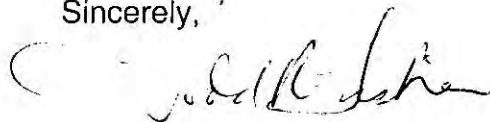
Mr. Mark Patterson  
March 19, 2004  
Page 3

- Comment # 8: Section 4.1.1.1, TAL Metals, page 4-5, lines 17 and 18 - Please change "SS-018-0001-SO" to "SCSS-018-0001-SO."
- Comment # 9: Section 4.1.1.1, TAL Metals, page 4-6, line 28 - Please change "SS-015-0001-SO" to "SCSS-015-0001-SO."
- Comment # 10: Section 4.1.1.1, TAL Metals, page 4-7, line 27 - Please change "SS-026-0001-SO" to "SCSS-026-0001-SO."
- Comment # 11: Table 4.1, Shallow Soil Samples March 2003, VOCs, SVOCs, Pesticides, and PCBs - Please convert units, so that they are the same across all columns of this Table (i.e., convert Region IX criteria from mg/kg to µg/kg). Please apply this strategy to Tables 4.2 and 4.3. Having uniform units across columns can greatly improve table readability.
- Comment # 12: APPENDIX E: Survey Report - It is unclear what coordinate system, scale, and projection was used to create this report. Using UTM 17, WGS84/NAD83, and Ohio State Plane North coordinates (Fipzone: 3401 and ADSzone: 4976), the Northing and Easting values should roughly be 4561918N and 495906E, respectively (source Topozone.com). This differs greatly from the values presented in the report. Please recheck points and/or provide coordinate system and datum used to generate the report.
- Comment # 13: APPENDIX F: Field Sampling Reports - For future submittals, please change "Grian Size" to "Grain Size" under the heading "Analytical Parameters."
- Comment # 14: APPENDIX F: Field Sampling Reports, Location ID SCSW-001-0001-SW - Please provide more information on how the sample was lost "due to lab error."
- Comment # 15: APPENDIX F: Field Sampling Reports, Location ID SCSW-001-0001-SW - There are two sampling reports with the same Location ID (original and resample). The sample ID's should not be the same, even though they were taken at different times from the same sample location.
- Comment # 16: APPENDIX F: Field Sampling Reports, Location ID SCSW-002-0001-SW - No parameters were selected. Please add a check mark next to those parameters analyzed by the lab.

Mr. Mark Patterson  
March 19, 2004  
Page 4

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

Sincerely,



Todd R. Fisher  
Project Coordinator  
Division of Emergency and Remedial Response  
[Todd@ToddFisher.us](mailto:Todd@ToddFisher.us)

TRF/kss

cc: Bonnie Buthker, Ohio EPA, SWDO/OFFO  
Eileen Mohr, Ohio EPA, DERR, NEDO  
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Jim Panozzo, MKM, RVAAP  
Brian Stockwell, MKM, RVAAP  
Paul Zorko, USACE, Louisville  
John Jent, USACE, Louisville

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

April 5, 2004

RE: RAVENNA ARMY AMMUNITION PLANT,  
PORTAGE/TRUMBULL COUNTIES,  
RESPONSES TO OHIO EPA  
COMMENTS, PARIS-WINDHAM AND  
~~SAND CREEK DUMPS~~  
RD/RA DRAFT FINAL REPORT

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed "MKM's Response to the Ohio EPA March 2004 Comments, Paris-Windham Road Dump RD/RA Draft Final Report, Ravenna Army Ammunition Plant, Ravenna, OH 44266," and "MKM's Response to the Ohio EPA February 2004 Comments, Sand Creek Dump RD/RA Draft Final Report, Ravenna Army Ammunition Plant, Ravenna, OH 44266." These two Response to Comments (RTC) tables were received on March 31, 2004. Ohio EPA has determined that all responses to comments have been adequately addressed and recommends issuance of the Final reports.

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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

cc: Eileen Mohr, Ohio EPA, NEDO, DERR  
Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Laurie Moore, Ohio EPA, SWDO, OFFO  
Richard Callahan, MKM, RVAAP  
Glen Beckham, USACE, Louisville

Brian Stockwell, MKM, RVAAP  
James Panozzo, MKM, RVAAP  
Stan Levenger, MKM, RVAAP  
John Jent, USACE, Louisville

ec: Mike Eberle, Ohio EPA, DERR, NEDO







State of Ohio Environmental Protection Agency

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

April 8, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
~~SAND CREEK DUMP~~  
FINAL RD/RA REPORT

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "Final, Remedial Design / Removal Action Plan Report For Sand Creek Dump, Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated March 2004 and received at Ohio EPA on April 6, 2004, was prepared for the U.S. Army Joint Munitions Command (JMC), by MKM Engineers, Inc., under contract number DAAA09-02-C-0072,

Ohio EPA has determined that all requested changes to the text have been made and considers this report complete.

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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

cc: Eileen Mohr, Ohio EPA, NEDO, DERR  
Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Glen Beckham, USACE, Louisville  
Brian Stockwell, MKM, RVAAP  
Stan Levenger, MKM, RVAAP  
Richard Callahan, MKM, RVAAP

ec: Mike Eberle, Ohio EPA, NEDO, DERR





State of Ohio Environmental Protection Agency

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

May 26, 2004

COL William Zieber  
United States Property and Fiscal Officer for Ohio  
2825 West Dublin-Granville Road  
Columbus, OH 43235-2789

**Re: Ravenna Army Ammunition Plant Transfer of Pistol Range**

Dear COL Zieber:

The purpose of this letter is to document the Ohio Environmental Protection Agency's (Ohio EPA) position concerning the early transfer of the Pistol Range Area of Concern (AOC) at the Ravenna Army Ammunition Plant (RVAAP) from the U.S. Army, BRAC - Hampton Roads, to the National Guard Bureau (NGB). Ohio EPA understands that the NGB needs to assume control over the former Pistol Range, prior to completion of the remedy, in order to be eligible for funding necessary to re-develop this site as a range. The NGB plans to use the former pistol range as a live-fire range for small arms, including .50 caliber machineguns with plastic ammunition, combat shotguns, various pistols, and the 9 mm submachinegun.

The Pistol Range is identified in the Installation Restoration Program (IRP) as AOC # RVAAP-36. The Pistol Range is a small (350' x 150') area north of the Winklepeck Burning Grounds (WBG) and was used primarily to re-certify marksmanship requirements for the civilian contract security force from 1941 through approximately 1993. During the timeframe of the mid -1950s until 1993, the Pistol Range was also occasionally utilized for local live-fire marksmanship training with various individual and crew-served weapons by members of the Ohio Army National Guard (OHARNG) and the U.S. Army Reserve. The weapons used were the .38 caliber pistol, .45 caliber pistol, 12 gauge shotgun, 5.56 mm rifle, .30 caliber rifle, 7.62 mm rifle, .30 caliber machine gun, and .45 caliber submachinegun. The major contaminant of concern at this site is lead from bullets and shot fired into the embankment or berm.

The planned remediation of the Pistol Range by the U.S. Army, BRAC - Hampton Roads, is as follows:

- sticks, stumps, and other debris will be removed, as needed, to facilitate the following removal operations;
- the top foot of soil on the entire face of the berm will be removed and sifted for lead using the appropriate screen size(s);
- lead shot will be containerized for disposal or recycling in accordance with all applicable State, Federal, and Local rules, laws, and regulations;





- sifted soil will be stockpiled (observing proper sedimentation and erosion controls) with the following exception, and depending upon analytical results, the soil may either be re-used for restoring the embankment, or it must be disposed of in accordance with all applicable State, Federal, and Local rules, laws, and regulations. In the event that the soils, based upon previous analytical results, fail the Toxic Characteristic Leaching Procedure (TCLP) for lead, those soils will immediately be containerized (i.e., not stockpiled), in order to prevent the necessity of undergoing a Resource Conservation and Recovery Act (RCRA) closure;
- the embankment will be restored utilizing either sifted soil or clean soil (tested according to facility-wide protocols) from either an on-installation or off-installation source; and
- the embankment will be stabilized with the approved RVAAP seed mixture and appropriate run-off control measures utilized.

An alternative remediation would be as follows:

- sticks, stumps, and other debris will be removed as needed to facilitate the following removal operations;
- the top foot of soil on the entire face of the berm will be removed and will immediately be containerized for disposal in accordance with all applicable State, Federal, and Local rules, laws, and regulations;
- the embankment will be restored utilizing clean soil (tested according to facility-wide protocols) from either an on-installation or off-installation source; and
- the embankment will be stabilized with the approved RVAAP seed mixture and appropriate run-off control measures utilized.

Based on our understanding of site conditions, Ohio EPA feels that either of the planned remediations will adequately address lead contamination at this AOC. Therefore, if the U.S. Army, BRAC - Hampton Roads, agrees to commit, in writing, to the NGB, OHARNG, and Ohio EPA that the Pistol Range will be remediated in accordance with either of the above-stated procedures, Ohio EPA would recommend that the NGB sign for the transfer of the property. Once the planned remediation for the Pistol Range is completed, no further remedial action would be required by Ohio EPA, until such time as the OHARNG proposed to close this small arms range. At that time, residual contamination present at the range would have to be evaluated, to determine if additional cleanup actions consistent with, and supportive of the new reuse of this land, would be required.

Ohio EPA also understands that the NGB will not re-develop the pistol range area until the Army's remediation is completed. Until the planned remedy is implemented, the NGB agrees to ensure access to the site is controlled, such that the site does not pose a risk to

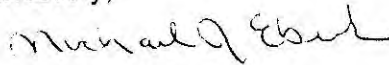


COL WILLIAM ZIEBER  
UNITED STATES PROPERTY AND FISCAL OFFICER FOR OHIO  
MAY 26, 2004  
PAGE 3

human health. In addition, OHARNG will ensure that both the Army and their contractors are provided access to the pistol range, so that the planned remediation activities can be completed.

If you have any questions regarding the contents of this letter or the recommendation contained herein, please do not hesitate to contact me at (330) 963-1221.

Sincerely,

  
- Fox -

Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Mark Patterson, RVAAP  
JoAnn Watson, AEC  
LTC Tom Tadsen, OHARNG  
MAJ Kim O'Keefe, NGB

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR



State of Ohio Environmental Protection Agency

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2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

April 5, 2004

RE: RAVENNA ARMY AMMUNITION PLANT,  
PORTAGE/TRUMBULL COUNTIES,  
RESPONSES TO OHIO EPA  
~~COMMENTS AND LOAD LINE 11~~  
DRAFT FINAL IRA REPORT

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed "MKM's Response to the Ohio EPA June 14, 2001 Comments, Load Line 11 Interim Removal Action Draft Final Report, Ravenna Army Ammunition Plant, Ravenna, OH 44266," and the "Load Line 11 Draft Final Interim Removal Action Report, Ravenna Army Ammunition Plant, Ravenna, OH 44266." Both the Draft Final report and the response to comments (RTC) table were received on March 8, 2004.

The following comments have not been addressed in the Load Line 11 Draft Final IRA Report:

- Item 2: List of Acronyms, pages iii and iv - The following acronyms have not been added to the report: ACM, AP, PCHD, and OHARNG. Please add these to the Acronym List.
- Item 3: Figure 1 -1 Ravenna Army Ammunition Plant Location Map - Please provide a direction indicator on this figure.
- Item 4: Figure 1-2 Load Line 11 Interim Action Facility Location Map - Load Line 11 has been omitted from the Legend of Sites. Please add Load Line 11.
- Item 14: Section 7.0 References, page 7-1 - Please include June 7, 2001 Ohio EPA correspondence in the references section.

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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

cc: Eileen Mohr, Ohio EPA, NEDO, DERR  
Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Brian Stockwell, MKM, RVAAP  
James Panozzo, MKM, RVAAP

John Jent, USACE, Louisville  
Richard Callahan, MKM, RVAAP  
Glen Beckham, USACE, Louisville  
Stan Levenger, MKM, RVAAP

ec: Mike Eberle, Ohio EPA, NEDO, DERR





State of Ohio Environmental Protection Agency

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

May 28, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE / TRUMBULL COUNTIES  
**DRAFT CENTRAL BURN PITS**  
HHRA WHITE PAPER

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

Dear Mr. Patterson:

Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "White Paper Human Health Risk Assessment Approach for the Central Burn Pits Remedial Investigations, Ravenna Army Ammunition Plant, Ravenna, Ohio, Rev. 0." This document, dated April 20, 2004 and received at Ohio EPA on April 21<sup>st</sup>, was jointly prepared by MKM Engineers and Tetra Tech Nus, Inc. The following comments were generated from the review of the above-referenced document:

**COMMENTS**

- Comment # 1: General Comment/Introduction - The white paper was clearly written and thoroughly illustrated how the FWHHRAM will be applied at these AOCs. The author did a good job pointing out where these are deviations from the risk manual and explaining why these deviations are recommended.
- Comment # 2: Section 1.0, Introduction, Background, page 1, lines 23-24 - The text states that "Sand Creek runs along the western boundary of the site and these are intermittent drainage ditches or gullies." What are "intermittent drainage ditches or gullies." The sentence as written infers that Sand Creek is an intermittent stream. This is not the case. Please make the appropriate changes to the text.
- Comment # 3: Section 2.0, Data Evaluation, page 2, line 9 - The proposed surrogates for 1,2-dichloroethene (total) and endosulfan II are acceptable. Ohio EPA recommends using the Region 9 PRG for benzo(a)pyrene as the surrogate for phenanthrene, and benzo(g,h,i)perylene. This approach is consistent with past practices.
- Comment # 4: Section 3.0, Potentially Exposed Populations, Exposure Media, and Exposure Pathways, page 5, lines 16-19 - Ohio EPA agrees that the hypothetical future land use exposure by the security guard/maintenance worker is most likely limited to soil only. However, this receptor reflects exposure of a maintenance worker



who could have contact with surface water and sediment during erosion control activities, natural resource management/sampling, or any future construction that may impact this AOC.

- Comment # 5: Section 3.0, Potentially Exposed Populations, Exposure Media, and Exposure Pathways, page 5 lines 21-31 - Ohio EPA agrees that the future land use scenario should include the national guard trainer/resident receptor. This receptor was originally presented in the LL 1-4 HHRA. Ohio EPA recommends that this receptor be presented in the main text of the report along with the other receptors evaluated per this white paper. Therefore, the inclusion of this receptor does not have to be limited to the uncertainty section.
- Comment # 6: Section 3.0, Inhalation Rate for National Guard Trainee, page 6, lines 28-33 - Ohio EPA recommends using the inhalation rate that is listed in the FWHHRAM for this receptor. The assumptions in the FWHHRAM were developed by Ohio EPA and USACE to be site-specific and protective of current and future exposures. This value was partly based on the Voluntary Action Program standard default assumptions for a construction worker.
- Comment # 7: Section 3.0, Exposure Time for National Guard Trainee Exposed to Surface Water, page 7, lines 1-4 - While it seems reasonable that the national guard trainee would not be sleeping in surface water and thus, it's reasonable to assume that this receptor's surface water exposure time is less than 24 hours/day. However, please provide the basis or justification for recommending a 2 hour/day exposure time since this rationale is not presented.
- Comment # 8: Section 3.0, Fish Ingestion Rate for Farmer Resident, page 7, lines 10-16 - Ohio EPA recommends using the fish ingestion rate that is listed in the FWHHRAM for this receptor. The assumptions in the FWHHRAM were developed by Ohio EPA and USACE to be site-specific and protective of current and future exposures.
- Comment # 9: Section 3.0, Fish Ingestion Rate for Hunter/Fisher Recreator, page 7, lines 18-23 - Ohio EPA recommends using the fish ingestion rate that is listed in the FWHHRAM for this receptor. The assumptions in the FWHHRAM were developed by Ohio EPA and USACE to be site-specific and protective of current and future exposures.
- Comment # 10: Section 3.0, Particulate Emission Factor, page 7, lines 30-36: It is true that the PEF presented in the FWHHRAM is conservative. This value was calculated to be conservative due to uncertainty regarding the type and nature of future training activities by the Ohio National

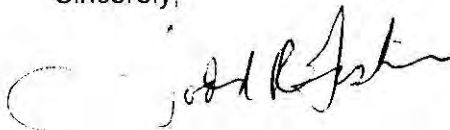
MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
MAY 28, 2004  
PAGE 3

Guard. Current events in Iraq have caused some people to question whether or not our reserve troops are adequately trained and prepared for war. People have questioned whether or not our troops would be impacted by the differences in terrain and weather since they had not experienced these conditions during training. Therefore, Ohio EPA recommends using the PEF value as presented in the FWHHRAM, since future training activities may include the simulation of desert like conditions.

Comment # 11: Section 3.0, Conversion Factor for Ingestion of Soils/Sediment Exposures for the Security Guard, the National Guard Dust/Fire Control Personnel, and the Recreator, page 8, lines 12-16 - While it is true that the security guard and the Recreator are unlikely to be exposed to soils/sediments/dust while sleeping, it is likely that the National Guard Dust/Fire Control Personnel may be a troop who sleeps in a tent on the ground. Therefore, for this receptor, Ohio EPA recommends using the assumptions in the FWHHRAM.

If you have any questions regarding these comments, 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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/ams

cc: Eileen Mohr, Ohio EPA, DERR, NEDO  
Laurie Moore, Ohio EPA, OFFO, SWDO  
Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Brian Tucker, Ohio EPA, DERR, CO  
Richard Callahan, MKM, RVAAP  
Stan Levenger, MKM, RVAAP  
Brian Stockwell, MKM, RVAAP  
Glen Beckham, USACE, Louisville  
John Jent, USACE, Louisville  
David Brancato, USACE, Louisville

ec: Mike Eberle, Ohio EPA, DERR, NEDO





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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

February 13, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
FINAL, REMEDIAL DESIGN/REMOVAL  
ACTION REPORT, ~~PARIS-WINDHAM~~  
~~ROAD DUMP~~, PORTAGE/TRUMBULL  
COUNTIES

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document entitled: "Remedial Design / Removal Action, Final Report for Paris-Windham, Ravenna Army Ammunition Plant, Ravenna, Ohio" dated January 2004. This document was prepared by MKM Engineers, Inc. for the U.S. Army Joint Munitions Command (JMC), under Contract and Delivery Order DAAA09-02-C-0072. Ohio EPA received this document on January 15, 2004. The following comments were generated from the review:

**GENERAL COMMENTS**

Comment # 1: The title of this report indicates that it is a "Final" document. This is the first time Ohio EPA has had an opportunity to review this document. The document should be considered a "Preliminary Draft." In a previous meeting, which included representatives from the USACE, the Ravenna Army Ammunition Plant (RVAAP), and Ohio EPA, it was decided to change the terminology utilized to describe the various reports which are submitted by the contractor. The following terminology is to be utilized for future submissions:

Old Terminology

Draft  
Draft-Final  
Final

New Terminology

Preliminary Draft  
Draft  
Final

The documents which are to be submitted to the information repositories in Newton Falls and Ravenna are the draft and final versions of the reports.



It is anticipated that for work plans, the format which the project team has been utilizing will remain in place. That is, there will be a draft work plan and, subsequent to comment resolution (matrices and meetings), the work plan will be revised and submitted as a final work product.

- Comment # 2: Hard copies of the Chain of Custodies have been omitted from the report. Even though they are included electronically in Appendix G, Ohio EPA requests that hard copies of all Chain of Custodies be provided for this report and all future submittals. Laboratory Analytical Reports included in electronic form may save time, money, and resources, however, they can prohibit review by the public.
- Comment # 3: Ohio EPA understands that the use of "Remedial Action / Remedial Design" terminology by the contractor was mandated by the U. S. Army Joint Munitions Command (JMC). It should be clarified that Ohio EPA considers this report an "Interim Action Report" only, and that the removal action performed should in no way be construed as a final remedy.

#### **SPECIFIC COMMENTS**

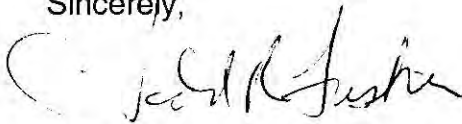
- Comment # 4: Section 1.2, Paris-Windham Road Dump Background, page 1-4, 1<sup>st</sup> paragraph, 1<sup>st</sup> sentence - The text states, "between the intersections of Paris-Windham Road and Remelia Road." "Remelia" is spelled incorrectly. "Remalia" is the correct spelling. Please make the appropriate changes to the text.
- Comment # 5: Figure 1-3, Paris-Windham Road Dump Site Map, Legend - "Intermitant Waterway" should be spelled "Intermittent Waterway." Please correct the Legend in Figure 1-3.
- Comment # 6: Section 1.3, Summary of RD/RA Activities, page 1-6, 1<sup>st</sup> paragraph - The text in this paragraph makes no mention of debris volume. Please add text to this section indicating the volume of debris removed.
- Comment # 7: Section 1.3, Summary of RD/RA Activities, page 1-6, 2<sup>nd</sup> paragraph, line 6 - The text states that "due to the presence of transitre, all debris was disposed of as special waste." Please change "transitre" to "transite" in the text.
- Comment # 8: Section 2.3, Previous Investigations, page 2-2, lines 19, 20, and 21 - The text states that "the study indicated that hunters and scrappers could be potential receptors." Should "scrappers" be "trappers?" Please verify that scrappers are the potential receptor.

Mr. Mark Patterson  
February 13, 2004  
Page 3

- Comment # 9: Section 3.8, Confirmation Sampling, page 3-6, lines 1-5 - The text states that "representatives from the Akron Regional Air Quality Management District concluded that as long as the transite fragments remain in their non-friable state (i.e., not pulverized or crushed), it would be acceptable to backfill the site as this would eliminate any exposure concerns and allow the area to return to its natural state." Please provide the October 14, 2003 Record of Telephone Conversation between MKM's Brian Stockwell and Akron Air's Chris Williams, regarding the site walkover and the observed transite fragments.
- Comment # 10: Table 4.1, Shallow Soil Samples March 2003, VOCs, SVOCs, Pesticides, and PCBs - Please convert units, so that they are the same across all columns of this Table (i.e., convert Region IX criteria from mg/kg to µg/kg). Please apply this strategy to Tables 4.2 and 4.3. Having uniform units across columns can greatly improve table readability.
- Comment # 11: Appendices - Please provide a signed copy of the Decision Document for Paris-Windham Dump (AOC # 51).

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

Sincerely,



Todd R. Fisher  
Project Coordinator  
Division of Emergency and Remedial Response  
[Todd@ToddFisher.us](mailto:Todd@ToddFisher.us)

TRF/kss

cc: Bonnie Buthker, Ohio EPA, SWDO/OFFO  
Eileen Mohr, Ohio EPA, DERR, NEDO  
Stan Levenger, MKM, RVAAP  
Jim Panozzo, MKM, RVAAP  
Brian Stockwell, MKM, RVAAP  
Paul Zorko, USACE, Louisville  
John Jent, USACE, Louisville

ec: Mike Eberle, Ohio EPA, DERR, NEDO





State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

April 7, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
~~PARIS-WINDHAM ROAD DUMP~~  
FINAL RD/RA REPORT

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "Final, Remedial Design / Removal Action Plan Report For Paris-Windham Road Dump, Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated March 2004 and received at Ohio EPA on April 6, 2004, was prepared for the U.S. Army Joint Munitions Command (JMC), by MKM Engineers, Inc., under contract number DAAA09-02-C-0072.

Ohio EPA has determined that all requested changes to the text have been made and considers this report complete.

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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

cc: Eileen Mohr, Ohio EPA, NEDO, DERR  
Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Glen Beckham, USACE, Louisville  
Brian Stockwell, MKM, RVAAP  
Stan Levenger, MKM, RVAAP  
Richard Callahan, MKM, RVAAP

ec: Mike Eberle, Ohio EPA, NEDO, DERR



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Bob Taft, Governor  
Christopher Jones, Director

May 20, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
PRELIMINARY DRAFT FACILITY-WIDE  
GROUNDWATER MONITORING PROGRAM  
PLAN (FWGWMPP)

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "Preliminary Draft, Facility-Wide Groundwater Monitoring Program Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated January 2004 and received at Ohio EPA on January 28, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District by Portage Environmental, under contract number GS-10F-0350M, delivery order number DACA27-03-F-0047.

This document was reviewed by personnel from Ohio EPA's Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR); and Division of Drinking and Ground Waters (DDAGW). The comments are presented in table form (see enclosure).

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

Sincerely,

  
- FCF -

Todd R. Fisher  
Project Coordinator  
Division of Emergency and Remedial Response  
[Todd.Fisher@epa.state.oh.us](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

enclosure

cc: Eileen Mohr, Ohio EPA, NEDO, DERR  
Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Diane Kurlich, Ohio EPA, NEDO, DDAGW  
Glen Beckham, USACE, Louisville  
Conni McCambridge, Ohio EPA, NEDO, DDAGW

John Jent, USACE, Louisville  
Susan McClauslin, RVAAP, Portage  
Greg Orr, Ohio EPA, NEDO, DHWM

ec: Mike Eberle, Ohio EPA, NEDO, DERR





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Bob Taft, Governor  
Christopher Jones, Director

May 25, 2004

Mark Patterson  
Commander's Representative  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, OH 44266-9297

**RE: RAVENNA ARMY AMMUNITION PLANT (OH5-210-020-730); PORTAGE COUNTY;  
PRELIMINARY DRAFT, ~~FACILITY-WIDE GROUND WATER MONITORING PROGRAM~~  
PLAN; DATED JANUARY 2004; RECEIVED JANUARY 28, 2004**

Dear Mr. Patterson:

The Army and Ohio EPA are in the process of negotiating Director's Findings and Orders (F&Os) which will include provisions for a Facility-wide Ground Water Monitoring Program (FWGWMP). Ground water monitoring activities currently being conducted under the RCRA (Open Detonation Area 2) and Solid Waste (Ramsdell Quarry Landfill) programs will be moved into the FWGWMP. Although the ground water monitoring at these sites will no longer be conducted in accordance with specific Ohio Administrative Code (OAC) rules (OAC 3745-54-90 through 3745-55-01 and OAC 3745-27-10), the intent of these regulations will be met within the context of the FWGWMP. The FWGWMP will also include a long term ground water monitoring network comprised of wells installed as part of the ground water investigations conducted at various Areas of Concern (AOCs) under the CERCLA program. The document currently under review is the preliminary draft of the proposed FWGWMP Plan. Ohio EPA has reviewed the document and has the following comments.

**COMMENTS**

1. Section 1.1 should be modified to document that an additional purpose of the FWGWMP is to ensure that the ground water monitoring obligations for the Ramsdell Quarry Landfill (RQL) and Open Detonation Area 2 (OD#2) are fulfilled. Although ground water monitoring at these two sites will no longer be performed in compliance with specific sections of the Ohio Administrative Code, the intent of the regulations is to be met through the implementation of the FWGWMP Plan.
2. Section 3.1, the bullets identifying the specific objectives of the FWGWMP should include documentation of the issues identified in Comment 1, above.
3. The discussion of the bedrock geology presented on page 3-3 seems to imply that the uppermost bedrock across the site is the Homewood Sandstone Member of the Pottsville Formation. However, previous reports have defined different uppermost bedrock units across the site. For example, the uppermost bedrock unit in the most northeastern





portion of the site is the shales of the Cuyahoga Formation. This should be verified and this section should be modified accordingly.

4. On page 3-4, the "Ground Water Occurrence" section fails to mention the occurrence of ground water at the interface between the glacial materials and the weathered top of bedrock. This section should be modified, accordingly.
5. Because of the fine grained nature of some of the sediments in the surface water bodies at the site, it may be an over simplification to state on page 3-4 that "ground water in the unconsolidated materials is in direct hydraulic communication with surface water, and that surface water drainage ways also act as ground water discharge locations." This section should be modified to state that ground water in the unconsolidated materials may be in direct hydraulic communication with surface water, and that surface water drainage ways also may act as ground water discharge locations if the sediments underlying the surface water bodies are not sufficiently fine to prohibit such interaction.
6. In general, the "Groundwater Occurrence" section minimizes the importance of the ground water resources found in the unconsolidated glacial materials at the site. However, it should be noted that many of the domestic and small public water supplies for homes and businesses surrounding the RVAAP are obtained from these materials. This section should be modified accordingly.
7. Arrows showing the estimated ground water flow direction(s) in the unconsolidated aquifer flow system and in the bedrock flow system should be added to Figures 3-1 and 3-2.
8. On page 3-8, the conclusion that transport of contaminants in the unconsolidated aquifer is only significant in local areas and not on a facility-wide basis does not take into consideration the movement of ground water and contaminants at the interface between the unconsolidated glacial material and the bedrock. Such movement could be continuous across the site or, at minimum, across large portions of the site and should not be discounted.
9. Table 3-1 is not a complete list of potential contaminants of concern at RVAAP. This table should be modified to include the general categories explosives, propellants, TAL metals, SVOCs/PCBs/Pesticides, and VOCs. Each general category should include documentation of what specific compounds are included.
10. Table 3-2 is incomplete. Each of the individual compounds included in the general categories which have an MCL or health advisory should be included on this table. The acronym N/A should be defined.



11. Page 3-9, incorrectly references Table 3-2 as being a list of wells where COPCs were detected. Table 3-3 actually contains this information.
12. Page 3-9 incorrectly references Table 3-3 as providing water quality and health advisories. The correct reference should be to Table 3-2.
13. Page 3-10, the reference to Table 3-3 should be changed to Table 3-2.
14. On page 3-13, it states that there are no background wells located upgradient of the AOCs that are completed in bedrock. During a previous investigation at the site, 14 background wells were installed. Seven of these wells were installed in bedrock. Although these seven wells may not technically be upgradient to the AOCs, they have been accepted by the Army and the Agency as representing background ground water conditions in the bedrock aquifers. This page should be modified accordingly.
15. In Section 3.1.3, it states that the major aquifer underlying the site is the Sharon Conglomerate. It should be noted that the Sharon Conglomerate is not the only bedrock aquifer providing domestic and public water supplies in the area surrounding the RVAAP. The importance of these other bedrock aquifers should not be minimized. This section should be modified accordingly.
16. Page 3-19 states that selected bedrock wells downgradient of LL-1 are downgradient of the whole site and that these wells form the basis of the facility-wide monitoring plan for indicating the potential for off-site ground water contaminant migration. This reasoning ignores the fact that many of the water supplies to the south of the facility are obtained from unconsolidated materials and bedrock other than the Sharon Conglomerate. In addition, there are areas along the southern boundary of the facility in which the ground water flow is to the south rather than to the east toward Load Line 1. This section should be modified accordingly.
17. The "Schedule for Implementation" section states that the plan will be implemented within 60 to 90 days after plan approval. It is possible that the FWGWMP Plan could be approved before the finalization of the Director's Findings and Orders. Because the Findings and Orders provide the mechanism for implementing an FWGWMP, it would seem that the plan cannot be implemented until the F&Os are final. This should be addressed in this section.
18. In Section 4.1, it states that if a monitoring well included in the FWGWMP is found to be of questionable integrity, a different well will be selected for monitoring. It is recommended that provisions be included in the Plan for prior Ohio EPA approval before any substitutions to the approved list of monitoring wells are made.



19. Section 4.1 states that if required, a new well will be installed as directed by the US. Army Project Manager. Provisions should be included for Ohio EPA to be part of this decision making process.
20. Total depth of the well should be added to the list of field parameters to be measured as documented on page 4-1. Procedures for this measurement should be added to this section.
21. On page 4-4, Section 4.2, the second sentence of the first paragraph of this section should be modified to state that the OD#2 and RQL wells will continue to be sampled, at a minimum, on a semi-annual basis. This change is necessary, because the next sentence in this paragraph states that the frequency of monitoring for all wells will be evaluated on an annual basis. This implies that the sampling frequency at OD#2 and RQL also will be re-evaluated. Although increasing the sampling frequency for these wells to quarterly is acceptable, reducing the frequency to less than semi-annually is not. The requested change ensures that an increase in sampling frequency for the wells at OD#2 and RQL can be evaluated and recommended for implementation, but a reduction in sampling frequency for these wells cannot be implemented.
22. Section 5.1, page 5-3, the minimum QA/QC information provided should also include surrogate recoveries.
23. Section 5.1, page 5-3, the statistical guidance documents cited should be modified to include the following two U.S. EPA documents:

Statistical Analysis of Ground Water Monitoring Data and RCRA Facilities, Interim Final Guidance (April 1989); and

Statistical Analysis of Ground Water Monitoring Data and RCRA Facilities, Addendum to Interim Final Guidance (July 1992).

It should be noted that the second document is presently cited in the Plan, however, the citation is not complete.

24. Section 5.2, page 5-3, the summary table of additional wells installed during any given year also should include the top of casing elevations of the wells and the screen slot size.
25. The sections of the Plan concerning the geology and hydrogeology at the site stress the importance of the Sharon Conglomerate as the major aquifer in the area around and including the RVAAP. This conclusion is based in large part on information gathered during investigations which were focused on finding high yield sources of drinking and industrial process water for use at the RVAAP. Although DDAGW does not dispute that

Mark Patterson  
Ravenna Army Ammunition Plant  
May 25, 2004  
Page 5

the Sharon Conglomerate is a major aquifer in the area and would probably have been the target for high yield drinking and industrial process water wells, it must be remembered that other aquifers in the area, including the unconsolidated glacial deposits and other bedrock units, do provide sufficient water for domestic and small public water supplies. These other aquifers are used extensively in the entire area surrounding the facility as sources for such water supplies. Therefore, the focus of the facility wide monitoring well network intended to determine whether contamination is moving off site cannot be only on the Sharon Conglomerate. The FWGWMP Plan should be modified to document the importance of other aquifers, both unconsolidated and bedrock, as sources of drinking water for both public and private water wells located in the vicinity of the facility. The FWGWMP Plan also should document that the locations of these wells, both public and private, and the aquifers they tap, will be evaluated when future decisions are made concerning which site monitoring wells will be included in the FWGWMP as monitoring points for potential off-site migration of contaminants.

## **CONCLUSIONS**

The FWGWMP Plan should be modified as per the above comments.

If you should have any questions regarding this matter, please feel free to contact me at (330) 963-1189 or via e-mail at [greg.orr@epa.state.oh.us](mailto:greg.orr@epa.state.oh.us).

Sincerely,



Gregory Orr  
Environmental Specialist  
Division of Hazardous Waste Management

GO:cl

cc: Jeremy Carroll, DHWM, CO  
  
ec: Natalie Oryshkewych, DHWM, NEDO  
Diane Kurlich, DDAGW, NEDO  
Eileen Mohr, DERR, NEDO  
Todd Fisher, DERR, NEDO





State of Ohio Environmental Protection Agency

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Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

September 1, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
DRAFT FACILITY-WIDE GROUNDWATER  
MONITORING PROGRAM PLAN  
(FWGWMPP)

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "Draft, Facility-Wide Groundwater Monitoring Program Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated July 2004 and received at Ohio EPA on July 16, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District by Portage Environmental, under contract number GS-10F-0350M, delivery order number DACA27-03-F-0047.

This document was reviewed by personnel from Ohio EPA's Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), and Division of Drinking and Ground Waters (DDAGW). The comments are presented in table form (see enclosure).

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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

enclosure

cc: Eileen Mohr, Ohio EPA, NEDO, DERR  
Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Diane Kurlich, Ohio EPA, NEDO, DDAGW  
Glen Beckham, USACE, Louisville  
Greg Orr, Ohio EPA, NEDO, DHWM  
Conni McCambridge, Ohio EPA, NEDO, DDAGW

John Jent, USACE, Louisville  
Paul Zorko, USACE, Louisville  
Susan McCauslin, Portage

ec: Mike Eberle, Ohio EPA, NEDO, DERR

ENCLOSURE TO 09/01/04 LETTER  
PAGE 1

OHIO EPA COMMENTS ON THE PRELIMINARY DRAFT - FACILITY-WIDE GROUNDWATER MONITORING PROGRAM PLAN FOR THE  
RAVENNA ARMY AMMUNITION PLANT, RAVENNA, OHIO

OHIO EPA - NEDO - DERR/DDAGW REVIEWERS: CONNI MCCAMBRIDGE, DIANE KURLICH, AND TODD FISHER

SECTION/ PAGE/LINE #	COMMENT	RECOMMENDATION	RESPONSE
<b>Part I - FWGWMP SAP Addendum</b>			
Section 3.1.2.1; pg. 3-2	A stratigraphic column illustrating the subsurface geology was not included in the submittal to support the text discussion and Figure 3-1 (bedrock map).	A stratigraphic column should be included in support of Section 3.1.2.1 and Figure 3-1.	
Section 3.1.2.1; pg. 3-3; lines 16 - 17	The source of information in the statement, <i>"There is some evidence that varved clays, indicative of lake deposits, exist in some of the deeper bedrock valleys."</i> was unclear.	A clarification of the source of information in this statement (site-specific observation versus information from other sources and appropriate reference) should be included in the text for this statement.	
Section 3.1.2.1; pg. 3-3; line 25	The word <i>"general"</i> was used in this statement.	The word <i>"general"</i> should be changed to <i>"in general"</i> in this statement.	
Section 3.1.1.1; pg. 3-9; line 10	This section was incorrectly numbered.	This section should be renumbered as <i>"3.1.2.2."</i>	
Section 3.1.1.1; pg. 3-9; lines 17 - 18	Ohio EPA agrees with the proposed locations and numbers of monitoring wells in the FWGWMP. However, if ground water contamination is detected during any sampling and analysis activities, additional wells may be needed to define the full extent (aerial and vertical) of ground water contamination and to determine the rate of contaminant migration beneath the site.	The text should clarify that additional ground water monitoring wells may need to be incorporated into the FWGWMP if ground water contamination is detected during any sampling and analysis activities.	



**ENCLOSURE TO 09/01/04 LETTER**  
**PAGE 2**

Figure 3-5; pg. 3-18	In Figure 3-5, two boxes use the phrase " <i>Consider for inclusion...</i> " These statements should read, " <i>Prepare for inclusion...</i> "	The word " <i>consider</i> " should be replaced with the word " <i>prepare</i> " in the two boxes.	
Section 3.1.1.1; pg. 3-19; line 6	The following acronym " <i>OEPA</i> " was used in reference to the Ohio Environmental Protection Agency.	The following acronym " <i>OEPA</i> " should be changed to " <i>Ohio EPA</i> ."	
Table 4-1, pg.4-6 through 4-8	The Initial Round Sample Identification Listing (Table 4-1) has two wells that should be added and one well that should be deleted from the list.	<p>The following wells should be added to/removed from the Initial Round Sample Identification Listing (Table 4-1):</p> <p><u>Add</u>  Load Line 1: well LL1-084.  Central Burn Pits: well CBP-007.</p> <p><u>Remove</u>  Central Burn Pits: well CBP-008.</p>	
<b>Part II - FWGWMP QAPP Addendum</b>			
Section 8.1; pg. 11; line 3	The text stated that matrix spike/matrix spike duplicates (MS/MSDs) will be " <i>...collected at a frequency of 5 percent.</i> " This number does not correspond with the number in the procedure discussed in Section 4.3.7 of the FSAP. The latter indicates that MS/MSDs should <i>also</i> " <i>...represent 10% of the total number of field samples collected...</i> " (FSAP, pg. 4-38).	The phrase " <i>...represent 10% of the total number of field samples collected...</i> " should be added to this statement.	





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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

December 9, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
FINAL FACILITY-WIDE GROUNDWATER  
MONITORING PROGRAM PLAN (FWGWMPP)

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "Final, Facility-Wide Groundwater Monitoring Program Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated September 2004 and received at Ohio EPA on October 26, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District by Portage Environmental, under contract number GS-10F-0350M, delivery order number DACA27-03-F-0047.

This document was reviewed by personnel from Ohio EPA's Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), and Division of Drinking and Ground Waters (DDAGW). All previous Agency comments have been adequately addressed and all requested changes have been incorporated into this final document. Ohio EPA hereby approves this document.

On December 7, 2004, the United State Army Corps of Engineers (USACE) contacted Ohio EPA by phone and requested a conference call with DERR and DDAGW, to discuss how to address recent ground water sampling data from Open Detonation Area # 2 (OD # 2) and Ramsdell Quarry Landfill (RQL) that show statistical significant differences (SSDs) for arsenic, pH, and Specific Conductance.

According to Section IV Exemptions, (9),(b), i of the Final RVAAP Findings & Orders (June 10, 2004), RVAAP is exempt from complying with Ohio Administrative Code (OAC) Rules 3745-54-90 through 3745-54-99, 3745-55-01, and 3745-55-011 for ground water investigation, monitoring, and remediation activities conducted at OD # 2, provided, however, that:

- i. Respondent shall conduct ground water monitoring and comply with all ground water monitoring and reporting requirements in OAC Rules 3745-54-90 through 3745-54-99; 3745-55-01; and 3745-55-011 for OD # 2, until Ohio EPA has **approved** the Facility-wide Ground Water Monitoring Program Plan (FWGWMPP) and **associated implementation schedule**.

According to Section IV Exemptions, (9),(d), i of the Final RVAAP Findings & Orders (June 10, 2004), RVAAP is exempt from complying with ground water investigation, monitoring, and remediation activities in OAC Rule 3745-27-10, for RQL, provided, however, that:

MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
DECEMBER 9, 2004  
PAGE 2

- i. Respondent shall conduct ground water monitoring at RQL, pursuant to OAC Rule 3745-21-10, effective March 1, 1990, and fulfill all ground water monitoring and reporting requirements, in accordance with OAC Rule 3745-27-10, until Ohio EPA's **approval** of the FWGWMPP and **associated implementation schedule**.

Ohio EPA has not received an implementation schedule for the Final FWGWMPP and, therefore, RVAAP will be required to follow the requirements set forth by OAC Rules 3745-54-90 through 3745-54-99; 3745-55-01; and 3745-55-011 (with respect to OD # 2) and OAC Rule 3745-27-10 (with respect to RQL), until an approved implementation schedule is in place.

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

TRF/kss

cc: Eileen Mohr, Ohio EPA, DERR, NEDO  
Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Paul Zorko, USACE, Louisville  
Glen Beckham, USACE, Louisville  
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Conni McCambridge, Ohio EPA, DDAGW, NEDO  
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Bob Taft, Governor  
Christopher Jones, Director

August 12, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
CRT LL's 6, 9, 11, CBP, COBBS PONDS  
HHRA WHITE PAPER

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the Response to Comments Table (CRT) for the "White Paper Human Health Risk Assessment Approach for the ~~Central Burn Pits, Cobbs Ponds, Load Line 11, and Load Lines 6 & 9 Remedial Investigations.~~" This table was received at Ohio EPA on July 30th. The following comments were generated from the review of the above-referenced document:

**General Comments:**

Comment #1: We may need to sit down and discuss the use and application of the FWHHRAM. First, we need to discuss how there seems to be some inconsistencies with respect to following and using the FWHHRAM. For example, some receptors are being added while others are being overlooked. In the case of WBG, they included an evaluation of the Mark 19 Soldier (only) in the FS and this receptor was not considered in the FWHHRAM. If the Army only evaluates the current receptor (e.g. the Guard trainee), restrictions will need to automatically be placed on the property to prevent other potential exposure scenarios. These restrictions will require funding and resources to maintain in perpetuity. Because other scenarios are not considered, the risk assessment will not give necessary information for the risk managers to decide if other cleanup standards that would not require restrictions could be more cost effective for these areas of concern. The Ohio EPA may consider placing future restrictions on those receptors which were not fully evaluated.

Comment #2: These white papers make an attempt to adjust some of the exposure parameters listed in the FWHHRAM for certain receptors. The Ohio EPA believes that the whole point of developing the FWHHRAM was to standardize the risk assumptions and approach at Ravenna and to facilitate reviews. However, it seems that we keep revisiting the use or appropriateness of exposure assumptions presented in the FWHHRAM. This defeats the purpose of developing this guidance. The Army should be clear with their contractors on how to use the FWHHRAM.

**Central Burn Pits White Paper Comment Response:**

Comment Responses #1, #2, and #3: The Ohio EPA finds these responses acceptable.





- Comment Response #4: The point of the comment is that we need to evaluate exposure to sediment and surface water if these media are present on site. The text stated that a potential exposure could be erosion control or natural resource management or sampling but it was not clear how this exposure was being evaluated. The comment was not suggesting the evaluation of the construction worker. Therefore, include in the report the portion of the response that states that the ONG Trainee's exposure to surface water and sediment is more likely representative of these types of exposures.
- Comment Response #5: On April 15th, Ohio EPA had a conference call with MKM and their consultants. We discussed concerns that the consultants raised regarding the receptor list. It was expressed on that call that it was felt that the residential receptor, along with the recreator and trespasser, were appropriate and to be included in this evaluation to give us a more robust evaluation and more information for risk management purposes. Agreement was made to include these receptors in addition to those in the FWHHRAM. Ohio EPA sent an email to Army contacts documenting the agreements that had been reached during the conference call (See attached email). However, since that call the Army has changed its position. At the very least, these receptors could be evaluated and presented in the uncertainty section to give the reader a more complete picture for risk management.
- Comment Response #6: The Army, with assistance from Ohio EPA, developed the exposure assumptions found in the FWHHRAM. These were developed based on site specific information and land use. These were developed to be protective for current and future users of the property and for consistency. The Ohio EPA does not fully understand why the Army has chosen not to follow these values presented in the FWHHRAM. Ohio EPA concurs with the approach to evaluate the alternative inhalation rate in the uncertainty section when these exposures exceed acceptable risk levels.
- Comment Response #7: Please include the response to comment in the text of the report for clarification purposes.
- Comment Responses #8 and #9: The Ohio EPA finds these responses acceptable
- Comment Response #10: The Army, with assistance from Ohio EPA, developed the exposure assumptions found in the FWHHRAM. These were developed based on site specific information and land use. These were developed to be protective for current and future users of the property and for consistency. The Ohio EPA does not fully understand why the Army has chosen not to follow these values presented in the FWHHRAM. Ohio EPA concurs with the approach to evaluate the alternative PEF rate in the uncertainty section when these exposures exceed acceptable risk levels.
- Comment Response #11: Concur. In the report, please include the portion of the comment response that explains that this is based on the hours per day over which this



exposure is averaged (ie. 24 total hours versus 16 hours awake), 4 hour exposure over a 16 hour day versus a 24 hours day.

**Upper and Lower Cobbs Pond White Paper Comment Response:**

Comment Responses #1, #2, #3, #4, and #5: The Ohio EPA finds these responses acceptable

Comment Response #6: Ohio EPA recommends that any detection of explosives or propellants, regardless of the concentration, are considered COPCs at Ravenna since these are known Army related contaminants.

Comment Response #7: The Ohio EPA finds this response acceptable

Comment Response #8, #9, #10, #11, #12, and #13: The Ohio EPA finds these responses acceptable.

Comment Response #14: The point of the comment is that we need to evaluate exposure to sediment and surface water if these media are present on site. The text stated that a potential exposure could be erosion control or natural resource management or sampling but it was not clear how this exposure was being evaluated. The comment was not suggesting the evaluation of the construction worker. Therefore, include in the report the portion of the response that states that the ONG Trainee's exposure to surface water and sediment is more likely representative of these types of exposures.

Comment Response #15: On April 15th, Ohio EPA had a conference call with MKM and their consultants. We discussed concerns that the consultants raised regarding the receptor list. It was expressed on that call that it was felt that the residential receptor, along with the recreator and trespasser, were appropriate to include in this evaluation to give us a more robust evaluation and more information for risk management purposes. Agreement was made to include these receptors in addition to those in the FWHHRAM. Ohio EPA sent an email to Army contacts documenting the agreements that had been reached during the conference call (See attached email). However, since that call the army has changed its position. At the very least, these receptors could be evaluated and presented in the uncertainty section to give the reader a more complete picture for risk management.

Comment Response #16: The Army, with assistance from Ohio EPA, developed the exposure assumptions found in the FWHHRAM. These were developed based on site specific information and land use. These were developed to be protective for current and future users of the property and for consistency. The Ohio EPA does not fully understand why the Army has chosen not to follow these values presented in the FWHHRAM. Ohio EPA concurs with the approach to evaluate the alternative inhalation rate in the uncertainty section when these exposures exceed acceptable risk levels.

Comment Response #17: Please include the response to comment in the text of the report for clarification purposes.

Comment Response #18 and 19: The Ohio EPA finds these responses acceptable.

Comment Response #20: The Army, with assistance from Ohio EPA, developed the exposure assumptions found in the FWHHRAM. These were developed based on site specific information and land use. These were developed to be protective for current and future users of the property and for consistency. Ohio EPA concurs with the approach to evaluate the alternative PEF rate in the uncertainty section when these exposures exceed acceptable risk levels.

Comment Response #21: Concur. In the report, please include the portion of the comment response that explains that this is based on the hours per day over which this exposure is averaged (ie. 24 total hours versus 16 hours awake), 4 hour exposure over a 16 hour day versus a 24 hours day.

**Load Lines 6, 9, and 11 White Paper Comment Responses:**

Comment Response #1 and #2: The Ohio EPA finds these responses acceptable.

Comment Response #3: As stated previously, on April 15th, Ohio EPA had a conference call with MKM and their consultants. It was expressed on that call that it was felt that the residential receptor, along with the recreator and trespasser, were appropriate to include in this evaluation to give us a more robust evaluation and more information for risk management purposes. Agreement was made to include these receptors in addition to those in the FWHHRAM. Ohio EPA sent an email to Army contacts documenting the agreements that had been reached during the conference call (See attached email). However, since that call the army has changed its position. At the very least, these receptors could be evaluated and presented in the uncertainty section to give the reader a more complete picture for risk management.

Comment Response #4: The Ohio EPA finds this response acceptable.

Comment Response #5: same as #3 above.

Comment Response #6: The Army, with assistance from Ohio EPA, developed the exposure assumptions found in the FWHHRAM. These were developed based on site specific information and land use. These were developed to be protective for current and future users of the property and for consistency. The Ohio EPA does not fully understand why the Army has chosen not to follow these values presented in the FWHHRAM. Ohio EPA concurs with the approach to evaluate the alternative inhalation rate in the uncertainty section when these exposures exceed acceptable risk levels.

Comment Response #7: Please include the response to comment in the text of the report for clarification purposes.

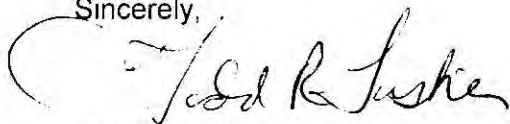
Comment Response #8 and #9: The Ohio EPA finds these responses acceptable.



RAVENNA ARMY AMMUNITION  
AUGUST 12, 2004  
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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

TRF:bo

[Todd.Fisher@epa.state.oh.us](mailto:Todd.Fisher@epa.state.oh.us)

pc: Laurie Moore, Ohio EPA, OFFO, SWDO (with attachment)  
Brian Tucker, Ohio EPA, DERR, CO (with attachment)  
Bonnie Buthker, Ohio EPA, OFFO, SWDO (with attachment)  
Eileen Mohr, Ohio EPA, DERR, NEDO (with attachment)  
David Brancato, USACE, Louisville (with attachment)  
LTC Tom Tadsen, RTLS, OHANG (with attachment)  
John Jent, USACE, Louisville (with attachment)  
Stan Levenger, MKM Engineers, RVAAP (with attachment)  
Richard Callahan, MKM Engineers, RVAAP (with attachment)  
Glen Beckham, USACE, Louisville (with attachment)

ec: Mike Eberle, Ohio EPA, DERR, NEDO (w/o attachment)



State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

~~September 20, 2004~~

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
ESS FOR TD/DEMOLITION OF ~~LL1-5, 7,~~  
~~8, 10, 11, BUILDINGS 1039, F-15,~~  
~~1200, S-4605 AND T-4602~~

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the following document: "Explosives Safety Submission for the Thermal Decomposition and Demolition of Load Lines 1-5, 7, 8, 10, 11, Buildings 1039, F-15, 1200, S-4605 and T-4602." This document, dated June 24, 2004 and received on July 21, 2004, was prepared by MKM Engineers Inc. for the United States Army Technical Center for Explosives Safety (USATCES). Comments from Ohio EPA were due on September 03, 2004, and I apologize for the delay.

Ohio EPA has the following comments on the ~~Explosives Safety Submission (ESS):~~

1. Please provide Ohio EPA a copy of the approval letter of the ESS when it is received from USATECES.
2. Please add an acronym list to the revised document.
3. In section 6.2 (pages 9 and 10), there should be a reference made to the removal of transite. Additionally, there should be a reference made to the spraying of the dunnage with diesel fuel and the placement of the gel mixture of fuel and surfactant.
4. In section 6.4 (page 12), please add a reference to the spraying of the dunnage with diesel fuel.
5. In section 6.9 (pages 14 and 15), please be advised that the water in the sumps must be sampled and analyzed for agreed-upon constituents, before decisions can be made regarding disposal options.
6. In section 13.0 (page 19), please provide a reference to the public relations plan that is in place at the Ravenna Army Ammunition Plant (RVAAP).





MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
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7. In Appendix B (Table 1), please provide an explanation for the listing of buildings at Load Line 1 that have already been demolished.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
LTC Tom Tadsen, RTLS  
JoAnn Watson, AEC  
Rick Callahan, MKM  
Brian Stockwell, MKM  
Mark Lamb, MKM

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO DERR



State of Ohio Environmental Protection Agency

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2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

August 10, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
DRAFT, 2003 FACILITY-WIDE  
BIOLOGICAL AND WATER QUALITY  
PART I - STREAMS STUDY  
PORTAGE AND TRUMBULL COUNTIES

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

Dear Mr. Patterson:

On June 30, 2004, the Ohio Environmental Protection Agency (Ohio EPA), Northeast and Southwest District offices, received the following document: "Draft, ~~Facility-Wide~~ Biological and Water Quality Study 2003, Part I - Streams, Ravenna Army Ammunition Plant, Ravenna, Dated June 2004. The following comments were generated from the review of this document:

**General Comments:**

1. As noted on the cover sheet for this report, the text that was received only consists of stream information. No data or discussion regarding pond/wetland sampling was included. Given that the received document does not represent a complete report, the volume of stream data and tables that are not included in this report, and the number of revisions requested, the position of Ohio EPA is that this represents a preliminary draft report. Draft and final reports will need to be prepared by USACE and reviewed and commented on by Ohio EPA.
2. Please provide Ohio EPA with a time-frame for the receipt of the preliminary-draft of the pond and wetland data/discussions that is to be drafted by USACE, as well as the missing tables from this report.
3. In the revised document, please include a more detailed discussion regarding the potential impact of the high water conditions and flooding that occurred between the two rounds of sampling in 2003.
4. Please ensure that the analytical data, chain of custody forms, etc., are included in the revised report. There are numerous portions of the text that indicate analytes were below the lab detection limits, however, there is no indication as to what analytical detection limits were actually achieved. Additionally, the report does not contain a section that details QA/QC issues, such as whether or not holding times were achieved, etc. Also, the sampling that used the multi-incremental sampling approach should have duplicates that are to be used to verify that the sampling was completed correctly. This information should be provided in the report, to demonstrate that the results are repeatable.
5. Given that this report does not contain any of the pond/wetland analytical data, Ohio EPA reiterates that the additional pond/wetland sampling conducted in July 2004 may or may not





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be adequate, and the Agency reserves the right to require additional sampling. Additionally, any reports that are forthcoming from the additional sampling must be prepared by USACE.

6. It would be extremely helpful if the text lines are numbered in the revised report.
7. Add an acronym list to the revised report.
8. Figure 1, Ohio EPA Tiered Approach first appears in the printed hard copy prior to the foreword on page iii and this figure is reprinted on the next eight pages. This is probably due to some type of formatting issue. Please look into this and resolve it, especially if this report will be reissued electronically.
9. Foreword: Should be reviewed and revised, so that it is specific to the study conducted at Ravenna, rather than the general discussion of Ohio EPA and how Ohio EPA evaluates water quality information in general. While this general information is informative, this report should be written specific to the study conducted by the Army at Ravenna. The foreword should be revised to state how the Army evaluated this data.
10. The study objectives (found in Section 1.4) should be mentioned in the Executive Summary, since this is often the only section that many folks will read.

**Specific Comments:**

11. The document should be proof-read for typographical, punctuation, and grammatical errors. Listed below are several common errors found within the text of the document (not all inclusive):
  - A. Add "the" before Modified Index of Well-Being on page i, third line.
  - B. In the second Yoder reference on page ii, change the period after the page numbers to a comma.
  - C. On page iv of the "Foreword:" Remove the sentence that states "Each year Ohio EPA conducts biosurveys in 6-10 different study areas with an aggregate of 350-400 sampling sites," since this particular report, though very similar to Ohio EPA's Comprehensive Water Quality Surveys (aka Technical Support Documents), is not a summary of the work that Ohio EPA does regularly, but is a study that the Army conducted specific to water quality at Ravenna.
  - D. Page v to vi of Foreword. The last sentence states that each biological and water quality study contains a summary of major findings and recommendations for revisions to WQS, ..... Is this statement accurate? Is the information in this report going to be used to evaluate and/or change Ohio's WQS?

- E. Change the text to read: "...Mahoning River sites were low quality...." (ES-1, 2<sup>nd</sup> para.)
  - F. Please clarify whether the term "total analyte list inorganic" is meant to be "target analyte list metals." If this is the case, run a search and replace all on the entire document, as this appears numerous times.
  - G. Please clarify whether the term "contaminates" is meant to be "contaminants." If this is the case, run a search and replace all on the entire document, as this appears numerous times.
  - H. Throughout section 2, please be consistent with titles. For example, there is a "Section on S-3" and a "Section of S-4."
  - I. Add a comma after "black powder" and before "potassium nitrate" in the text on page 2-3 (section 2.1.4).
  - J. Check capitalization. For example, on page 2-4, affected should not be capitalized; on page 2-6 (section 2.2.4, two places), Winklepeck Burning Grounds should be capitalized; on page 2-9 (section 2.3.1), affected should not be capitalized; on page 2-10 (section 2.4), direction should not be capitalized.
  - K. Change text on page 2-4 to read: "completed round to determine its integrity."
  - L. Add an "and" in front of potassium chlorate in section 2.2.2 (page 2-5).
  - M. Add a period after practices on pages 2-6 and 2-7 (section 2.2.4). Add a period after "...SFE-1 through SFE-5" on page 2-8 (section 2.3).
  - N. Change "non-detected" to either not detected or non-detect throughout the entire document. Using a search and replace function would be efficient, given that there are numerous sections of the report which contain this verbiage.
  - O. Remove the bolding from "ecological harmful effects guidelines" on page 5-4 (section 5.3.2).
  - P. Remove the second punctuation mark (period) after the word "guidelines" on page 6-4 (section 6.3.1), after "50.5" on page 7-2, and after "good" on page 7-7 (section 7.6.1). Remove the period before "2003" in the first paragraph of section 7.1 (page 7-1).
12. Make any necessary changes to the text of the Executive Summary (ES), based upon changes that are made to the body of the report. (Pages ES1 - ES-4)



13. Executive Summary, (page ES-16 on LM's copy) first paragraph: The second to last sentence states, "Sediment samples were collected by multi-incremental sampling at the co-located biological sampling sites." Sediments were collected by composite methods and not specifically using the multi-incremental approach advocated by Chuck Ramsey. These two approaches may be similar, however, there are fundamental differences between them. Please revise the sentence.
14. Executive Summary, (page ES-16 on LM's copy) second paragraph: The fourth sentence states that some sites along the Tributary to the West Branch of the Mahoning River had low quality substrates and extensive embeddedness, a cause of biological impairment. What is the cause of the embeddedness? Is this due to army related activities at this site? The sentence following this states that fish and macroinvertebrate communities attained WWH biocriteria, but the text did not (yet) state what their use designations currently are. Please state what these streams aquatic life use designations are prior to the discussion of attainment. I realize that Table ES-2 presents this information, but the reader does not get this information until after saying they meet WWH. If these streams have not been designated, then please make this clear and clarify that one of the recommendations from this study is for the State of Ohio to designate these streams as WWH. Please revise for clarity.
15. Executive Summary, (page ES-16 on LM's copy): Ohio EPA suggests moving the last paragraph (and table ES-1) stating, "The recommended use designations for streams sampled within RVAAP are detailed ....." to the second paragraph before the sixth sentence (that says "chemical contamination of water....."), since this is where you first discuss use designations. The sixth sentence can then be the beginning of a new paragraph.
16. Table ES-1 (page ES-2) seemingly indicates that the surface water and sediment quality were not evaluated at the reference site. Please confirm. If this is truly the case, then add a footnote to this table that indicates no samples were obtained and explain.
17. Table ES-1 (page ES-17 on LM's copy) does not indicate what the use designation is for each stream/tributary, however, the last column seems to indicate whether or not the stream is meeting that use designation. Add a column that states what the current use designation is for each stream. If the stream has yet to be designated, then indicate that it has not yet been designated. The other option is to present Table ES-2 prior to Table ES-1, so that the reader is told what the classification is prior to being told whether or not the stream is in attainment.
18. Sections 1.1 and 1.2 should be reduced in scope. It is not clear why there is so much operational history, geology, hydrogeology, etc., in this section, given that it appears in numerous other installation documents and does not add much to the surface water aspect. It would be more effective to focus on section 1.4 (current study objectives) methodology, and the information obtained from this study. If the decision is made to keep the majority of the text, then, at a minimum, the following revisions need to be made:

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- A. Split up the first sentence in the third paragraph to be two complete sentences. Although DLA has a presence at RVAAP, the presence was not as dominant as the text would indicate. (Page 1-1)
- B. Revise the last paragraph on page 1-1 to reflect the correct dates and acreage of the land transfers. It was the later amendment that resulted in the transfer of all but 1,481 acres, not the 1999 transfer.
- C. The Dec. 1941 to Jan. 1942 entry should not be divided. It should be one entry. (Page 1-2)
- D. There should be a Korean Conflict activation date. (Page 1-2)
- E. Make sure that table headings (description of activity/facility status) are at the top of the page (ex. page 1-3 needs to be corrected).
- F. The latter part of the chronology needs to be updated (page 1-4). For example, there needs to be additional discussion of decontamination and demolition activities (including thermal decomposition), the Order journalization date should be referenced, etc.
- G. The discussion of the disposition of the pink water that resulted from the steam cleaning activities at various load lines should also indicate that explosives-contaminated water was also swept out of the doorways. Not all pink water was handled in the manner described in the second paragraph. (Page 1-4)
- H. On page 1-4, please provide an explanation for including potential contamination from Load Lines 5 through 11 and not Load Lines 1 through 4 and 12.
- I. Revise the text on page 1-4 (second para.) to read: "... Load Lines 5 - 11 included, but are not limited to..."
- J. The text indicates that for Load line 12, "...all residual dust and spills were washed into the storm drainage system." This is not correct, otherwise, the removal of contaminated soil from this Load Line for use in the bio-remediation project would not have occurred. Revise the text. (Page 1-4, second para.)
- K. In the discussion of potential contaminants at the settling ponds (pages 1-4 and 1-5), add in SVOCs, propellants, and hexavalent chromium.
- L. In section 1.2.1, please clarify whether there is more recent climate data than the data presented from 1995. If so, please use in the revised report. (Page 1-5)
- M. Watch formatting issues, for example, too many spaces between paragraphs and sections. (See pages 1-6 through 1-9 for examples.)



- N. Section 1.2.3.3 (page 1-9, first paragraph), change the text to read: "This well will be activated per IRP for decon and bioremediation purposes."
  - O. Section 1.2.3.3 (page 1-9, second paragraph) should indicate that a significant percentage of residents in the vicinity of RVAAP also utilize groundwater from the unconsolidated aquifer.
  - P. Change "...manage fishing programs..." to "...managed fishing programs..." (Page 1-11, partial paragraph at the top of the page.)
  - Q. Please provide an explanation for the inclusion of section 1.2.4 (air quality) on page 1-11)
  - R. On page 1-12, first full paragraph, please provide a reference to the well at T-5301.
  - S. Section 1.2.5 Site Use, (page 31 on LM's copy) Second to last paragraph: The first sentence states that surface water is primarily used by only wildlife. While this is true, there is limited use by facility personnel, such as ONG, Tim Morgan's folks that should also be mentioned.
  - T. Section 1.2.6 on page 1-13, does not include the most up to date list of State Endangered species. For example, the river otter is no longer on the list. Please revise to include the most recent list.
  - U. Section 1.4 Study Objectives (page 34 on Lms copy): Define "energetic constituents" in point number 2. Are these radionuclides?
- 12. Change text on page 2-1 (section 2.1.2) to read: "... from diesel fuel and gasoline..."
  - 13. Change the text on page 2-2 (section 2.1.2, last paragraph) to read: "Any spillage from transfer or re-packaging..."
  - 14. The text on page 2-2 (section 2.1.2) seemingly indicates that AR 385-100 would have instituted SOPs for dealing with spills. Please provide the date of AR 385-100. Spills during the early operations of the installation may not have resulted in the digging up of contaminated soil and transporting it to the various burning grounds. Revise the text.
  - 15. Revise the text in section 2.1.3 (page 2-2), second paragraph, to read: "The highest probability...."
  - 16. The text on page 2-2 (section 2.1.3) should indicate that wastes disposed of in C-Block Quarry also contained hexavalent chromium.
  - 17. Change the text on page 2-3 (section 2.1.4) to read: "...of a mine testing pond and an additional above ground..."

18. In section 2.1.4 (page 2-3), please add to the revised text information that details what was tested at the above-ground test area southeast of Building 2F-3.
19. Section 2.2.1 (page 2-4) needs to be revised (second paragraph), so that the text indicates that Block-C contained finished products and no contamination would be expected. This is not the case for C-Block Quarry.
20. Provide additional information in section 2.2.1 (page 2-4) regarding the potential presence of white phosphorous (WP) at Building F-16. Although the handling of WP may have been "rigid," there is still evidence of WP (and not oxides) on the south bank of Sand Creek at Open Demolition Area # 2. As such, it could be reasonable to assume that perhaps some WP was buried at F-16. If this is not believed to be the case, please provide additional documentation.
21. In section 2.2.1 (page 2-4, last paragraph), please indicate that it is the UXO/OE ASR that is being referenced.
22. In section 2.2.1 (page 2-4, last paragraph), please provide additional text with respect to what happened to tested products that malfunctioned. This is also applicable to the text on page 2-9 9section 2.3.1.
23. Section 2.2.2, page 2-5 - change text to read: "... (LL#7) may also contribute contaminants from surface run-off."
24. Section 2.2.2, page 2-5 - change text to read: "...some of which is summarized..."
25. Section 2.2.3, page 2-5 - Describe the handling practices utilized at the wet storage igloos.
26. Section 2.2.4, page 2-6 - diphenylamine would be expected from bulk disposal of what materials/compounds?
27. Change text on page 2-7 (section 2.2.5) to read: "...combustion processes which include, but are not limited to...."
28. Change "project" to "product" in the second paragraph of section 2.2.7 on page 2-7.
29. Change the text on page 2-7 (section 2.2.8) to read: "The nature of the expected contamination from LL#3 and LL#12 includes, but is not limited to..."
30. Change text on page 2-9 (section 2.3.1) to read: "Compounds that may have affected SFE-1 include, but are not limited to...."
31. Is "Erie Pond" used in reference to Erie Burning Grounds? If so, please revise the text accordingly. (Page 2-10, section 2.4)



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
AUGUST 10, 2004  
PAGE 8

32. Provide an explanation for not including OHARNG activities that may have impacted No Name Stream # 3. (Page 2-10, section 2.4)
33. Change the text (page 2-10, section 2.4.3) to read: "...DBP, and diphenylamine."
34. Change the text on page 2-11 (section 2.5) to read: "This arm is also in the proximity of RVAAP48 (Anchor Test Area), which will undergo initial investigation in Fall, 2004."
35. Change text on page 2-11 (section 2.5) to read: "...locations are not conducive to processes..."
36. Change text on page 2-11 (section 2.5) to read: "RVAAP#48 will undergo investigation in Fall, 2004, so little..."
37. Section 3.3, first paragraph page 3-2 (page 47 on LMs copy), text states that incremental (composite) sampling was performed. Is incremental, multi-incremental, and composite sampling all synonymous? Please clarify.
38. Change text on page 3-2 (section 3.3, first paragraph) to read: "...within the sediment, multi-incremental..."
39. In section 3.3 (and applicable portions of section 4), was any of the sediment data compared to the installation background? Why or why not?
40. In two places in section 3.3 (page 3-2), change "Corps" to USACE.
41. In section 3.4 (and applicable portions of section 4), was any of the surface water data compared to the installation background? Why or why not?
42. Section 3.3 Sediment Sampling/Assessment, last paragraph (page 48 in Lms copy): Please list the sediment screening hierarchy that was used to evaluate these sediments and list them in the order used. Explain or clarify how Site-specific background and Ohio EPA Sediment Reference Values (SRVs) were used to evaluate sediment quality. Ensure that this is clear and consistent throughout the report.
43. In section 3.7 (page 3-4), the first sentence is not complete. Please revise accordingly.
44. In section 3.7 (page 3-4), the last sentence is not clear. Please clarify in the revised document.
45. Page 3-5 (map) - the map provided in this report is too small. Please provide a larger map in the revised document.
46. The text on page 4-7 (section 4.1) indicates that: "Sediment collected from all locations in Sand Creek reflected non-contaminated conditions." Yet, there were one or more SVOCs

- detected in the sediment samples. Please clarify what is meant by "non-contaminated conditions." This is also applicable to section 5.3.2 (page 5-4) and section 6.3.1 (page 6-4)
47. Revise the text on page 4-11 (section 4.4.2) to read: "...runoff from the east fuze and booster..."
  48. Section 4.4.3 (page 4-12) - Please clarify whether it is the Winklepeck Burning Grounds or the Landfill North of Winklepeck Burning Grounds (or both) which is being referenced.
  49. In several sections of the report, there is reference made to the observed phthalate contamination potentially being due to lab contamination. Please advise the Agency as to whether or not the lab was contacted in an effort to determine the source of contamination.
  50. Provide additional details (section 6.5.1 on page 6-5) as to how it is being determined that the low fish diversity at RM 3.3, during 1993 and 1999, might be due to impaired surface water quality when no chemical data was collected to support the assertion?
  51. On Table 7-1 (page 7-2), add a footnote to the table that explains why three sampling locations do not have ICI scores.
  52. Explain or clarify how Site-specific background and Ohio EPA Sediment Reference Values (SRVs) were used to evaluate sediment quality.
  53. Change text in section 8.1 to state that this was a holistic examination of streams, since we have not yet discussed ponds or wetlands data in part I of this report.
  54. Change text in section 8.1 (page 8-1) to read: "...and absence of substantial silt deposits."
  55. The West Branch of the Mahoning River at RM 9.63, 0.74 had HMX and RDX in the water column during the September sampling pass. These explosives compounds are related to RVAAP. As such, the text on page 8.1 (section 8.2), which states that: "in both surface water samplings, the results indicated no evidence of site related contamination" needs to be revised.
  56. In section 8.2 (page 8-1), the conclusion is drawn that the surface water bodies tested in this study are not currently affected by the activities that occurred on the site when it was in operation. On a site wide scale, this may be correct; however, it is not necessarily applicable to an area of concern (AOC) scale. For example, site operations have clearly impacted upon Sand Creek as it traverses through ODA#2, where there is visible OE (and potentially UXO) in the stream bed, and WP on the southern bank, which could potentially be flushed into the creek during high flow conditions. Revision to the text is required.
  57. In section 8.2 page 8-1 (page 106 on Lms copy), the first paragraph states that the 2003 study was during a time of unusual rainfall. During low flow periods, would you expect to



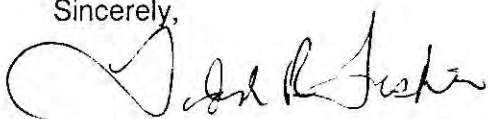
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see the same results as 2003? Any concern with dissolved oxygen fluctuations or possible algae blooms, due to nutrient loadings from AOCs?

58. Section 8.3 (page 8-2) must indicate that on an AOC by AOC study basis, that surface water and sediment sampling must be conducted during the Remedial Investigation (RI) phase. It was never the intent of this study to replace the AOC by AOC surface water and sediment sampling, but to complement the work that is being conducted. Text that reflects this position must be added to the revised document.
59. In section 8.3 (page 8-2), can it be categorically stated that even after heavy rains that contamination does not appear to be migrating from the AOCs? Or is it possible that there is contaminant migration, but that it is not sufficient enough to impact upon stream quality?
60. In section 8.3 (page 8-2), was this sampling conducted at the onset of a rain event and during the rain event? Is it possible that the "first flush" of contaminants had already peaked in the stream (prior to sample collection) and was offset by dilution from rain water by the time the samples were collected?
61. Please ensure that all the references utilized in preparing this report are listed. For example, the Persaud's reference does not appear in section 9.

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

Sincerely,



Todd R. Fisher, Project Coordinator  
Division of Emergency and Remedial Response

cc: Eileen Mohr, Ohio EPA, DERR, NEDO  
Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Laurie Moore, Ohio EPA, OFFO, SWDO  
Brian Tucker, Ohio EPA, DERR, CO  
Dave Altfater, Ohio EPA, DERR, CO  
David Brancato, USACE, Louisville  
John Jent, USACE, Louisville  
Glen Beckham, USACE, Louisville  
Timothy Morgan, OHANG, RTLS  
LTC Tom Tadsen, OHANG, RTLS  
Elizabeth Ferguson, USACE, Louisville

ec: Mike Eberle, Ohio EPA, DERR, NEDO



State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

December 09, 2004

RE: RAVENNA AMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
DRAFT, FACILITY-WIDE BIOLOGICAL  
AND WATER QUALITY STUDY, 2003

Mr. Glen Beckham  
U.S. Army Corps of Engineers  
CELRL-PM-M, Room 765  
P.O. Box 59  
Louisville, KY 40201

Dear Mr. Beckham:

This correspondence is provided in response to a discussion held on December 08, 2004, during the Ravenna Army Ammunition Plant (RVAAP) project team schedule meeting.

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR); and Southwest District Office (SWDO), Office of Federal Facilities Oversight (OFFO) have received the document entitled: "Draft, Ravenna Army Ammunition Plant, Facility-Wide Biological and Water Quality Study, 2003." This document, prepared by the U.S. Army Corps of Engineers (USACE) Louisville District, was received at NEDO on October 19, 2004. This initiative is under project orders, and USACE has requested comments on the draft report from NEDO, DERR, and SWDO, OFFO, to be submitted in early January 2005.

Ohio EPA notes that the draft report and the response to comment (RTC) table were both received on the same date. In the last couple of weeks, there has been email traffic between Ohio EPA and USACE regarding the review of this report. Ohio EPA indicated that there would not be a detailed review of the report, due to the fact that there were a number of instances in the USACE RTCs where there is the notation that "discussion is required;" where USACE disagrees with Ohio EPA comments; and where there is an indication that the text was changed, but in checking the reports, the verbiage was not corrected. Given this, Ohio EPA believed that time would be better spent in having a comment resolution meeting, rather than forging ahead and reviewing the document knowing that additional changes would need to be made and the document revised. It has been standard practice on the RVAAP project to receive the RTCs, resolve the RTCs (if necessary) through a comment resolution meeting or conference call and, subsequent to comment resolution, revise and re-issue the document. This is not the process that was followed with respect to the draft sitewide surface water document.

Additionally, one of the latest emails from USACE requested that Ohio EPA address their "additional concerns" internally with Ohio EPA technical leads on the project. However,





MR. GLEN BECKHAM  
U.S. ARMY CORPS OF ENGINEERS  
DECEMBER 09, 2004  
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since the USACE is the author of both the report and the RTCs, it is our position that any resolution of outstanding issues needs to be made between USACE and Ohio EPA. This position was transmitted to USACE via email on December 06, 2004.

In an effort to more clearly indicate to USACE where there are remaining issues (based upon information provided in USACE's RTC table), I have provided a review of the RTC table and a  *cursory*  review of the draft document. I did not provide a line by line comparative review of the revised document with the original version. A detailed review will not be conducted until the broader issues detailed in this correspondence are resolved. Additionally, I contacted SWDO, OFFO and indicated to the project risk assessor that her review of the document was to be put on temporary hold, in order to reduce expenditures of limited risk assessment resources.

Within this correspondence, you will note that Ohio EPA's comments are divided into several broad categories: 1) RTCs that were not reviewed by me, because they came from Ohio EPA risk assessment personnel; 2) RTCs that need to be discussed, because USACE requested discussion; 3) RTCs that need to be discussed, because USACE is disagreeing with Ohio EPA's comments; 4) comments that need to be discussed, because no RTCs were provided; 5) RTCs that Ohio EPA is in disagreement with; 6) RTCs that indicate that the data is still being compiled or in which the RTC is unclear; and 7) text changes that were to be made (based upon the RTC), and yet when the revised text was consulted, the changes were not made.

The following is probably not all inclusive. I apologize in advance for any inadvertent errors in this listing:

1. **RTCs that will not be addressed in this correspondence, as they were generated by Ohio EPA risk assessment personnel:**

Streams: 8, 9, 10, 13, 14, 15, 17, 18s, 44, 49, 59, 60, 64, and 67.

Ponds: 8, 20, 21, 22, 31, and 32.

2. **RTCs that USACE indicates they want discussion on (either stated explicitly or implied in the response):**

Streams: 18d, 18f, 46, and 48

Ponds: 2, 7, 22, 23, 26, and 33.

3. **RTCs that Ohio EPA needs to discuss, because USACE disagrees with the original Ohio EPA comment:**

MR. GLEN BECKHAM  
U.S. ARMY CORPS OF ENGINEERS  
DECEMBER 09, 2004  
PAGE 3

Streams: 63 and 65.

Ponds: none

4. **RTCs that need to be discussed, because no responses to the original Ohio EPA comments were provided in the RTC table:**

Streams: 38.

Ponds: 6a-j, 9, 18, 20, and 29.

5. **RTCs that Ohio EPA is in disagreement with:**

Streams: 11h, 18g, 18j, 21, 23, 27, 53, 55, and 62.

Ponds: 30.

6. **RTCs which indicate data is still being compiled and that are needed to complete the report or in which the RTC is not clear:**

Streams: 4, 14, and 56 (not clear whether the lab was contacted).

Ponds: 15 (what happened to the IDW?).

7. **RTCs that indicate: the text was "noted," but not changed (or indicated no change was required, but the text was changed); the text was changed, but it was not really changed or changed incorrectly; and where the RTC makes no indication of whether or not the verbiage was added to the revised text and it was (or should have been):**

Streams: 7 (acronym list added, but numerous incorrect entries), 11k, 11l, 11o, 16, 18a, 18b, 18r (no reference added), 20, 22, 25, 31, 32, 33, 39, 50, and, 57.

Ponds: 17.

As Bonnie Buthker's email of December 09, 2004 indicated, I, too, believe that these issues can be discussed and resolved. The major issues that I believe need to have attention focused on are as follows: the question as to when the additional data, QA/QC information (etc.), will be received, as well as the additional data collected at Kelly's Pond and how these will be integrated into the revised report; the impact of past facility operations on the localized surface water/sediment quality; and Ohio EPA's position that

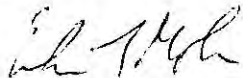


MR. GLEN BECKHAM  
U.S. ARMY CORPS OF ENGINEERS  
DECEMBER 09, 2004  
PAGE 4

the sitewide surface water and sediment assessment was never intended to supplant the sampling of the surface water and sediment on an area of concern (AOC) by AOC basis. Additionally, it is not the intention of Ohio EPA to provide re-written conclusions to the USACE to evaluate. The author of the report is to remain with the USACE, with Ohio EPA providing the review, comment, and approval.

I believe that this correspondence contains the information that I indicated I would provide during our December 08, 2004 schedule call. If you have any questions, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Laurie Moore, Ohio EPA, OFFO, SWDO  
Mark Patterson, RVAAP  
JoAnn Watson, AEC  
Dave Brancato, USACE Louisville  
John Jent, USACE Louisville

ec: Mike Eberle, Ohio EPA, DERR, NEDO  
Todd Fisher, Ohio EPA, DERR, NEDO  
Dave Altfater, Ohio EPA, CO



State of Ohio Environmental Protection Agency

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June 10, 2004

Mr. Stanley R. Citron, Associate Counsel  
General Law Division, Office of Command Counsel  
Department of the Army  
Headquarters, U.S. Army Materiel Command  
9301 Chapek Road  
Fort Belvoir, Virginia 22060-5527

Subject: Ravenna Army Ammunition Plant:  
**Final Administrative Consent Order**

Dear Mr. Citron:

Enclosed please find a certified copy of the executed administrative consent order for the Ravenna Army Ammunition Plant. Thank you for your assistance and cooperation in this regard. Should you have any questions in this regard, please call me, (614) 644-3037.

Sincerely,

Mark J. Navarre  
Supervising Attorney

enclosure (1)

cc: Eileen Mohr/Todd Fisher, DERR, NEDO (with enclosure)  
Graham Mitchell/Bonnie Buthker, OFFO, SWDO (with enclosure)

Cindy Hafner/Peter Whitehouse, DERR, CO (with enclosure)  
Dan Harris/Bruce McCoy, DSIWM, CO (with enclosure)  
Mike Savage/Ed Lim, DHWM, CO (with enclosure)

MAJ Richard E. Ratliff, BRAC (with enclosure)  
**Mark Patterson**, RVAAP (with enclosure)

Bob Taft, Governor  
Jennette Bradley, Lieutenant Governor  
Christopher Jones, Director

OEPA.DF-FO.04 28.00CS



DEPARTMENT OF THE ARMY  
RAVENNA ARMY AMMUNITION PLANT  
RAVENNA, OH 44266-9297

OHIO ENVIRONMENTAL PROTECTION AGENCY  
DIRECTOR'S FINAL FINDINGS AND ORDERS  
10 JUNE 2004

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APPENDIX F – FACILITY WIDE GROUNDWATER MONITORING PLAN – DEC 2003

BEFORE THE  
OHIO ENVIRONMENTAL PROTECTION AGENCY

OHIO E.P.A.

JUN 10 2004

ENTERED DIRECTOR'S JOURNAL

In the matter of:

United States Department of the Army  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, Ohio 44244-9297

: Director's Final  
: Findings and Orders  
:  
:

Respondent

PREAMBLE

It is agreed by the Parties hereto as follows:

I. JURISDICTION

1. These Director's Final Findings and Orders ("Orders") are issued to the United States Department of the Army ("Army" or "Respondent") pursuant to the authority vested in the Director of Environmental Protection ("Director"), on behalf of the Ohio Environmental Protection Agency ("Ohio EPA"), under Chapters 3734, 3745 and 6111 of the Ohio Revised Code ("ORC").
2. These Orders are entered into by the Army pursuant to authority vested in the Secretary of the Army by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. Section 9601 et seq.; the Defense Environmental Restoration Program (DERP), 10 U.S.C. Section 2701 et seq.; and the National Contingency Plan (NCP), 40 C.F.R. Part 300.

II. PARTIES BOUND

3. These Orders shall apply to and be binding upon Respondent and its successors in interest liable under Ohio law. No change in ownership or operation of the Ravenna Army Ammunition Plant ("RVAAP") shall in any way alter Respondent's obligations under these Orders.

III. PURPOSE

4. The objective of the Parties in entering into these Orders is to contribute to the protection of public health, safety, and welfare and the environment from the disposal, discharge, or release of contaminants at or from the Site, through implementation of a CERCLA based environmental remediation program. This program will include the development by Respondent of an RI/FS for each AOC or appropriate group of AOCs at the Site, and upon completion and publication of a Proposed Plan and Record of Decision or other appropriate document for each AOC or appropriate group of AOCs, the design, construction, operation and maintenance of the selected remedy as set forth in the Record of Decision or other appropriate document for each AOC or appropriate group of AOCs.



Ravenna Army Ammunition Plant  
Director's Final Findings and Orders

- are used in CERCLA and the NCP.
- b. "Area of Concern" or "AOC" shall mean an area at the Site at which contaminants are known or suspected to be present, requiring investigation or remediation. AOC shall include the areas included or subsequently included in the Installation Action Plan (IAP).
  - c. "Army" or "Respondent" shall mean the United States Department of the Army.
  - d. "Biological Warfare materiel" shall mean microorganisms, or toxins derived from them intended for use in military operations (including research and weapons development) to cause disease in humans, animals or plants, or which cause the deterioration of material.
  - e. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) set forth at 42 U.S.C. § 9601 et seq.
  - f. "Chemical warfare materiel" shall mean a chemical substance intended for use in military operations to kill, seriously injure, or incapacitate a person through its physiological properties, excluding industrial chemicals, riot control agents, chemical herbicides, smoke, and flame.
  - g. "Contaminants" shall include (1) any "hazardous waste" under ORC § 3734.01(J); (2) any "hazardous substances" or "pollutant and contaminant" as defined in CERCLA § 101(14) and (33); and (3) any other substance that the Army is required to remediate under applicable law including the Defense Environmental Restoration Program (10 U.S.C. 2701 et seq.). By way of example, contaminants may include, but are not limited to, chlorinated solvents, heavy metals, waste chemical warfare materiel, and discarded military munitions (DMM).
  - h. "Contractor" shall mean a contractor, retained by the Respondent to perform any portion of the Work pursuant to these Orders, and shall include any subcontractor, representative, agent, employee or designee thereof.
  - i. "Day" shall mean a calendar day unless expressly stated to be a business day. "Business day" shall mean a day other than a Saturday, Sunday or State Holiday. In computing any period of time under these Orders, where the last day would fall on a Saturday, Sunday or State Holiday, the period shall run until the close of the next business day.
  - j. "Discarded Military Munitions (DMM)". Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations.
  - k. "Document" shall mean any record, report, photograph, video tape, letter, correspondence, computer disk or tape, recorded or retrievable information of any kind, or any other documentary evidence, regarding the treatment, storage, accumulation,

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Interim Removal Action Decision Document" shall mean the documentation that is prepared to define the early response action that is identified and implemented during the study or design phase of a comprehensive response action. Interim removal actions are limited in scope, and address areas or media for which a final remedy will be subsequently developed.

- t. "Milestone" shall mean a fixed, firm, and enforceable date as set forth in an approved work plan for a particular AOC. A milestone is a requirement and is enforceable.
- u. "Munitions and Explosives of Concern" or "MEC". This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means: (A) Unexploded Ordnance (UXO), as defined in 10 U.S.C. 2710 (e) (9); (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710 (e) (2); or (C) Munitions constituents (e.g., TNT, RDX) present in high enough concentrations to pose an explosive hazard.
- v. "Munitions Constituents" or "MC". Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.
- w. "National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300, as amended.
- x. "Orders" shall mean this document and all Appendices to this document, which shall be attached to and made an integral part of this document.
- y. "Paragraph" shall mean a portion of these Orders identified by an Arabic numeral or an upper or lower case letter.
- z. "Party" or "Parties" shall mean the Army and/or Ohio EPA.
- aa. "Record of Decision" shall mean the same as this term is used in the CERCLA and the NCP.
- bb. "Relative Risk Site Evaluation" or "RRSE" shall mean a methodology used by all DoD Components to evaluate the relative risk posed by a site in relation to other sites. It is a tool used across all of DoD to group sites into high, medium and low categories based on an evaluation of site information using three factors: the contaminant hazard factor (CHF), the migration pathway factor (MPF), and the receptor factor (RF).
- cc. "Remedial Action" shall mean any action that abates permanently a placement or disposal or threatened disposal of contaminants to prevent present or future harm to the public health or welfare or to the environment, i.e., those activities to be undertaken by or on



installation, personnel, or material and (C) remain unexploded either by malfunction, design or any other cause.

- nn. "Work" shall mean any activities Respondent is required to perform under these Orders.
- oo. "Work plan" shall mean that document detailing the requirements for characterizing the RVAAP and for support of a Remedial Investigation and Feasibility Study, Interim Remedial Action, or Remedial Design and Remedial Action. Each Workplan includes a detailed description of the proposed investigations and/or remediation activities; a schedule for those actions; and personnel and equipment requirements.

## **V. FINDINGS OF FACT, DETERMINATIONS, AND CONCLUSIONS OF LAW**

8. All findings of fact, determinations, and conclusions of law necessary for the issuance of these Orders pursuant to ORC Chapters 3734, 3745 and 6111 have been made and are outlined below. The Director has determined the following:

### **Background:**

- a. The U.S. Department of the Army ("Army" or "Respondent") owns the Ravenna Army Ammunition Plant ("RVAAP" or "Facility"), which is located at 8451 State Route 5, Portage and Trumbull Counties, approximately 4.8 kilometers (3 miles) east/northeast of the City of Ravenna. The RVAAP consists of 21,419 acres (8.668 hectares) contained in a 17.7-kilometer-long (11-mile-long), 5.63 kilometer-wide (3.5-mile-wide) tract bounded by State Route 5 and the CSX System Railroad on the south; State Route 534 on the east; the Garrettsville and Berry Roads on the west; and the Conrail Railroad on the north. The Michael J. Kirwan Reservoir is located immediately south of the RVAAP.
- b. At the RVAAP, the Army has engaged in the manufacture and storage of munitions and munition derivatives. Prior operators of the Facility include: Ravenna Arsenal, Inc. - 1951 until 1982; Physics International Corp., a subsidiary of Rockcor Inc., 1982 until 1985; Rockcor, purchased in 1985 by Olin Corporation, 1985 until 1993; Mason & Hanger-Silas Mason Co., Inc.; 1993 until 1998; and R&R International, Inc., 1998 until November 15, 1999. At the present time, the operator of the RVAAP is Toltest Inc.
- c. Although currently inactive, the RVAAP has historically handled hazardous wastes and operated several waste management units in support of its operations. Various industrial operations at the RVAAP have been identified as potential sources of contaminants. These operations include the load lines, sewage treatment plants, wastewater treatment plants, vehicle maintenance areas, storage tanks, waste storage areas, equipment storage areas, and furnaces and evaporation units. Landfills at the RVAAP were used to bury wastes from industrial operations and sanitary sources. Other burial sites may be located on-Site based on historical information. Settling and retention ponds at the Site collected

Ravenna Army Ammunition Plant  
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- i. The July 30, 1992 Findings and Orders state that the exemption provided therein would be effective until the Hazardous Waste Facility Board makes a final determination on the RVAAP/Ravenna Arsenal's Part B permit application.
- j. By letter dated, April 11, 1994, Ravenna Arsenal notified Ohio EPA of the Ravenna Arsenal's intent to withdraw its RCRA Part B permit application for treatment and storage of hazardous waste at the Facility.
- k. On February 23, 2001, the Respondent submitted the final closure plan for the Deactivation Furnace.

**RVAAP Open Detonation Area (OD):**

- l. The RVAAP Open Detonation Area (OD) was established in 1948 for the testing, detonation and disposal of ordnance items. On February 12, 1998, Ohio EPA approved a revised closure plan for the RVAAP Open Detonation (OD) Area (OD#2) Hazardous Waste Treatment Unit and required Ravenna Arsenal to prepare minor modifications to the plan. Those specific modifications were presented to Ohio EPA in a June 26, 2000 memorandum. In addition, Ravenna Arsenal requested that Ohio EPA grant an extension of time to complete closure of the OD area based on ongoing facility-wide remediation activities taking place under the March 2000 RVAAP Installation Action Plan (IAP).
- m. Open Detonation Area #2, approximately 25 acres in size and located in the west central area of the RVAAP, was historically utilized to open burn and open detonate large caliber munitions and off-specification bulk explosives.

**Ramsdell Quarry Landfill (RQL):**

- n. The Ramsdell Quarry Landfill (RQL) located on a 10-acre site in the northeastern portion of the RVAAP, has been utilized for various waste treatment and disposal activities since 1946. From 1976 until 1989, the RQL operated as a non-hazardous solid waste disposal facility. Respondent was issued an Ohio EPA Solid Waste Disposal Facility License (No. 67-00-06) for the RVAAP for the operation of the RQL from 1976 to 1989.
- o. By letter dated February 10, 1989, Ohio EPA notified Respondent that the Respondent must either submit a Permit-to-Install application to continue operation of the RQL or proceed with closure activities. By letter dated June 9, 1989, the Respondent notified Ohio EPA of its intent to commence closure of the RQL by September 22, 1989.
- p. By letter dated August 29, 1989, Environmental Design Group, Inc., on behalf of Respondent, requested a waiver from OAC 3745-27-10(C) to allow a final cover slope of 33% to be constructed on the RQL. On December 28, 1989, Ohio EPA issued Director's Final Findings and Orders allowing the Respondent to establish a final closure slope for the RQL at a grade greater than that provided under existing regulations.



Ravenna Army Ammunition Plant  
Director's Final Findings and Orders

required investigations, scheduled removal or remedial actions and the planned restoration of the RVAAP.

- x. The RVAAP's CERCLA related actions, including Remedial Investigations/ Feasibility Studies and Remedial Design/Remedial Actions, have been conducted under the Department of Defense (DoD) Installation Restoration Program (IRP).
- y. Under the RVAAP's IRP, Ohio EPA has provided technical assistance to the Army in accordance with the DSMOA. As part of the technical assistance, the documents listed in the RVAAP Document Compendium, Appendix B, were prepared by the United States Army Corps of Engineers and its consultants and have been reviewed by Ohio EPA.
- z. By written submission, dated October 4, 1996 and revised October 17, 1996, the Respondent requested authorization, pursuant to OAC rule 3745-27-13, to fill, grade, excavate, drill, build or mine at the previously unranked Areas of Concern on the Facility.
- aa. By letter dated November 4, 1996, Ohio EPA indicated that the October 4 and 17, 1996 RVAAP authorization request pursuant to OAC 3745-27-13 was approved by the Director, thereby authorizing the Respondent to perform the above referenced actions in accordance with state/ federal requirements.
- bb. By written submissions, dated July 7, 2000 and revised July 24, 2000, the Respondent requested authorization, pursuant to OAC 3745-27-13, to conduct intrusive activities consisting of: drilling, trenching, monitoring well installation, piezometer and well point installation, surface water and sediment sampling, excavation, surgical removal/other removal of unexploded ordnance (UXO) and suspected UXO, grading, and placement of clean hard fill or backfilling at known and to-be-discovered CERCLA AOCs. These activities would be performed in regard to implementation of the RVAAP Installation Restoration Program (IRP) Areas of Concern.
- cc. By letter dated August, 2000, Ohio EPA indicated that the July 7 and 24, 2000 RVAAP authorization requests pursuant to OAC rule 3745-27-13 were approved by the Director, thereby authorizing the Respondent to perform the above referenced actions in accordance with applicable requirements.

**RVAAP Ground Water Monitoring Program:**

- dd. Ground water at OD#2 is currently being monitored in accordance with OAC rules 3745-54-90 through 3745-55-011. Ground water at the RQL is currently being monitored in accordance with OAC rule 3745-27-10 (effective March 1, 1990).

**ORC Chapter 3734 Exemptions:**

- mm. Respondent is a "person" as defined in ORC §§ 1.59, 3734.01 and 6111.01, and OAC rule 3745-50-10.
- nn. Because of their quantity, concentration, or physical or chemical characteristics of the types of contaminants found at the Site, the Director has determined that the contaminants at the Site are "hazardous wastes" as defined under ORC § 3734.01(J). The RVAAP constitutes a hazardous waste facility, solid waste facility, or other location where hazardous waste was treated, stored, or disposed. Conditions at the Site constitute a substantial threat to public health or safety or are causing or contributing or threatening to cause or contribute to air or water pollution or soil contamination.
- oo. The ground water and surface water at the Site constitute "waters of the state" as defined in ORC § 6111.01(H). The Work required by these Orders will contribute to the prohibition or abatement of the discharge of industrial wastes or other wastes into the waters of the State.
- pp. In issuing these Orders, the Director has given consideration to, and based his determination on, evidence relating to the technical feasibility and economic reasonableness of complying with these Orders and to evidence relating to conditions calculated to result from compliance with these Orders, and their relation to benefits to the people of the State to be derived from such compliance.
- qq. Pursuant to ORC § 3734.02(G) and OAC rule 3745-50-31, the Director may by order exempt any person generating, storing, treating, disposing of or transporting hazardous waste in such quantities or under such circumstances that, in the determination of the Director, are unlikely to adversely affect the public health or safety or the environment, from any requirement to obtain a permit or license or comply with the manifest system or other requirements of Chapter 3734.
- rr. Pursuant to ORC Section 3734.02(G), the Director has determined that the Army's (i) proposed investigative, monitoring and remedial activities to be conducted in accordance with the Facility-Wide Ground Water Monitoring Program Plan (FWGWMPP), AOC Work Plans, and the requirements of these Orders, and (ii) proposed hazardous waste storage and treatment activities to be conducted in accordance with the hazardous waste requirements set forth in Appendix E and the requirements of these Orders, are unlikely to adversely affect public health or safety or the environment.



Ravenna Army Ammunition Plant  
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- i. Respondent shall conduct ground water monitoring and comply with all ground water monitoring and reporting requirements in OAC rules 3745-54-90 through 3745-54-99, 3745-55-01, and 3745-55-011 for the Deactivation Furnace until Ohio EPA has approved the FWGWMPP and associated implementation schedule; and
  - ii. Upon approval by Ohio EPA of the FWGWMPP and associated implementation schedule, Respondent shall comply with the requirements set forth in Section VIII, Performance of Work by Respondent, paragraph 15, Facility-Wide Ground Water Monitoring Program.
  - iii. Respondent shall conduct ground water and soil remediation of the Deactivation Furnace as part of the Winklepeck Burning Ground AOC Workplan and shall comply with the requirements set forth in Section VIII, Performance of Work by Respondent, paragraph 14.
- d. The requirement to comply with the ground water investigation, monitoring and remediation requirements in OAC rule 3745-27-10, for the Ramsdell Quarry Landfill, provided, however, that Respondent shall comply with the requirements set forth in Section VIII, Performance of Work by Respondent, paragraph 15, Facility-Wide Ground Water Monitoring Program, and the following conditions:
  - i. Respondent shall conduct ground water monitoring at the RQL pursuant to OAC rule 3745-27-10, effective March 1, 1990, and fulfill all ground water monitoring and reporting requirements in accordance with OAC rule 3745-27-10 until Ohio EPA's approval of the FWGWMPP and associated implementation schedule.
  - ii. Upon approval by Ohio EPA of the FWGWMPP and associated implementation schedule, Respondent shall comply with the requirements set forth in Section VIII, Performance of Work by Respondent, paragraph 15, Facility-Wide Ground Water Monitoring Program.
  - iii. With the exception of the requirement to monitor ground water in accordance with OAC rule 3745-27-10 (effective March 1, 1990), Respondent shall conduct post closure care activities in accordance with OAC rule 3745-27-14, at the RQL until at least July 3, 2020. Post-closure care requirements contained in OAC rule 3745-27-14(A) include, but are not limited to:
    - (a) Continuing operation and maintenance of the surface water management system;

- iv. All liquids, semisolids, industrial wastes and other wastes regulated by ORC Chapter 6111 removed during intrusive activities shall be managed in accordance with ORC Chapter 6111 and regulations promulgated thereunder.
- b. All activities undertaken by Respondent pursuant to these Orders shall be performed in accordance with the requirements of CERCLA, the NCP, and all other applicable federal and state laws and regulations.
- c. Respondent shall perform the activities required pursuant to these Orders in a manner which is not inconsistent with the NCP. Ohio EPA believes that activities conducted pursuant to these Orders, if approved by Ohio EPA, shall be considered to be consistent with the NCP.
- d. Prior to commencement of Work, Respondent shall obtain Ohio EPA's approval of work plans or designs for investigation or remediation of AOCs under these Orders.
- e. It is Ohio EPA's position that if state law related to a remedial or removal action requires a permit, then a permit must be acquired in accordance with CERCLA Section 120(a)(4). It is Respondent's position that these Orders implement a CERCLA-based remediation program and that a permit is not required in accordance with CERCLA Section 121(e). The Parties agree that the remedial or removal actions anticipated at the RVAAP are not of the type that routinely require a permit under state law. If Ohio EPA determines that a permit is required for a particular remedial or removal action at the RVAAP, the Parties will meet and attempt in good faith to resolve to this issue.

#### **VIII. PERFORMANCE OF WORK BY RESPONDENT**

##### **13. Supervising Contractor**

- a. All Work performed pursuant to these Orders shall be under the direction and supervision of a contractor with expertise in hazardous waste site investigation and remediation, and shall include expertise in unexploded ordnance, if applicable. Prior to the initiation of the Work, Respondent shall notify Ohio EPA in writing of the name of the supervising contractor and any subcontractors to be used in complying with the requirements of these Orders.
- b. Respondent shall provide a copy of these Orders to all contractors, subcontractors, laboratories and consultants retained to perform any portion of the Work pursuant to these Orders. Respondent shall ensure that all contractors, subcontractors, laboratories and



- f. Respondent shall notify Ohio EPA within seven (7) days of the discovery of any placement or disposal or threatened placement or disposal of contaminants at an AOC not listed in Appendix A of these Orders.
- g. Within sixty (60) days of the discovery of a Suspect AOC, Respondent shall submit a Schedule for conducting a Relative Risk Site Evaluation ("RRSE") to Ohio EPA for review pursuant to these Orders. The purpose of such investigation shall be to gather necessary information in order to establish a relative priority for the Suspect AOC compared to previously identified AOCs at the RVAAP. This priority shall then be used to determine when funding will be allocated to complete the Work required by these Orders to address the release or threat of release at or from the Suspect AOC. The Suspect AOC must be reviewed by and receive concurrence from the IAP Workshop prior to inclusion as an AOC. Once identified as a Suspect AOC, the area may be listed and the CERCLA process initiated at the Preliminary Assessment stage.

15. Facility-Wide Ground Water Monitoring Program

- a. Within 60 days of the effective date of these Orders (unless otherwise specified in writing by Ohio EPA), Respondent shall submit to Ohio EPA for review and approval, a schedule to develop and implement a Facility-Wide Ground Water Monitoring Program Plan (FWGWMPP). The FWGWMPP shall be developed in conformance with the Facility-Wide Ground Water Conceptual Plan, Appendix F. It shall include the basis for well selection and the constituents and frequency of the monitoring program.
- b. In accordance with the schedule prepared in accordance with paragraph 15.a., and upon Ohio EPA's approval of the FWGWMPP, the Respondent shall implement the FWGWMPP. Facility-wide ground water monitoring activities shall continue for a minimum of three years following the completion of all environmental investigations at the Site. If ground water contamination is detected at the Site or a portion of the Site, then the Facility-wide ground water monitoring activities shall continue for a minimum of three years following the completion of environmental investigations and remediation at the Site, or until a minimum of three consecutive years of ground water monitoring data indicate that the concentration limits for each contaminant of concern have not been exceeded at the Site, whichever is longer. At the completion of ground water monitoring activities at the Site, all remaining ground water monitoring wells shall be properly plugged and abandoned in accordance with the methods included in the most recent revision of the FWSAP and Ohio EPA's "Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring," (February, 1995).
- c. The FWGWMPP shall include regularly scheduled ground water monitoring activities specific to OD#2 that ensure that the detonation does not adversely affect ground water at

notification shall be of sufficient detail to fully explain the rationale for an amendment of the approved plan, including an accounting of the circumstances that justify a plan amendment. If sufficient information on the proposed amendment is not currently available to the Respondent in order to submit an amended plan within the timeframes set out below, the Respondent in its written notification, may propose an alternative schedule for submitting the amended plan that addresses the proposed amendment.

- b. The Respondent shall submit an amended plan: (i) within sixty (60) days from the date of the written notification to address a proposed extension of a milestone; (ii) within ninety (90) days from the date of the written notification to address a proposed change in a target date, or any other aspect of an approved plan; and (iii) annually, if appropriate as part of the budget consultation process.
- c. If the Respondent disagrees with an Ohio EPA notification of the need to amend an approved plan, the Respondent shall, within thirty (30) days, notify Ohio EPA in writing of the reasons for such disagreement. If the Respondent and Ohio EPA are unable to resolve the disagreement, either the Respondent or Ohio EPA may invoke the dispute resolution procedure, Section XIX. During the pendency of such dispute resolution process, the time period for completion of work affected by the dispute shall be extended for a period not to exceed the actual time taken to resolve any such dispute.
- d. Ohio EPA will, in a timely manner, provide written notification to Respondent of Ohio EPA's approval, approval with modifications, or disapproval of a proposed amended plan.
- e. Prior to approving with modifications or disapproving a proposed amendment to an approved plan, Ohio EPA will consult with the Respondent regarding the proposed amendment. The Respondent and Ohio EPA shall attempt to resolve any disagreement with respect to a proposed amendment pursuant to the provisions of Section XIX, Dispute Resolution. Determinations by Ohio EPA to approve with modifications or to disapprove a proposed amendment will be accompanied by a written statement detailing the reasons for modifications or disapproval.

#### **IX. FUNDING AND SCHEDULE**

- 17. Respondent shall seek and take all necessary steps to obtain sufficient funding to comply with these Orders. Respondent shall consult with Ohio EPA in formulating its annual Installation Restoration Plan (IRP) budget request as set forth in this section.
- 18. During the annual IAP Workshop, Respondent shall provide Ohio EPA with a briefing on the proposed Army budget request for the RVAAP, and the scope of work proposed for the RVAAP, including modifications to the scope of work, schedules, and funding levels. Respondent and Ohio EPA shall discuss work scope, priorities, milestones and target dates, and funding levels required to



Anti-Deficiency Act, 31 U.S.C. § 1341. It is Ohio EPA's position that the Anti-Deficiency Act does not apply to any obligations set forth in these Orders and except as otherwise provided in these Orders, obligations hereunder are unaffected by Respondent's failure to obtain adequate funds or appropriations from Congress. The Parties agree that it is premature to resolve the validity of such positions at this time. However, noncompliance with the requirements of these Orders, whether or not the result of inadequate funding, may, at the sole discretion of the Director of Ohio EPA, result in the revocation of the exemption provided herein. The Parties agree that the exemption shall not be revoked without at least thirty (30) days prior written notice to the Respondent and is subject to the Dispute Resolution provisions set forth in Section XIX.

## **X. EXTENSIONS**

22. Except as expressly provided in these Orders, the Respondent shall cause all work to be performed in accordance with the milestones established in the IAP. Not later than thirty (30) days after determining that work will not be performed in accordance with a milestone, Respondent may request that a milestone be extended. Any request for extension by the Respondent shall specify:
- (i) The milestone that is sought to be extended;
  - (ii) The length of the extension requested;
  - (iii) The cause(s) for the extension; and
  - (iv) Any related milestones or target dates that would be affected if the extension request were granted.

Upon receipt of a request that a milestone be extended, Ohio EPA will determine whether good cause for the requested extension exists, and shall approve the extension request if good cause for the requested extension exists.

- a. Good cause for an extension of a milestone may include a delay caused by, or likely to be caused by: (i) an event of unavoidable delay; (ii) Ohio EPA's failure to timely take any action contemplated by these Orders; (iii) the good faith invocation of dispute resolution or the initiation of administrative or judicial action; (iv) Ohio EPA's approval of a request to extend another milestone; (v) additional work agreed to by the Respondent and Ohio EPA; (vi) an inconsistency or conflict between such milestone and the requirements of any other existing agreement, order or permit to which the Respondent is a party.
- b. Ohio EPA's determination of whether good cause for an extension of a milestone exists is necessarily a fact specific determination. The foregoing examples of circumstances that may constitute good cause for extension of a milestone shall not be construed to create a presumption that such circumstances will, in any particular instance, be determined by Ohio EPA to constitute good cause for extension of a milestone.

its Office of Federal Facilities Oversight ("OFFO"), concurs in writing with Respondent's decision, then that particular AOC may be deleted from Appendix A of these Orders.

27. Following remediation of an AOC pursuant to these Orders, including any required Operation and Maintenance, the Respondent may submit an AOC-specific Close Out Report to Ohio EPA for review. The Close Out Report shall be developed in conformance with CERCLA and applicable guidance documents, and shall contain all necessary data and information to support Respondent's decision that the remedy is complete and that the remedial action objectives and performance standards included within the AOC's Record of Decision or other appropriate documentation have been met, warranting no further action. Ohio EPA will review the Close Out Report pursuant to Section XVIII, Review of Submittals. If Ohio EPA concurs with Respondent's position, then that particular AOC may be deleted from Appendix A of these Orders.

### **XIII. SAMPLING AND DATA AVAILABILITY**

28. Respondent shall notify Ohio EPA not less than fifteen (15) days in advance of all sample collection activity. Upon request, Respondent shall allow split and/or duplicate samples to be taken by Ohio EPA. Ohio EPA shall also have the right to take any additional samples it deems necessary. Upon request, Ohio EPA will allow Respondent to take split and/or duplicate samples of any samples Ohio EPA takes as part of its oversight of Respondent's implementation of the Work.
29. Within fourteen (14) days of a request by Ohio EPA, Respondent shall submit copies to Ohio EPA of validated data and original laboratory reports, generated by or on behalf of Respondent with respect to the Site and/or the implementation of these Orders. Respondent may submit to Ohio EPA any interpretive reports and written explanations concerning the raw data and original laboratory reports. Such interpretive reports and written explanations shall not be submitted in lieu of original laboratory reports and raw data. Should Respondent subsequently discover an error in any report or raw data, Respondent shall promptly notify Ohio EPA of such discovery and provide the correct information.

### **XIV. ACCESS**

30. Ohio EPA shall have access to the Site and any other property to which access is required for the implementation of these Orders, to the extent access to the property is controlled by Respondent. If access to the Site is not permitted under the current security requirements and can not be accommodated due to current military operations, Respondent shall promptly notify Ohio EPA in writing, explain the reasons for the denial of access and propose a plan for accommodating Ohio EPA's access request in a less intrusive manner. Access under these Orders shall be for the purposes of conducting any activity related to these Orders including, but not limited to the following;



- b. Observing, taking photographs, or otherwise recording information related to the implementation of these Orders, including the use of any mechanical or photographic device;
- c. Directing that the Work stop whenever the Project Manager for Ohio EPA determines that the activities at the Site may create or exacerbate a threat to public health or safety, or threaten to cause or contribute to air or water pollution or soil contamination;
- d. Conducting investigations and tests related to the implementation of these Orders;
- e. Inspecting and copying records, operating logs, contracts and/or other documents related to the implementation of these Orders; and
- f. Assessing Respondent's compliance with these Orders.

#### **XVI. PROGRESS REPORTS**

36. Unless otherwise specified in writing by Ohio EPA, Respondent shall submit a written progress report for every month to Ohio EPA by the tenth (10th) day of the following month. At a minimum, the progress reports shall:
- a. Describe the status of all projects being implemented under these Orders and actions taken toward achieving compliance with the Orders during the reporting period;
  - b. Describe difficulties encountered during the reporting period and actions taken to rectify any difficulties;
  - c. Describe activities planned for the following month;
  - d. Identify changes in key personnel;
  - e. List target and actual completion dates for each element of activity, including project completion;
  - f. Provide an explanation for any deviation from any applicable schedules; and
  - g. Indicate how much contaminated soil was removed and contaminated ground water was pumped and indicate where such contaminated media were disposed.

disapprove the submission in whole or in part, notifying Respondent of deficiencies; or (e) any combination of the above.

40. In the event of Ohio EPA's approval, conditional approval, or modification of Respondent's submission, Respondent shall proceed to take any action required by the submission as approved, conditionally approved, or modified by Ohio EPA.
41. In the event that Ohio EPA disapproves a submission, in whole or in part, and notifies Respondent of the deficiencies, Respondent shall within thirty (30) days from the date of actual receipt of the disapproval correct the deficiencies and submit a revised document to Ohio EPA for approval. This time limitation may be extended by mutual written agreement of the Project Managers. The revised submission shall incorporate all of the uncontested changes, additions, and/or deletions specified by Ohio EPA in its notice of deficiency.
42. Subsequent to receipt of the Ohio EPA comments, the Respondent may request a meeting with Ohio EPA to discuss and clarify comments. Except as agreed to by the Parties, the meeting shall commence within fifteen (15) days of the close of the comment period. This time limitation may be extended by mutual written agreement of the Project Managers.
43. Ohio EPA will review any revised submissions within 45 days from the date of actual receipt of such revised submission by the Project Manager. In the event that Ohio EPA disapproves a revised submission, in whole or in part, the Respondent and Ohio EPA may again require Respondent to correct the deficiencies and incorporate all changes, additions, and/or deletions within thirty (30) days of the disapproval, or such period of time as specified by Ohio EPA.
44. All work plans, reports, or other items required to be submitted to Ohio EPA under these Orders shall, upon approval by Ohio EPA, be deemed to be incorporated in and made an enforceable part of these Orders. In the event that Ohio EPA approves a portion of a work plan, report, or other item, the approved portion shall be deemed to be incorporated in and made an enforceable part of these Orders.

#### **XIX. DISPUTE RESOLUTION**

45. The Project Managers shall, whenever possible, operate by consensus. In the event consensus cannot be reached, the dispute resolution procedure set forth in the DSMOA (Appendix D to these Orders) shall be implemented. The opportunity to invoke dispute resolution under this Section shall be available regarding any disputes arising under the following sections of these Orders: VII. General Provisions; VIII. Performance of Work by Respondent; IX. Funding and Schedule; X. Extensions; XI. Additional Work; XII. AOC Closeout; XIV. Access; XVIII. Review of Submittals; XXVII. Modification; XXVIII. Property Transfers; XXIX. Revocation; and XXX. Termination, and other sections as may be mutually agreed upon by the Parties.



52. The Director reserves the right to revoke these Orders pursuant to Section XXIX, Revocation, or under applicable law, and reserves the right to terminate these Orders pursuant to Section XXX, Termination, or under applicable law.
53. Ohio EPA reserves the right to take any action, including but not limited to any enforcement action, action to recover costs, or action to recover damages to natural resources, pursuant to any available legal authority as a result of past, present, or future violations of state or federal laws or regulations or the common law, or as a result of events or conditions arising from, or related to, the Site. Upon termination of these Orders pursuant to Section XXX, Termination, Respondent shall have resolved its liability to Ohio EPA only for the Work performed pursuant to these Orders.
54. Nothing in these Orders is intended by the Parties to be an admission of facts or law, or an estoppel or a waiver of defenses by Respondent in any unrelated proceedings, and the Respondent specifically does not admit that conditions at the RVAAP present an imminent and substantial endangerment to public health, welfare, or the environment.

## **XXII. ACCESS TO INFORMATION**

55. Respondent shall provide to Ohio EPA, upon request, copies of all documents and information within its possession or control or that of its contractors or agents relating to events or conditions at the Site including, but not limited to manifests, reports, correspondence, or other documents or information related to the Work.
56. Respondent may assert a claim that documents or other information submitted to Ohio EPA pursuant to these Orders is confidential under the provisions of OAC rule 3745-50-30(A) or ORC § 6111.05(A). If no such claim of confidentiality accompanies the documents or other information when such information is submitted to Ohio EPA, it may be made available to the public by Ohio EPA without notice to Respondent.
57. Respondent may assert that certain documents or other information are privileged or confidential under any privilege or confidentiality provision recognized by state or Federal law. If Respondent makes such an assertion, it shall provide Ohio EPA with the following: (1) the title of the document or information; (2) the date of the document or information; (3) the name and title of the author of the document or information; (4) the name and title of each addressee and recipient; (5) a general description of the contents of the document or information; and (6) the privilege or confidentiality provision being asserted by Respondent.
58. No claim of confidentiality shall be made with respect to any data, including but not limited to, all sampling, analytical monitoring, or laboratory or interpretive reports.

and all rights it might have, either in law or equity, to seek administrative or judicial review of these Orders.

64. Notwithstanding the preceding, the Ohio EPA and the Respondent agree that, in the event that these Orders are appealed by any other party to the Environmental Review Appeals Commission or any court, the Respondent retains the right to intervene and participate in such appeal in support of these Orders. In such event, the Respondent shall continue to comply with these Orders, notwithstanding such appeal and intervention, unless these Orders are stayed, modified or vacated.

#### **XXVII. MODIFICATION**

65. These Orders may be modified only by agreement of the Parties. Any modification of these Orders shall be in writing, signed by the Director and by an authorized representative of the Respondent, and shall be effective on the date entered in the journal of the Director of Ohio EPA.

#### **XXVIII. PROPERTY TRANSFERS**

66. If there is a change in ownership or operation of the RVAAP or any portion thereof, the Respondent may seek a modification of these Orders to reflect a transfer of obligations under these Orders with respect to the portion of the RVAAP that is the subject of the change in ownership or operation by submitting to Ohio EPA a proposed modification in accordance with Section XXVII. Modification.

#### **XXIX. REVOCATION**

67. The Director of Ohio EPA may revoke these Orders at any time upon ninety (90) days written notice to Respondent. Written notice of revocation will be sent, by certified mail or equivalent method that bears a return receipt, to the Project Manager designated pursuant to Section XV of these Orders. The notice of revocation will state the reason for revocation, and is subject to Section XIX, Dispute Resolution. Revocation shall not affect the terms and conditions of Section XXI, Reservation of Rights, Section XXII, Access to Information, Section XXIII, Other Contracts and Section XXIV, Other Claims. In the event of revocation of these Orders, the Ohio EPA reserves the right to take any action, including but not limited to any enforcement action pursuant to any available legal authority to require compliance or remediation of the RVAAP in accordance with state or federal laws or regulations.



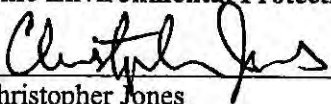
Ravenna Army Ammunition Plant  
Director's Final Findings and Orders

**XXXII. SIGNATORY AUTHORITY**

72. Each undersigned representative of a Party to these Orders certifies that he or she is fully authorized to enter into these Orders and to legally bind such Party to these Orders.

**IT IS SO ORDERED AND AGREED:**

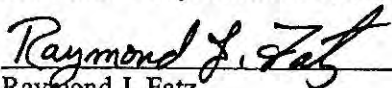
Ohio Environmental Protection Agency

  
\_\_\_\_\_  
Christopher Jones  
Director

6-9-04  
Date

**IT IS SO AGREED:**

United States Department of the Army  
Ravenna Army Ammunition Plant

  
\_\_\_\_\_  
Raymond J. Fatz  
Deputy Assistant Secretary of the Army  
(Environmental, Safety and Occupational Health)  
OASA (I&E)

MAY 10 2004  
Date

## LIST OF APPENDICES

Appendix A – Areas of Concern

Appendix B - RVAAP Document Compendium

Appendix C – Installation Action Plan for Ravenna Army Ammunition Plant dated January 2004

Appendix D - Department of Defense and State Memorandum of Agreement (DSMOA) dated September 1992

Appendix E - Open Detonation Area #2 Hazardous Waste Requirements

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**Appendix A**  
**Areas of Concern**

RVAAP-01	Ramsdell Quarry Landfill
RVAAP-02	Erie Burning Grounds
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RVAAP-37	Pesticide Building S-4452
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RVAAP-43	Load Line 10 Percussion Element
RVAAP-44	Load Line 11 Artillery Primer
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RVAAP-48	Anchor Test Area
RVAAP-49	Central Burn Pits
RVAAP-50	Atlas Scrap Yard
RVAAP-51	Dump Along Paris-Windham Road

## **Appendix B**

### **RVAAP Document Compendium**

- i. (November 1978), "Installation Assessment of Ravenna Army Ammunition Plant. Report 132;
- ii. (November 1983), "Hazardous Waste Management Study No. 37-26-0442-84: Phase 2 of AMC Open Burning/Open Detonation Ground water Evaluation, Ravenna Army Ammunition Plant, Ravenna, Ohio;
- iii. (October 1989), "Ravenna Army Ammunition Plant, Ravenna, Ohio. RCRA Facility Assessment Draft RR/VSI Report;
- iv. Final (February, 1996), "Facility-Wide Safety and Health Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio";
- v. Final (February, 1996), "Preliminary Assessment for the Characterization of Areas of Contamination, Ravenna Army Ammunition Plant, Ravenna, Ohio";
- vi. Final (March, 1996); "Action Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio";
- vii. (July 1996), "Phase I Remedial Investigation Sampling and Analyses Plan Addendum for High Priority Areas of Concern for the Ravenna Army Ammunition Plant, Ravenna, Ohio";
- viii. (July 1996), "Phase I Remedial Investigation Site Safety Addendum for High Priority Areas of Concern for the Ravenna Army Ammunition Plant, Ravenna, Ohio;
- ix. Final (April, 1996), "Facility-Wide Sampling and Analysis Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio";
- x. Final (July, 1996), "Phase I Remedial Investigation Sampling and Analysis Plan, Addendum for High Priority Areas of Concern for the Ravenna Army Ammunition Plant, Ravenna, Ohio";

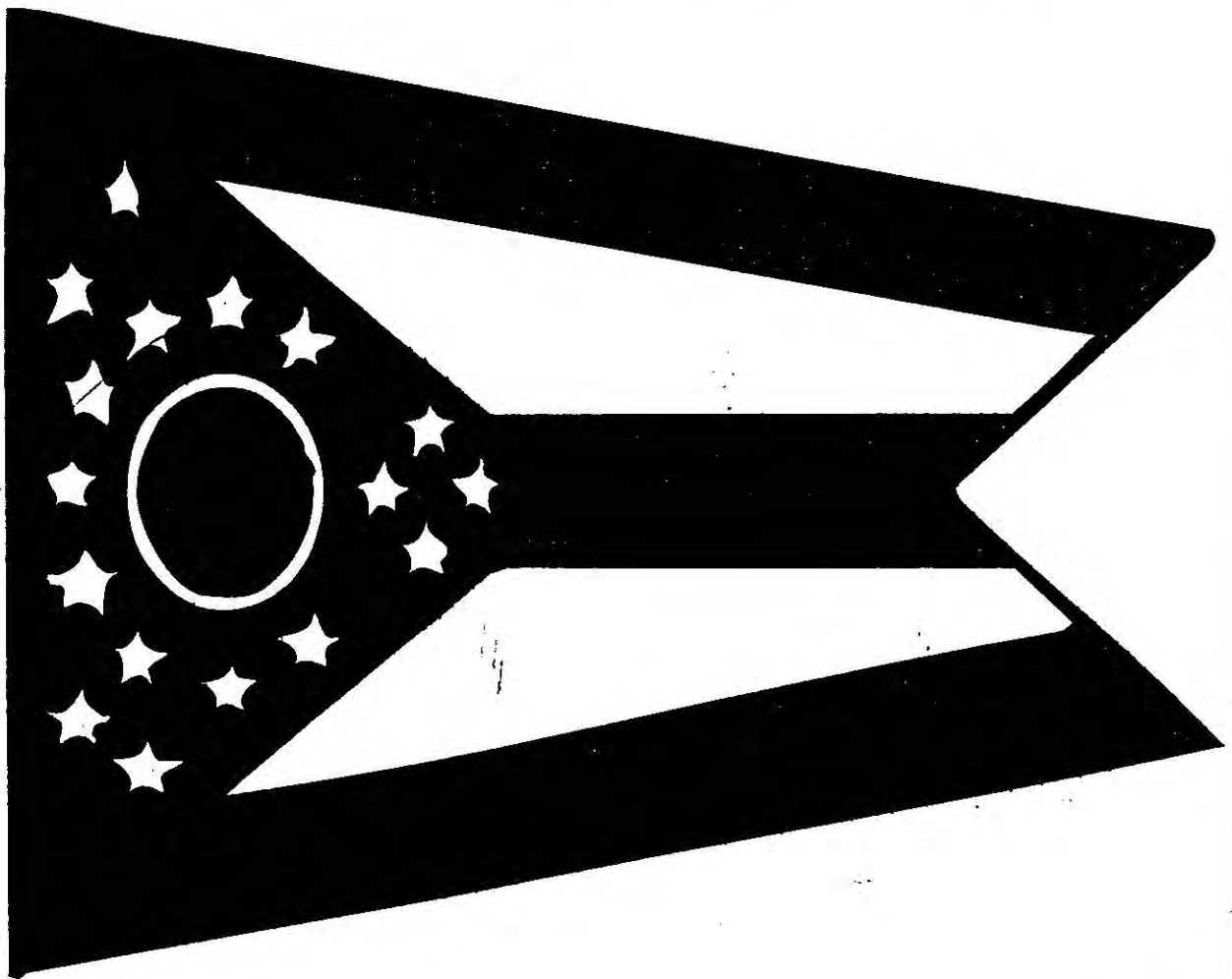


## **Appendix C**

### **Installation Action Plan for Ravenna Army Ammunition Plant dated January 2004**

**INSTALLATION ACTION PLAN  
For  
RAVENNA ARMY  
AMMUNITION PLANT**

**FY04 as of January 2004**



30% post-consumer material paper





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# Acronyms & Abbreviations

AEDB-R	Army Environmental Database - Restoration
AEHA	(United States) Army Environmental Hygiene Agency
AOC	Area of Concern
bgs	below ground surface
CERCLA	Comprehensive Environmental Response Compensation and Liability Act (1980)
CERCLIS	CERCLA Inventory System
CHPPM	(United States Army) Center for Health Promotion and Preventive Medicine
COEC	Consituent of Ecological Concern
COPC	Chemical of Potential Concern
DD	Decision Document
DoD	U.S. Department of Defense
DOT	Department of Transportation
DSERTS	Defense Site Environmental Restoration Tracking System (Now AEDB-R)
EPA	Environmental Protection Agency
ERA	Ecological Risk Assessment
ER,A	Environmental Restoration, Army (formally called DERA)
FPRI	Fixed Price Remediation with Insurance
FS	Feasibility Study
FY	Fiscal Year
GOCO	Government-Owned, Contractor-Operated
HMX	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazacine
IAP	Installation Action Plan
IRA	Interim Removal Action
IRP	Installation Restoration Program
LAP	Load, Assemble and Pack
LL	Load Line
LTM	Long Term Monitoring
MACOM	Major Command
MCL	Maximum Contaminant Level
MMRP	Military Munitions Response Program
NACA	National Advisory Committee on Aeronautics
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NE	Not Evaluated
NEPA	National Environmental Policy Act
NFA	No Further Action
NGB	National Guard Bureau
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
OBG	Open Burning Ground
ODOW	Ohio Department of Wildlife
OE	Ordnance and Explosives
OEPA	Ohio Environmental Protection Agency
OHARNG	Ohio Army National Guard
OSC	Operations Support Command
PA	Preliminary Assessment
PBC	Performace Based Contracting
PCB	Poly Chlorinated Biphenals
POL	Petroleum, Oil & Lubricants
RA	Remedial Action
RA(C)	Remedial Action - Construction
RA(O)	Remedial Action - Operation



**Approval**

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**Ravenna Army Ammunition Plant  
Installation Action Plan  
FY04**

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**MARK C. PATTERSON**  
Facility Manager  
Ravenna AAP

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**KENNETH E. WIGGANS**  
Chief, Oversight North Branch  
US Army Environmental Center

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**RANDALL J. CERAR**  
Chief, Cleanup Division  
US Army Environmental Center

# Installation Information

<b>SITE DESCRIPTION:</b>	<p>The Ravenna Army Ammunition Plant (RVAAP) is located on 21,419 acres in Portage and Trumbull Counties, Ohio. Warren, Ohio is located 7 miles to the east of RVAAP and Kent, Ohio is located 15 miles to the west. The Operations Support Command (OSC) transferred control and operation of 16,164 acres to the National Guard Bureau in May 1999. In March 2002, an agreement was signed to immediately transfer an additional 3,774 uncontaminated acres to the National Guard with the remaining acreage to be transferred as restoration of the AOCs is completed.</p>
<b>COMMAND ORGANIZATION:</b>	<p><b>INSTALLATION:</b> Ravenna Army Ammunition Plant, Commander's Representative and National Guard Bureau <b>INSTALLATION MODIFIED CARETAKER CONTRACTOR:</b> Toltest Inc.</p>
<b>IRP EXECUTING AGENCIES:</b>	<p><b>INVESTIGATION PHASE:</b> U.S Army Corps of Engineers, Louisville District <b>ACTION PHASE:</b> U.S Army Corps of Engineers, Louisville District</p>
<b>REGULATORY PARTICIPATION:</b>	<p><b>FEDERAL:</b> U.S. Environmental Protection Agency, Region V <b>STATE:</b> Ohio Environmental Protection Agency (Ohio EPA)</p>
<b>REGULATORY STATUS:</b>	<ul style="list-style-type: none"><li>- RCRA Interim Part A Permit</li><li>- Signing of the Orders will also transfer regulation of the RCRA groundwater unit at Ramsdell Quarry and Open Demolition Area #2 and all media at the Deactivation Furnace to the CERCLA program. The source of most contamination at or adjacent to the sites originates from unregulated activities that took place from 1940 to 1980. Cleanup of the sites will be more efficient once the sites are placed under a single regulatory program.</li></ul>



# Installation Description

3,774 uncontaminated acres to the National Guard with the remaining acreage to be transferred as restoration of the AOCs is completed.

## REGULATORY STATUS

RVAAP is not on the U.S. EPA NPL, although it is in the U.S. EPA's CERCLIS database. Management of the IRP sites follows CERCLA requirements. There are a number of other regulatory programs addressing other non-IRP sites.

RVAAP received a RCRA Part A permit in 1980 for the storage and treatment of off-spec munitions and munitions-related waste. RVAAP submitted a RCRA Part B permit application in 1992 for the installation's Open Burning and Open Detonation Grounds and a hazardous waste storage building. The permit application was withdrawn during the 3rd quarter of FY 1994. The closure of the storage units and the open burn trays in Winklepeck Burning Grounds was completed and approved in 1998. Three 90-day hazardous waste storage areas were also officially closed.

A closure plan was developed for the Demolition Area #2 (RVAAP-04) in 1998, but has been reconsidered at this time. The site has been used since 1941 for treatment of explosive waste and ordnance by burning and detonation. The need for a treatment unit, to support the IRP and other projects, to detonate unexploded ordnance (UXO) was not known at the time the plan was developed. Subsequently, UXO has been found at several areas at RVAAP. Some of the areas are associated with IRP sites, while others are strictly a UXO concern. More UXO will almost certainly be found during future environmental investigations, remediation activities, and National Guard exercises. These circumstances have demonstrated the need for the use of a previously permitted RCRA unit where UXO can be detonated. The Army and Ohio EPA are currently developing Director's Findings and Orders to authorize continued use of Demolition Area #2 for purposes of supporting environmental restoration.



# Contamination Assessment

surface water.

Phase II field sampling has been completed at the four melt-pour Lines. A final report for Load Line 1 and draft reports for Load Lines 2, 3 and 4, and the draft final report for LL-12 have been issued. Results have for the most part confirmed initial beliefs that explosives and heavy metals are the most common contaminants and are generally located immediately around buildings and in the ditches and ponds draining the sites. Less common contaminants include PCBs and propellants. These same contaminants have been detected in the water and sediment within the storm sewers in the past. On-post wells located to the southeast of Load Line 2 near the perimeter have shown trace amounts of explosives. Of the fuze and booster Lines, only Load Line 11 has undergone extensive sampling to determine the nature and extent of contamination. Although a report has not been issued, the data indicates that lead, arsenic, antimony, chromium, PCBs, and some other organics appear to be the most common contaminants. Very low levels of explosives were sporadically detected. High lead levels have been detected in the sediment from the sanitary sewers. Surface and sediment samples indicate significant levels of contaminants are not migrating from the site. This is consistent with the results from limited SI sampling of Load Lines 6, 9, and 10 in the spring of 2002 and the RRSE data collected in 1996 and 1998 for the other fuze and booster Lines. The preliminary-draft RI reports for Load Lines 2, 3 and 4 are under review.

Varying amounts of RI data are also available for some of the other AOCs used to support the main production activities. Limited data available from earlier efforts again show explosives and heavy metals to be the principle contaminants at sites used to burn, dump, or bury explosive waste from the Load Lines. These contaminants are most frequently found in the soils at Demolition Area #2 and Erie Burning Grounds, areas used to detonate and burn waste explosives. Erie has in recent years existed as a shallow impoundment and wetlands, resulting in explosives, metals and some organics being detected in the surface water and sediment at and downstream of the site. Explosives have been detected in the RCRA groundwater well samples taken at OD 2 where large amounts of UXO and OE scrap are still present.

Data currently being evaluated for the Cobb Ponds, which were settling basins for Load Line 3 and 12 effluent, indicate low levels of explosives, organics, and metals. Generally, contaminants are not present in the ground and surface water. After completion of a UXO removal operation at OD 1, confirmation samples of the soils had no detections of explosives and some metals were only slightly above background. The explosive RDX (below reporting limit) was detected at very low levels in the surface water downstream of the site near the installation boundary. Central Burn Pits, an area used to burn electrical components, dunnage, and other non explosive waste, has shown significant detections of lead, arsenic, antimony, cyanide, silver, and pesticides in the soil. Lead, cyanide, arsenic, and pesticides were noted in the sediment while surface and groundwater had slightly elevated arsenic. The data is currently being evaluated and a report is expected to be completed in spring 2004.

In 2003, a Performance Based Contract (PBC) was awarded to Shaw Environmental to complete the soil remediation at Load Lines 1, 2, 3 and 4. Remedial investigation at Load Lines 2, 3 and 4 will be completed; remedial technologies will be screened and an approved method will be selected and implemented to eliminate any threat to human health or the environment from contaminated soils and sediments. Ravenna AAP was one of the first Army installations to implement PBC, the Army's new strategy to accelerate clean up programs nationwide. The project will result in an interim remedy. Additional investigations of the soils under the inaccessible portions of the buildings will be needed. Results of the investigations will be used to determine if additional remedial action is needed to make the sites safe for training by the OARNG.



Title	Author	Date
Site Specific Safety and Health Plan for the Interim Removal Action, Decontamination and Demolition of Building T-5301 (AOC 47)	OSC	Feb-00
Work Plan & Sampling and Analysis for the Bioremediation Pilot Study for Soils from Former Bldg. FJ 904 at Load Line 12 (AOC 12)	OSC	Mar-00
Draft-Final Completion Report for the Bioremediation Pilot Study for Soils from Former Bldg. FJ 904 at Load Line 12 (AOC 12)	OSC	Mar-00
SAP and SSHP Addendum No. 2 for the Biological Measurements at Winklepeck Burning Grounds at RVAAP	USACE	May-00
Facility-Wide SAP and Facility-Wide SSHP for Environmental Investigations for RVAAP	USACE	Jul-00
Report Groundwater Investigation at Ramsdell Quarry at RVAAP	USACE	Aug-00
Sampling and Analysis Plan Addendum No. 2 for the Phase II RI of Load Line 1	USACE	Sep-00
SAP for Phase II RI Load Line 12 at RVAAP	USACE	Sep-00
SSHP for Phase II RI Load Line 12 at RVAAP	USACE	Sep-00
OE/UXO Locating, Removal and Disposal at the Open Detonation Area #2	OSC	Sep-00
Work Plan for the Remedial Investigation at Load Line 11 (AOC 44)	OSC	Oct-00
Site Safety and Health Plan for the Remedial Investigation at Load Line 11 (AOC 44)	OSC	Oct-00
Sampling and Analysis Plan for the Remedial Investigation at Load Line 11 (AOC 44)	OSC	Oct-00
Work Plan for the Remedial Investigation at Load Line 11 (AOC 44)	OSC	Oct-00
Site Safety and Health Plan for the Remedial Investigation at Load Line 11 (AOC 44)	OSC	Oct-00
Sampling and Analysis Plan for the Remedial Investigation at Load Line 11 (AOC 44)	OSC	Oct-00
Work Plan for the Remedial/Design Removal Action of the Paris-Windham Road Dump (AOC 51)	OSC	Apr-01
Work Plan for the Phase II Remedial Investigation at Central Burn Pits	OSC	Aug-01
Sampling and Analysis for the Phase II Remedial Investigation at Central Burn Pits	OSC	Aug-01
Site Safety and Health Plan for the Phase II Remedial Investigation at Central Burn Pits	OSC	Aug-01
Work Plan for the Interim Removal Action, Decontamination and Demolition of Building T-5301 (AOC 47)	OSC	Feb-00
Work Plan for the Interim Removal Action at Load Line 11 (AOC 44)	OSC	Jan-01
Sampling and Analysis for the Interim Removal Action at Load Line 11 (AOC 44)	OSC	Jan-01
Site Specific Safety and Health Plan for the Interim Removal Action at Load Line 11 (AOC 44)	OSC	Jan-01
Work Plan for the Phase II Remedial Investigation at Upper & Lower Cobbs Pond	OSC	Jul-01
Sampling and Analysis for the Phase II Remedial Investigation at Upper & Lower Cobbs Pond	OSC	Jul-01
Site Safety and Health Plan for the Phase II Remedial investigation at Upper & Lower Cobbs Pond	OSC	Jul-01
Closure Report for the Interim Removal Action, Decontamination and Demolition of Building T-5301 (AOC 47)	OSC	Jul-01
Draft Compliance Monitoring Program for the Open Detonation Area #2	OSC	Jun-01
Draft Groundwater Quality Assessment Program Report for the Ramsdell Quarry Landfill	OSC	Nov-01
Sampling and Analysis Addendum for the Remedial/Design Removal Action of the Paris-Windham Road Dump (AOC 51)	OSC	Apr-02
Site Specific Safety and Health Plan for the Remedial/Design Removal Action of the Paris-Windham Road Dump (AOC 51)	OSC	Apr-02
Sampling and Analysis Addendum for the Remedial/Design Removal Action at the Sand Creek Disposal Road Landfill (AOC 34)	OSC	Apr-02
Work Plan for the Remedial/Design Removal Action at the Sand Creek Disposal Road Landfill (AOC 34)	OSC	Apr-02
Site Specific Safety and Health Plan for the Remedial/Design Removal Action at the Sand Creek Disposal Road Landfill (AOC 34)	OSC	Apr-02
Interim Removal Action for Load Line #11		Apr-02
OE/UXO Removal and Interim Removal Action Report for the Open Demolition Area #1		Apr-02
Sampling and Analysis Plan Addendum #3, Biological Measurements at the Winklepeck Burning Grounds	SAIC	May-02
Work Plan and Sampling and Analysis Plan Agenda for the Phase II Remedial Investigation of Demolition Area 2		Jun-02

# **ER,A ELIGIBLE ACTIVE DSERTS SITES**



# RVAAP-02 ERIE BURNING GROUNDS

## SITE DESCRIPTION

This 35 acre AOC was used to thermally treat munitions by open burning on the ground surface. Bulk, obsolete, off-spec propellants, conventional explosives, rags, and large explosive-contaminated items were treated at this location. The ash residue from the burns was left at the AOC. UXO is present at the site. Waste constituents of concern at this location include RDX, TNT, and heavy metals. There is a potential for release of contaminants from this unit to the surrounding soils, surface water/sediment and groundwater. This site is in a wetland area.

The PA/SI was completed in 1989. Phase I RI field work was conducted at this site in July 1999. The final report was completed in 2001. It was determined that additional groundwater sampling was needed.

## PROPOSED PLAN

Groundwater, soil and sediment samples will be taken in fall 2003. This report is expected in summer 2004.

## STATUS

### RRSE RATING:

High

### CONTAMINANTS:

Explosives, Metals, SVOCs

### MEDIA OF CONCERN:

Soil, Groundwater, Surface Water,  
Sediment

### COMPLETED IRP PHASE:

PA/SI

### CURRENT IRP PHASE:

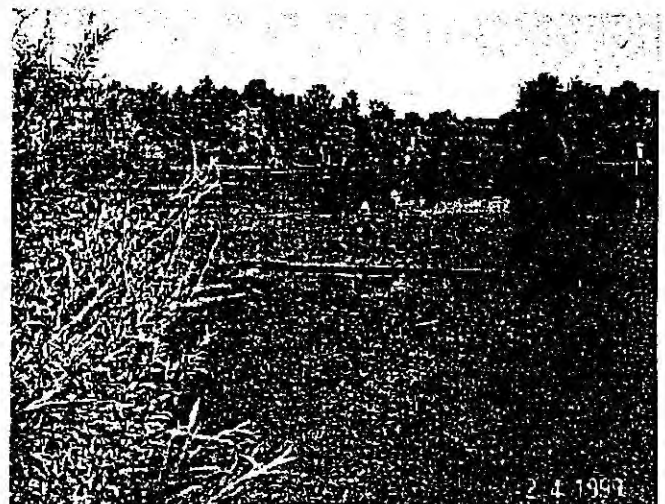
RI/FS

### FUTURE IRP PHASE:

RI/FS, LTM

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	16	122		
IRA				
RD				
RA				
RA(O)				
LTM		35	30	30
<b>Total</b>	<b>233,000</b>			





# RVAAP-05 WINKLEPECK BURNING GROUNDS

## SITE DESCRIPTION

The total burning ground area consists of 200 acres and has been in operation since 1948. Prior to 1980, open burning was carried out in pits, pads, and sometimes on the roads within the 200 acre area. Burning was conducted on the bare ground and the ash was abandoned at the site. Prior to 1980, wastes treated in the area included RDX, antimony sulfide, Composition B, lead azide, TNT, propellants, black powder, waste oils, sludge from the load lines, domestic wastes and small amounts of laboratory chemicals. UXO is present at the AOC. From 1980 to 1998, burns of scrap explosives, propellants and explosive-contaminated materials were conducted in raised refractory-lined trays within a 1.5 acre area.

A USAEHA geotechnical study was conducted at the active portion of this site in 1992. The Part B permit application covering the active portion of the site was withdrawn in 1994. The burn trays along with the 90-day storage unit, Building 1601, were closed in accordance with Ohio EPA guidance in 1998. Minor amounts of contamination were detected in the soils.

Field work for a Phase II RI was conducted in 1998 and the report finalized in late 2002 (end use has since changed). The report includes facility-wide background levels, as well as human health and ecological risk assessments. Additional field studies were conducted in FY00 at Winklepeck and RVAAP reference locations to more accurately define the risk to ecological receptors at the site. The Draft Eco report was submitted in April 2001. This Eco report has undergone revisions and is currently undergoing finalization. Phase III RI fieldwork was completed in fall 2000, the preliminary draft report is expected to be submitted in late spring 2004. The data will be used along with data from previous studies to evaluate remedial alternatives.

## PROPOSED PLAN

Finalize RI/FS reports. There will be some UXO removal in 2003-04 with non-IRP funds. A RD/RA, of soil removal in conjunction with UXO removal, is planned. LTM will follow.

The most likely future use of this site will be as an impact area for a training range for the Mk 19 grenade machine gun (target practice rounds only). This site has an increased priority for action in order to expedite property transfer to the National Guard Bureau.

## STATUS

### RRSE RATING:

High

### CONTAMINANTS:

Explosives, Metals, SVOCs

### MEDIA OF CONCERN:

Soil, Groundwater, Surface Water, Sediment

### COMPLETED IRP PHASE:

PA/SI

### CURRENT IRP PHASE:

RI/FS, RD

### FUTURE IRP PHASE:

RA, LTM

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	40			
IRA				
RD	69			
RA		600	400	
RA(O)				
LTM			760	240
<b>Total</b>	<b>2,109,000</b>			





# RVAAP-08 LOAD LINE 1

## SITE DESCRIPTION

From approximately 1941 to 1971, wash-down water and wastewater from the load line operations were collected in concrete sumps, pumped through sawdust filtration units and then discharged to a settling pond. Building wash-down water from the melt-pour buildings was also swept out through doorways onto the ground surrounding the buildings. The settling pond was an unlined earthen impoundment ~1 acre in size. Water from the impoundment was discharged to a surface stream that exited the installation. This area was also used as a demil area. Contaminants of concern at this unit are explosive compounds and heavy metals (including lead, chromium, and mercury). There is a high potential for releases from this unit to the soils, surface water/sediment and groundwater. Most above ground structures were demolished during 2000. Environmental controls were used during the demolition activities to prevent migration of contaminants to the environment.

The RI sampling (1999-2000) found high levels of explosives in the soil around the melt-pour and preparation buildings. Groundwater has low levels of explosives and metals. Preliminary screening of the contaminant levels indicates that the sediments may cause an ecological risk. Surface water did not show any significant contamination. The RI report was finalized in June 2003.

## STATUS

**RRSE RATING:** High

**CONTAMINANTS:**

Explosives, Metals, SVOCs, VOCs  
Propellents

**MEDIA OF CONCERN:**

Soil, Groundwater, Surface Water,  
Sediment

**COMPLETED IRP PHASE:**

PA/SI, Phase I RI (1998), Phase II RI  
(2003)

**CURRENT IRP PHASE:**

PBC

**FUTURE IRP PHASE:**

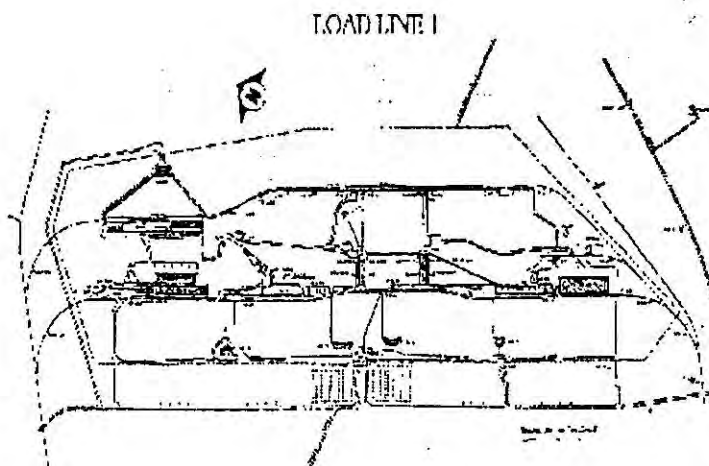
PBC

## PROPOSED PLAN

A PBC contract was awarded to Shaw Environmental in Sept 2003 to complete all phases through LTM at LL1, 2, 3 and 4 for all soils and some sediments.

Final: All concrete wall and foundations and walkways will be removed. Flushing and grouting or removal of the underground utilities will be done as needed. Any residual contamination will be removed. This may be accomplished with non-ER,A funds.

The project will result in an interim remedy. Additional investigations of the soils under the inaccessible portions of the buildings will be needed. Results of the investigations will be used to determine if additional remedial action is needed to make the sites safe for training by the OARNG.





# RVAAP-10 LOAD LINE 3

## SITE DESCRIPTION

From approximately 1941 to 1971, building wash-down water and wastewater from the load line operations were collected in concrete sumps, pumped through sawdust filtration units and then discharged to a drainage ditch leading to a settling pond. Building wash-down water from the melt-pour buildings was also swept out through doorways onto the ground surrounding the buildings. Contaminants of concern at this unit are explosive compounds and heavy metals (ex., lead, chromium, and mercury). There is a high potential for releases from this unit to the soils, surface water/sediment and groundwater.

A Phase I RI was completed in 1998. Explosives and metals were the most common soil contaminants. Organics, PCBs, propellants and pesticides were also detected. Low levels of some contaminants were found in the groundwater at this site. Fieldwork for a Phase II RI to further determine the nature and extent of the contamination was completed in 2001. A preliminary draft RI report was submitted in May 2003 with regulatory review completed in June 2003.

Thermal decomposition of the building walls and foundations will be conducted (with non-ER,A funds).

## STATUS

### RRSE RATING:

High

### CONTAMINANTS:

Explosives, Metals, SVOCs, VOCs

### MEDIA OF CONCERN:

Soil, Groundwater, Surface Water,  
Sediment

### COMPLETED IRP PHASE:

PA/SI, Phase II RI (1998)

### CURRENT IRP PHASE:

PBC

### FUTURE IRP PHASE:

PBC

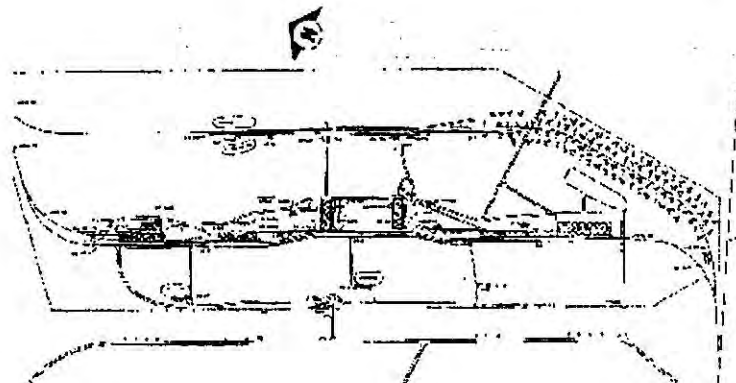
## PROPOSED PLAN

A PBC contract was awarded to Shaw Environmental in Sept 2003 to complete all phases through LTM at LL1, 2, 3 and 4 for all soils and some sediments.

Final: All concrete wall and foundations and walkways will be removed. Flushing and grouting or removal of the underground utilities will be done as needed. Any residual contamination will be removed. This may be accomplished with non-ER,A funds.

The project will result in an interim remedy. Additional investigations of the soils under the inaccessible portions of the buildings will be needed. Results of the investigations will be used to determine if additional remedial action is needed to make the sites safe for training by the OARNG.

Load Line 3





# RVAAP-12 LOAD LINE 12

## SITE DESCRIPTION

From 1941-43 and 1946, ammonium nitrate was produced at this site. From 1949 to 1993, munitions were periodically demilitarized with building wash-down water and waste water from the bomb melt out facility operations being collected in a house gutter system, and flowing through a piping system to two stainless steel tanks. The first tank was used for settling and the second tank was used for filtration. Prior to the 1980s, the water leaked under the building and ponded there. Building wash-down water from Building 904 was also swept out through doorways onto the ground surrounding the building. After 1981, the water was treated in the Load Line 12 wastewater treatment system (RVAAP-18). Contaminants of concern at this unit are explosive compounds and heavy metals. There is a high potential for releases from this unit to the soils, surface water/sediment and groundwater. The original pink water treatment plant servicing Building 904 was officially closed as of May 2000.

A composting pilot study (IRA) using soils contaminated with explosives from the area of Building F-904 was started in 2000. The report from this pilot bioremediation project is final. Samples of environmental media were collected in the fall of 2000. The Phase II RI will be submitted in fall/winter 2003.

High levels of nitrates were detected in the groundwater. Metals and explosives were detected in the soil, sediment and groundwater. Metals were detected in surface water.

The Phase II RI report is being reviewed by regulators.

## PROPOSED PLAN

Finalize the RI report. A FS will be completed. Additional soil removal is likely to be required.

## STATUS

### RRSE RATING:

High

### CONTAMINANTS:

Explosives, Metals

### MEDIA OF CONCERN:

Soil, Groundwater, Surface Water, Sediment

### COMPLETED IRP PHASE:

PA/SI, Phase I RI (1998), IRA

### CURRENT IRP PHASE:

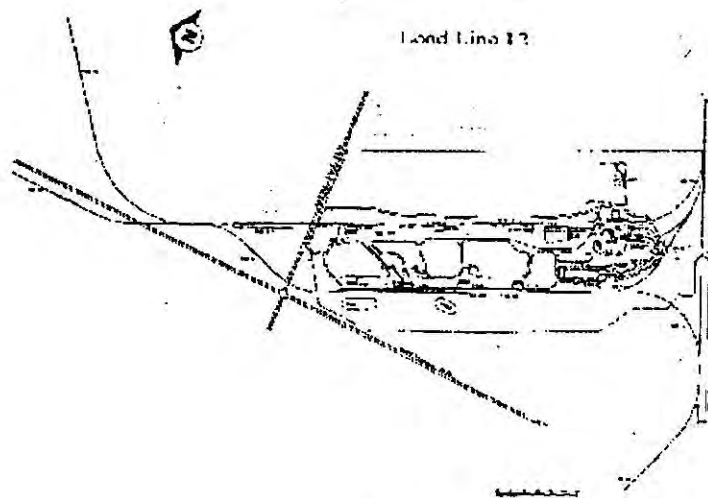
RI

### FUTURE IRP PHASE:

FS, RD, RA, LTM

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	239	50		
IRA				
RD			5	
RA				213
RA(O)				922
LTM				
<b>Total</b>	<b>1,429,000</b>			





# FUZE AND BOOSTER QUARRY LANDFILL/PONDS

## SITE DESCRIPTION

This AOC operated during the period 1945 through 1993. The site consists of three ponds in an abandoned rock quarry. The ponds are 20 to 30 ft deep and are separated by earthen berms. Prior to 1976, the quarry was reportedly used for open burning and as a landfill. The debris from the burning/landfill was reported to have been removed during pond construction. From 1976-93, spent brine regenerate and sand filtration backwash water from one of the RVAAP drinking water treatment plants was discharged into the ponds. This discharge was regulated under a NPDES permit. In 1998, this AOC was expanded to include three other shallow settling ponds and two debris piles, bringing the site to ~45 acres. The lands adjacent to the quarry were utilized as an impact area to test 40mm projectiles and to incinerate/deactivate fuze and booster components.

Constituents of concern include explosive compounds and heavy metals. There is a potential for release of contaminants to the groundwater, soils and surface water/sediment from this AOC.

The Phase II RI field work was completed in November 2003.

## PROPOSED PLAN

RI work will be required. A RD/RA of sediment and/or debris removal may be needed.

## STATUS

### RRSE RATING:

High

### CONTAMINANTS:

Explosives, Metals

### MEDIA OF CONCERN:

Soil, Groundwater, Surface Water, Sediment

### COMPLETED IRP PHASE:

PA/SI (1989)

### CURRENT IRP PHASE:

RI

### FUTURE IRP PHASE:

RI/FS, RD, RA, LTM

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	487	540	120	
IRA				
RD				15
RA				566
RA(O)				435
LTM				
<b>Total</b>	<b>2,163,000</b>			





# RVAAP-28 MUSTARD AGENT BURIAL SITE

## SITE DESCRIPTION

This unit is a possible mustard agent burial site ~15 x 18 ft and is triangularly shaped. In 1969, records indicate that an EOD Unit had excavated a suspected mustard agent burial site near the west end of the NACA runway. One 190 liter (50 gallon) drum and seven rusty canisters were recovered. All recovered items were empty and no contamination was discovered. Following this excavation, an unidentified and undocumented source reported that the site had not been correctly identified and was actually in an adjacent area.

This additional area (~15 x 18 ft) is located southwest of the original area. The area is now marked by Seibert (reflective) stakes. Two non-intrusive, geophysical surveys (EM-31, and EM-61) of the site were completed in 1998. Several areas were identified with metallic responses. Some, if not all, may be related to cultural features at or near the surface. Soil samples taken in 1998 found no thiodiglycol (mustard breakdown product). There was no sign of disturbed soils or numerous buried metallic objects that would clearly delineate a formal burial site.

## PROPOSED PLAN

Groundwater samples will be collected to test for mustard breakdown products.

## STATUS

### RRSE RATING:

Low

### CONTAMINANTS:

Mustard Agent

### MEDIA OF CONCERN:

Soil, Groundwater, Surface Water

### COMPLETED IRP PHASE:

PA/SI, Phase I RI (1998)

### CURRENT IRP PHASE:

RI/FS

### FUTURE IRP PHASE:

RC

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	162			
IRA				
RD				
RA				
RA(O)				
LTM				
Total	162,000			



# RVAAP-32 40 AND 60 MM FIRING RANGE

## SITE DESCRIPTION

This site was used as a test firing range for 40 mm projectiles during the late 1960s and early 1970s. This AOC was reported by former workers at RVAAP to have been a test firing range for munitions. The dates of this operation were from 1969-71. No original file documentation exists for the operation. UXO is suspected at this ~2-acre site.

The site is now covered with pole timber. Soil samples collected by CHPPM in 1996, detected arsenic and cadmium above the RRSE screening concentrations.

Additional samples were taken in fall 2003.

## STATUS

### RRSE RATING:

Medium

### CONTAMINANTS:

Metals

### MEDIA OF CONCERN:

Soil

### COMPLETED IRP PHASE:

PA/SI

### CURRENT IRP PHASE:

RI/FS

### FUTURE IRP PHASE:

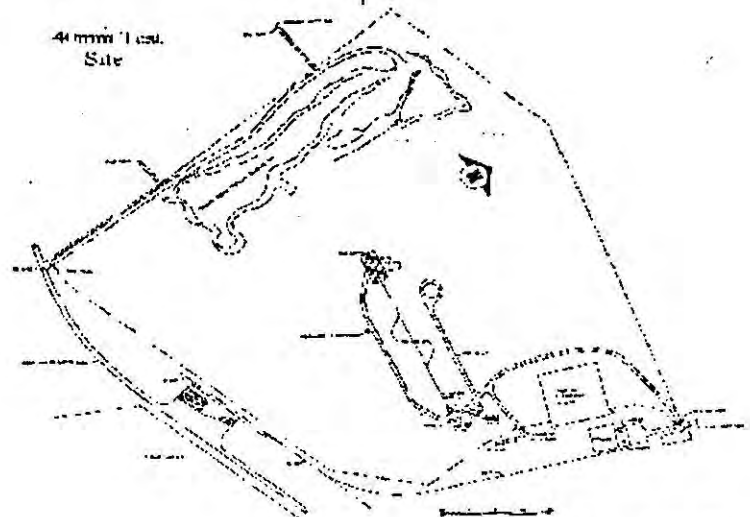
RI/FS

## PROPOSED PLAN

RI sampling, including UXO precautions, will be completed.

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	20			314
IRA				
RD				
RA				
RA(O)				
LTM				
<b>Total</b>	<b>334,000</b>			





**SAND CREEK DISPOSAL ROAD LANDFILL****SITE DESCRIPTION**

This AOC was reported by former workers at RVAAP to have been an open dump for concrete, wood, asbestos debris, lab bottles, 55-gallon drums and fluorescent light tubes. Debris is at the surface, but covered by vegetation. The AOC is ~2.7 acres and located adjacent to Sand Creek. The dates of operation of this unit are not known, but are believed to be around the 1950s. No original file documentation exists. The debris is eroding into Sand Creek.

Arsenic was detected in sediment at levels above the RRSE screening concentrations. Soil samples were taken by the USACE in September 2001 to further refine the RRSE. Arsenic (87ppm), benzo(a)pyrene (0.322ppm), benzo(a)anthracene (0.347ppm), benzo(b)fluoranthene (0.446ppm) and indeno(1,2,3-cd)pyrene were detected at significant concentrations. The high RRSE rating was confirmed by this sampling event.

Soil and debris removal (IRA) was completed in summer 2003. The preliminary report is expected in early spring 2004.

**STATUS****RRSE RATING:**

High

**CONTAMINANTS:**

Heavy Metals, Asbestos, PAHs

**MEDIA OF CONCERN:**

Soil, Groundwater, Surface Water, Sediment

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RI/FS

**FUTURE IRP PHASE:**

RC

**PROPOSED PLAN**

Complete the IRA report. Additional soil/debris removal may be needed (possibly addressed with non-ER,A funds).

**Constrained Cost to Complete**

	2004	2005	2006	2007+
RI/FS	60			
IRA				
RD				
RA				
RA(O)				
LTM				
<b>Total</b>	<b>60,000</b>			





# RVAAP-38 NACA TEST AREA

## SITE DESCRIPTION

This is an approximately 12.4 acre AOC that was used as an aircraft test area. Surplus military aircraft were crashed into a barrier using a fixed rail attached to the aircraft landing gear in an attempt to develop crashworthy fuel tanks and/or high flashpoint fuel. Some of the aircraft were buried at the site after the tests. Demo Area #1, RVAAP-03, is located within the RVAAP-38 boundary.

Phase I RI samples were taken in October 1999. The Phase I RI was completed in 2000 and finalized in fall 2001. Low levels of metals, inorganics and VOCs were detected in soil. Nitrocellulose was detected in the sediment, but is believed to be attributed to RVAAP-03.

## STATUS

### RRSE RATING:

Medium

### CONTAMINANTS:

Metals, Inorganics, VOCs

### MEDIA OF CONCERN:

Soil, Groundwater, Surface Water, Sediment

### COMPLETED IRP PHASE:

PA/SI, Phase I RI

### CURRENT IRP PHASE:

None

### FUTURE IRP PHASE:

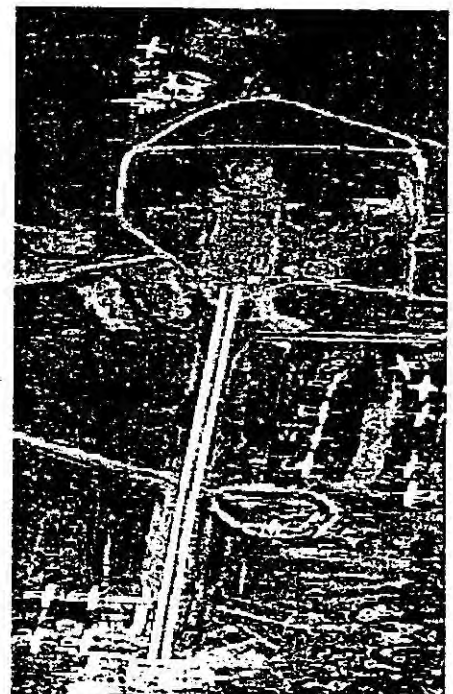
Phase II RI/FS, RD, RA, LTM

## PROPOSED PLAN

Additional RI work will be completed. This will include installing monitoring wells, that will be used to monitor this site and RVAAP-03. Evaluate risk. Soil bioremediation may be used over part of the site, followed by LTM.

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS		128	17	332
IRA				
RD				24
RA				237
RA(O)				564
LTM				
<b>Total</b>	<b>1,302,000</b>			





# RVAAP-40 LOAD LINE 7

## SITE DESCRIPTION

This AOC was used to assemble booster charges for artillery projectiles between 1941 and 1945. Load Line 7 was deactivated and the equipment was removed in 1945. The LL-7 was used again in 1969 and 1970 to produce 40mm projectiles, and between 1989 and 1993 the LL-7 Pink Water Treatment Plant was in operation.

The relative risk site evaluation was completed in 1998 by USACHPPM. The surface soil and groundwater pathways are considered complete. Six surface soil samples were collected from outside of the production buildings and analyzed for explosives and metals. The sampling locations were selected based on the production use. Emphasis was placed on areas around production and explosive storage buildings. One sediment sample was originally going to be collected from one of the settling ponds at the AOC, but no settling ponds or other sediment pathways were evident. One screening groundwater sample was collected north-northwest of Building 1B-2 (down gradient by surface topography) and analyzed for explosives and metals. The groundwater was collected from between 8 and 9 feet bgs. Significant concentrations of lead (maximum 2,000 ppm) and low concentrations of explosives, HMX, RDX and 2,4,6 TNT, were found in the surface soils.

## PROPOSED PLAN

A RI will be completed. Thermal treatment of buildings will be conducted. A RD and RA, such as soil removal, may be needed.

All foundations and footers (to 4 ft bgs) will be removed. Flushing and grouting or removal of the underground utilities will be done as needed. Any residual contamination will be removed. This will be accomplished with non-ER,A funds.

## STATUS

### RRSE RATING:

Low

### CONTAMINANTS:

Explosives, Metals

### MEDIA OF CONCERN:

Soil, Groundwater, Surface Water, Sediment

### COMPLETED IRP PHASE:

PA/SI

### CURRENT IRP PHASE:

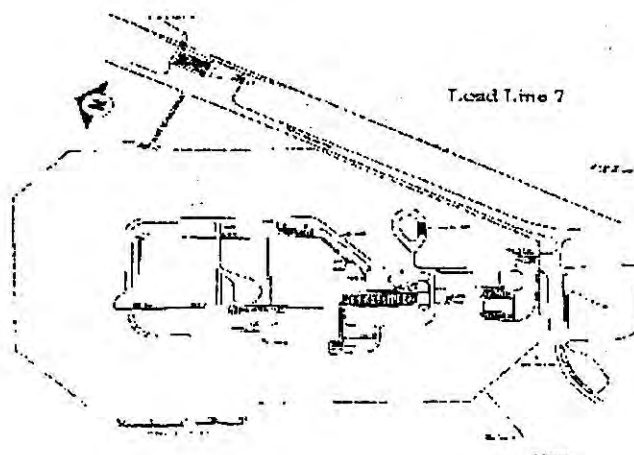
None

### FUTURE IRP PHASE:

RI/FS, RD, RA, LTM

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS				1157
IRA				
RD				8
RA				258
RA(O)				
LTM				369
<b>Total</b>	<b>1,792,000</b>			





# RVAAP-42 LOAD LINE 9

## SITE DESCRIPTION

This AOC operated from 1941 to 1945 to produce detonators. Load Line 9 was deactivated and its equipment removed in 1945.

The relative risk site evaluation was completed in 1998 by USACHPPM. The surface soil and groundwater pathways are considered complete. Six surface soil samples were collected from outside of the production buildings and analyzed for explosives and metals. The sampling locations were selected based on the production use. Emphasis was placed on the buildings that were used to process and store the lead azide and tetryl. One sediment sample was originally going to be collected from one of the settling ponds at the AOC, but no settling ponds or other sediment pathways were evident. Subsurface soil data collected for RVAAP-26, Fuze and Booster Area Settling Tanks during the first RRSE, was used to score the groundwater pathway at the AOC. The subsurface soil used to estimate the groundwater pathway was collected adjacent to the settling tank on the east side of Building DT-5. Lead was the only contaminant that exceeded the RRSE standard concentration in the surface soil. No explosives were detected during the RRSE sampling.

Limited samples taken in 2000 detected low levels (below 2%) of lead azide in sediment and surface water in the sumps. The buildings were thermally treated and the remaining structures removed in 2003. The Phase I RI field work was completed in November 2003.

## PROPOSED PLAN

Complete RI. A RD and RA, such as soil removal, may be needed.

All foundations and footers (to 4 ft bgs) will be removed. Flushing and grouting or removal of the underground utilities will be done as needed. Any residual contamination will be removed. This will be accomplished with non-ER,A funds.

## STATUS

### RRSE RATING:

Medium

### CONTAMINANTS:

Explosives, Metals

### MEDIA OF CONCERN:

Soil, Groundwater, Surface Water, Sediment

### COMPLETED IRP PHASE:

PA/SI

### CURRENT IRP PHASE:

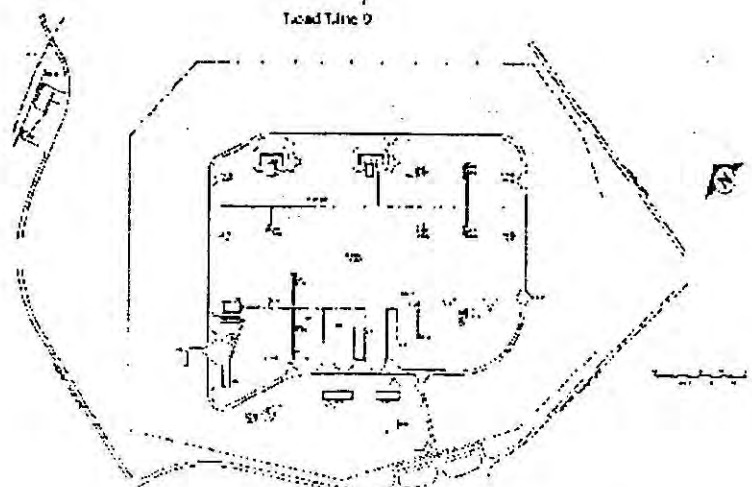
RI/FS

### FUTURE IRP PHASE:

RI/FS, RD, RA, LTM

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	118	83		
IRA				
RD			8	
RA				258
RA(O)				
LTM				297
<b>Total</b>	<b>764,000</b>			





# RVAAP-44 LOAD LINE 11

## SITE DESCRIPTION

This AOC operated from 1941 to 1945 to produce primers for artillery projectiles. Load Line 11 was placed on standby in 1945. From 1951 to 1957, LL-11 was used to produce primers and fuzes.

The relative risk site evaluation was completed in 1998 by USACHPPM. The surface soil, groundwater and sediment pathways are considered complete. Five surface soil samples were collected from outside of the production buildings and analyzed for explosives and metals. The sampling locations were selected based on the production use. Emphasis was placed on those buildings that were used to produce and store explosives. One sediment sample was collected and analyzed for the same parameters. The sediment sample was collected from a drainage ditch running north from the load line. Data collected for RVAAP-26, Fuze and Booster Area Settling Tanks during the first RRSE, was used to score the groundwater pathway at the AOC. The subsurface soil used to estimate the groundwater pathway was collected adjacent to the settling tank immediately to the east of Building AP-3. Arsenic was detected in the sediment slightly above the RRSE ecological screening concentration. Lead was the only contaminant found in the surface soil with a maximum concentration of 11,000ppm.

In 2001, the lead-lined sumps, lead contaminated sediments, and solvent contaminated soils were removed during an IRA in 2001. Some of the sewer lines were also permanently plugged with grout to prevent migration of contaminants. The RI field work was conducted in FY01.

Note: No perchlorate was detected in groundwater. The detection limit was 4 ppb.

## PROPOSED PLAN

Prepare the RI report. Thermal treatment of buildings will be conducted. No remediation is expected. LTM will follow.

All foundations and footers (to 4 ft bgs) will be removed. Flushing and grouting or removal of the underground utilities will be done as needed. Any residual contamination will be removed. This will be accomplished with non-ER,A funds.

## STATUS

### RRSE RATING:

High

### CONTAMINANTS:

Explosives, Metals, VOCs

### MEDIA OF CONCERN:

Soil, Groundwater, Sediment

### COMPLETED IRP PHASE:

PA/SI

### CURRENT IRP PHASE:

RI/FS

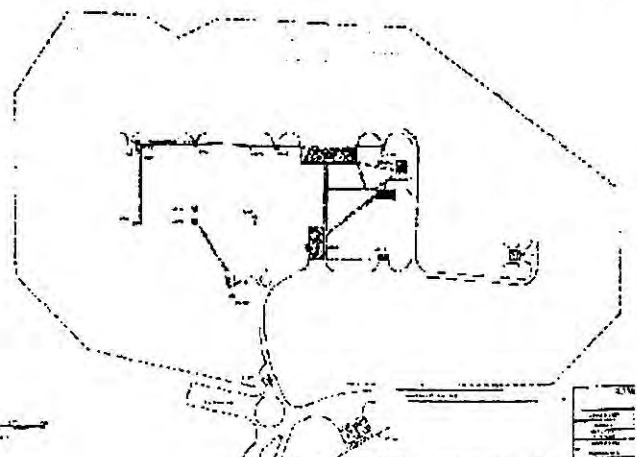
### FUTURE IRP PHASE:

LTM

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	40			
IRA				
RD				
RA				
RA(O)				
LTM			449	100
<b>Total</b>	<b>589,000</b>			

Load Line 11





# RVAAP-46 BLDG F-15 & F-16

## SITE DESCRIPTION

These buildings were used during World War II, the Korean Conflict and Vietnam War to test miscellaneous explosives. Quantities and exact dates of testing are unknown.

The surface soil and sediment pathways are considered completed at this AOC. Four surface soil samples were collected from the AOC and analyzed for explosives and metals. Two samples were collected just outside of the foundations of each of the buildings. One sediment sample was collected in a drainage ditch leading to Sand Creek near Building F-16. Soil samples showed slightly elevated levels of lead (maximum 430 ppm) and arsenic (maximum 28 ppm). Arsenic was also detected in the sediment at a maximum concentration of 9 ppm, approximately 1.5 times the ecological RRSE screening concentration.

## STATUS

### RRSE RATING:

High

### CONTAMINANTS:

Explosives, Metals

### MEDIA OF CONCERN:

Soil, Sediment

### COMPLETED IRP PHASE:

PA/SI

### CURRENT IRP PHASE:

RI/FS

### FUTURE IRP PHASE:

RI/FS, RD, RA

## PROPOSED PLAN

A RI will be completed. Limited sediment removal may be required.

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	51	161	147	
IRA				
RD				34
RA				474
RA(O)				
LTM				
<b>Total</b>	<b>867,000</b>			





# RVAAP-49 CENTRAL BURN PITS

## SITE DESCRIPTION

This approximately 20 acre AOC was used for the burning of non-explosive scrap materials. The dates of operation for the AOC are unknown.

The surface soil and groundwater pathways are considered complete. Five surface soil samples were collected and analyzed for SVOCs, PCBs, herbicides, explosives and metals. One subsurface soil sample was collected and analyzed for the same compounds plus VOCs. The subsurface soil used to estimate the groundwater pathway was collected from the eastern limit (downhill side) of the main disturbed area. The USACHPPM sampling detected significant levels of antimony (maximum 9,000 ppm), arsenic (maximum 30 ppm) and lead (maximum 2,200 ppm) in the soil.

Field work for the Phase I RI was done in summer 2001; the report is pending.

## PROPOSED PLAN

The Phase I RI will be completed (preliminary draft is expected in spring 2004). A FS will be completed. A RD/RA of soil removal may be required, followed by LTM.

## STATUS

### RRSE RATING:

High

### CONTAMINANTS:

VOCs, SVOCs, PCBs, Herbicides, Metals

### MEDIA OF CONCERN:

Soil, Groundwater, Surface Water, Sediment

### COMPLETED IRP PHASE:

PA/SI

### CURRENT IRP PHASE:

RI/FS

### FUTURE IRP PHASE:

RI/FS, RD, RA, LTM

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	284	120		
IRA				
RD			16	
RA			804	
RA(O)				
LTM				702
Total	1,926,000			



# RVAAP-51 DUMP ALONG PARIS-WINDHAM RD.

## SITE DESCRIPTION

This AOC is an area adjacent to Sand Creek that was used as an open dump for miscellaneous materials including transite siding, lab bottles and drums. The site is 400 x 20 x ~3 ft deep. The dates of operation for the dump are unknown, but aerial photos show the site in the 1950s.

The surface soil and sediment pathway are considered complete. Three surface soil samples and one sediment sample were collected and analyzed for SVOCs, explosives and metals. Soil samples were taken by USACE in September 2001 to further refine the RRSE. The most significant contaminants were organics including benzo(a)anthracene (3.45 ppm), benzo(a)pyrene (3.38 ppm), benzo(b)fluoranthene (4.65 ppm), chrysene (2.91 ppm) and Indeno(1,2,3-cd)pyrene (2 ppm). The high RRSE rating was confirmed by this sampling event.

A soil and debris removal action was completed in fall 2003.

## PROPOSED PLAN

A removal report will be prepared in winter 2003-4.

## STATUS

### RRSE RATING:

High

### CONTAMINANTS:

Explosives, Metals, SVOCs

### MEDIA OF CONCERN:

Soil, Groundwater, Surface Water,  
Sediment

### COMPLETED IRP PHASE:

PA/SI, RI/FS, RD

### CURRENT IRP PHASE:

RA (funded), LTM

### FUTURE IRP PHASE:

LTM

## Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS				
IRA				
RD				
RA				
RA(O)				
LTM	40	14		
Total	54,000			





## RVAAP-03

### OPEN DEMOLITION AREA #1

#### SITE DESCRIPTION

This is a 6 acre AOC that was used for the purpose of thermal treatment of munitions by burning and detonation. The AOC consists of a circular 1 to 1.5 ft berm surrounding a grassy area ~1 to 1.5 acres in size and a pushout area. Operations took place in ~8 foot deep unlined pits. The whole AOC is within the NACA Test Area (RVAAP-38). Contaminants of concern at this AOC include explosive compounds and metals. There is potential for release of contaminants from this unit to the surrounding soils and groundwater. Munitions fragments, including scrap metal, small arms primers, and fuzes, were found outside the bermed area. The AOC was operational from 1941 through 1949 (Jacobs Engineering 1989).

The Phase I RI field work was completed at the site in Oct 1999 and was finalized in 2002. An IRA was started in Nov 2000 and was conducted along with a project funded by OSC to remove UXO from the site. The purpose of the IRA was to remove obvious surface contamination that could pose an immediate risk to human health and the environment. These hot spots are located primarily in an area outside the horseshoe where munitions and scrap were pushed after detonation. The IRA field work was completed in Jul 2001, removing ~83,000 lbs of ordnance explosive waste and UXO.

Groundwater monitoring at this AOC will be addressed under NACA Test Area (RVAAP-38).

#### STATUS

##### RRSE RATING:

High

##### CONTAMINANTS:

Explosives, Metals

##### MEDIA OF CONCERN:

Soil

##### COMPLETED IRP PHASE:

PA/SI, RI, IRA

##### CURRENT IRP PHASE:

RC

## RVAAP-07

### BLDG. 1601 HAZARDOUS WASTE STORAGE

#### SITE DESCRIPTION

This site is not eligible for ER/A funds.

This is a RCRA storage facility for solid ash residue and spent activated carbon. It was operated under interim status from 1980 to 1998. No hazardous wastes are currently being stored in the building. The Part B permit application covering the facility was withdrawn during 1994. The building is a 20 by 22 foot concrete igloo. Wastes stored in this building were containerized in 55 gallon DOT drums. There is little potential for contamination resulting from operation of this unit. Closure plans were approved and implemented in 1998.

This site has been officially closed by Ohio EPA.

#### STATUS

##### RRSE RATING:

Low

##### CONTAMINANTS:

Metals

##### MEDIA OF CONCERN:

Soil

##### COMPLETED IRP PHASE:

PA/SI

##### CURRENT IRP PHASE:

RC - 1989

## RVAAP-17 DEACTIVATION FURNACE

### SITE DESCRIPTION

This site is not eligible for ER,A funds.

This unit is a No. 2 oil-fired horizontal rotary retort furnace used for the deactivation of small munition items. It was operated from 1960 through 1983.

The furnace is currently undergoing closure under a RCRA closure plan. Sampling during closure activities indicates heavy metals contamination to the soils surrounding the furnace area. The closure plan calls for the removal of all contaminated soils associated with the unit. Closure plans have been submitted to Ohio EPA. The buildings were demolished and properly disposed of in October and November 1999.

This site in RC because it is not eligible for IRP funding.

### STATUS

**RRSE RATING:**

High

**CONTAMINANTS:**

Metals

**MEDIA OF CONCERN:**

Soil

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC - 1989

## RVAAP-18 LOAD LINE 12 PINK WASTE WATER TREATMENT

### SITE DESCRIPTION

This site is not eligible for ER,A funds.

This is an active unit, consisting of dual mode activated carbon filters for the treatment of explosive-contaminated wastewater. This unit was operated from 1982 to 1999. The wastewater treatment discharge was regulated under the NPDES permitted discharge system. Contaminants of concern included explosive compounds. The plant and the associated demil building (904) were closed and demolished under the supervision of Ohio EPA in the fall of 1999. A final closure letter was issued by EPA in May 2000.

### STATUS

**RRSE RATING:**

Low

**CONTAMINANTS:**

Explosives

**MEDIA OF CONCERN:**

Soil, Groundwater

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC - 1997



## GEORGE ROAD SEWAGE TREATMENT PLANT

RVAAP-22

### SITE DESCRIPTION

This site is not eligible for ER,A funds.

This is an inactive domestic sewage treatment plant regulated under an NPDES discharge permit. The plant was closed in FY93 in accordance with EPA requirements. There is a low potential for releases to the soil and groundwater from this unit.

This site in RC because it is not eligible for IRP funding.

### STATUS

**RRSE RATING:**

NE

**CONTAMINANTS:**

Metals

**MEDIA OF CONCERN:**

Soil

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC - 1989

## UNIT TRAINING EQUIPMENT SITE UST

RVAAP-23

### SITE DESCRIPTION

This site is not eligible for ER,A funds.

This unit was a underground storage tank for waste oil used by a RVAAP tenant organization. The PA/SI was completed in 1989. The tank, and any associated contaminated soil, were removed in 1989 by the OARNG. Documentation of the removal will be provided to Ohio EPA for final closure by OHARNG.

This site in RC because it is not eligible for IRP funding.

### STATUS

**RRSE RATING:**

Medium

**CONTAMINANTS:**

Waste Oil

**MEDIA OF CONCERN:**

Soil

**COMPLETED IRP PHASE:**

PA/SI, RA

**CURRENT IRP PHASE:**

RC - 1989

## RVAAP-26 FUZE BOOSTER AREA SETTLING TANKS

### SITE DESCRIPTION

The fuze and booster area covers ~450 acres and includes load lines 5, 6, 7, 8, 9, 10 and 11. These load lines were used for the manufacture of miscellaneous fuzes, boosters, primers, detonators and percussion elements from 1941 through 1971. Within the line areas are 14 concrete underground storage tanks and 1 concrete above ground storage tank which were used as settling basins for explosive-contaminated waste water. The tanks were emptied, cleaned and covered in 1971.

Contaminants of concern from these units are explosives, lead, lead azide, lead styphnate, mercury, and unknown compounds. Shallow monitoring wells were installed in 1981 around the perimeter of the fuze and booster area. Subsequent sampling of the wells did not detect heavy metals in the groundwater. The wells were eventually destroyed by frost heave.

This site is RC, because each LL became its own AOC.

### STATUS

**RRSE RATING:**

Medium

**CONTAMINANTS:**

Explosives, Metals

**MEDIA OF CONCERN:**

Soil, Groundwater, Surface Water

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC - 2000

## RVAAP-27 BUILDINGS 854, PCB STORAGE

### SITE DESCRIPTION

This unit consists of a 50 x 250 ft. area within a wood framed building used for the storage of PCB contaminated materials. All PCB contaminated material was removed from the building and the interior decontaminated to non-detection limits in the summer of 1998.

Ohio EPA issued a closure letter for this site on September 1, 1999.

### STATUS

**RRSE RATING:**

NE

**CONTAMINANTS:**

PCBs

**MEDIA OF CONCERN:**

Soil

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC - 1989



## RVAAP-35 1037 BUILDING - LAUNDRY WASTEWATER SUMP

### SITE DESCRIPTION

This AOC consists of a concrete sump that was used as a settling tank for RVAAP laundry facilities. This sump was in operation from the early 1940s until 1992. No original file documentation exists for this site.

This site is RC because it is not eligible for IRP funding.

### STATUS

**RRSE RATING:**

Medium

**CONTAMINANTS:**

Explosives, Metals

**MEDIA OF CONCERN:**

Soil, Groundwater

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC - 2000

## RVAAP-37 PESTICIDE BUILDINGS S-4452

### SITE DESCRIPTION

This unit consists of a 12.2 x 6.1 meter (40 x 20 ft) wooden structure with a crawl space, which housed various pesticides. A 6.1 x 3.6 meter (20 x 12 ft) pesticide mixing area was also located in a gravel area outside of the building. This unit was in use from the 1970s until 1993. An empty can with chlorinate residue and a hand sprayer were found in the building crawl space. No original file documentation exists for this site.

The building and soil were removed from the site and properly disposed of in the fall of 1999 in accordance with Ohio EPA guidance and recommendations. No pesticides were detected in the soil following remediation.

This site is RC because it is not eligible for IRP funding.

### STATUS

**RRSE RATING:**

Low

**CONTAMINANTS:**

Synthetic organic compounds

**MEDIA OF CONCERN:**

Soil, groundwater

**COMPLETED IRP PHASE:**

PA/SI

**CURRENT IRP PHASE:**

RC - 1996

# Schedule

## PAST MILESTONES

1990

PA, Installation 38 AOCs

1996

PA/RI Action Plan

Phase I RI High Priority Sites

1998

Phase II RI Winklepeck Burning Grounds Field Work Complete/Draft Report under Review  
Facility-wide Background Field Work Complete/Draft Report currently under Review  
RRSE for 13 new sites Field Work Complete/Draft Report Currently Under Review

1999

RI - Phase II Erie Burning Grounds

RI - Phase II NACA Test Area

RI - Phase II Open Demolition Area #1

2000

IRA - LL 12/ Bioremediation Pilot Study Demonstration Complete

RI - Phase II Erie Burning Grounds Draft Report Completed/ Under Review

RI - Phase I NACA Test Area Field Work/Draft Report Completed/Under Review

RI - Phase I Open Demolition Area #1 Field Work/Draft Report Completed/ Under Review

RI - Winklepeck Open Burning Grounds Ecological Risk Assessment Field Work Complete

IRA - Building 5301 Completed/No Further Action Status

Facility-Draft Revision to Wide SAP and HSP completed

2001

RI - Phase I Load Line 11 Field Work Complete

RI - Phase II Load Line 1, 12 Field Work Complete

FS - Winklepeck Field Work Completed

RI - Phase I Load Line 11 Field Work Completed

IRA - Open Demolition Area #1 Fieldwork Completed

RI - Load Lines 2,3,4 Fieldwork (Phase II) Completed

RI - Central Burn Pits Phase I Fieldwork Completed

RI - Upper & Lower Cobb Ponds Phase I Fieldwork Completed

2002

RI- Phase II Open Demolition Area #2 Fieldwork Completed

- Work Plans completed for the IRAs at Paris Windham Road Dump (RVAAP-51) and Sand Creek Disposal Road Landfill (RVAAP-34)

- IRA reports for Open Demolition Area #1 (RVAAP-03) and Load Line 11 (RVAAP-44) issued

- Work Plans for Open Demolition Area #2 completed

- Draft Final Report for Winklepeck Burning Grounds Biological Field Truthing project issued.

- Work Plans issued for Facility-wide Human Health and Ecological Risk Assessments issued.

- Draft Work Plans for Facility-wide surface water assessment issued

2003

PBC for soil/sediment at Load Lines 1, 2, 3 and 4

RI- Field work for LL 6 & 9 and the Fuze & Booster Quarry Landfill Pond Completed



# Ravenna Army Ammo Plant IAP Schedule

(based on current funding)

DSERTS #	SITE NAME	PHASE	FY03	FY04	FY05	FY06	FY07	FY08	FY09+
RVAAP-01	Ramsdell Quarry Landfill (H)	RI/FS							
		LTM							
RVAAP-02	Erie Burning Grounds (H)	RI/FS							
		LTM							
RVAAP-04	Demolition Area #2 (H)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-05	Winklepeck Burning Grounds (H)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-08	Load Line 1 (H)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-12	Load Line 12 (H)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-16	Fuze and Booster Quarry Landfill/ Pond (H)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-34	Sand Creek Disposal Road	RI/FS							
RVAAP-44	Load Line 11 (H)	RI/FS							
		LTM							
RVAAP-46	Bldg F-15 & F-16 (H)	RI/FS							
		RD							
		RA							
RVAAP-49	Central Burn Pits (H)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-51	Dump Along Paris Windham	LTM							
RVAAP-11	Load Line 4 (M)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-29	Upper & Lower Cobbs Ponds (M)	RI/FS							
		LTM							
RVAAP-32	40 MM Firing Range (M)	RI/FS							
RVAAP-33	Load Line 6 Fuze and Booster (M)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-36	Pistol Range (M)	RD							
		RA							
RVAAP-38	NACA Test Area (M)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-39	Load Line 5 Fuze and Booster (M)	RI/FS							
		RD							
		RA							

# REM/IRA/RA ASSESSMENT

## Past REM/IRA/RA

- RVAAP-03, Open Demo Area #1
- RVAAP-12, Load Line 12 IRA- Composting
- RVAAP-34 IRA- Waste removal 2002
- RVAAP-47, Building T-5301 IRA
- RVAAP-51 IRA- Waste removal 2002

## Current REM/IRA/RA

- None

## Future REM/IRA/RA

RVAAP-04, 05, 06, 08, 09 (PBC), 10 (PBC), 11 (PBC), 12, 13, 16, 19, 33, 36, 38, 39, 40, 41, 42, 43, 45, 46, 49, 50



# PRIOR YEAR FUNDING

	Building T-5301	\$215,000	\$6,001,500
FY 2001	Erie Burning Grounds RI/FS	\$25,000	
	Open Demolition Area #1 RI/FS	\$30,000	
	Open Demolition Area #2 RI/FS	\$689,300	
	Winklepeck Burning Grounds RI/FS	\$157,200	
	Load Line 1 RI/FS	\$33,000	
	Load Line 2 RI/FS	\$1,208,300	
	Load Line 3 RI/FS	\$642,300	
	Load Line 4 RI/FS	\$681,000	
	Load Line 12 RI/FS	\$21,000	
	Upper & Lower Cobb Ponds RI/FS	\$496,500	
	Sand Creek Disposal Road Landfill	\$20,000	
	NACA Test Area	\$20,000	
	Load Line II RI/FS	\$186,800	
FY 2002	Central Burn Pits RI/FS	\$630,000	
	Dump Along Paris-Windham Road RD	\$10,000	\$4,850,400
	Open Demolition Area #1	\$17,300	
	Open Demolition Area #2	\$71,100	
	Winklepeck Burning Grounds	\$403,900	
	C Block Quarry	\$5,000	
	Load Line 1	\$39,100	
	Load Line 2	\$42,600	
	Load Line 3	\$204,900	
	Load Line 4	\$101,700	
	Load Line 12	\$41,300	
	Upper & Lower Cobb Ponds	\$21,900	
	Load Line 6	\$804,800	
FY03	Sand Creek Disposal Road Landfill	\$472,800	
	NACA Test Area	\$18,300	
	Load Line 9	\$794,200	
	Central Burn Pits	\$23,800	
	Dump Along Paris-Windham Road	\$188,800	\$3,251,600
	including \$9,836,280 for PBC		\$13,259,430
TOTAL PRIOR YEARS FUNDING		\$23,386,992.32	
ESTIMATED TOTAL FUTURE REQUIREMENTS (FY04+)		\$36,718,000	



# Ravenna AAP Unconstrained (Required) Cost to Complete

DSERTS #	SITE TITLE (RRSE)	PHASE	FY04	FY05	FY06	FY07	FY08	FY09	FY10+	PHASE TOTAL	SITE TOTAL	DESCRIPTION OF WORK
RVAAP-34	Sand Creek Disposal Road Landfill (H)	RI/FS	60							60		finalize IRA report, site closure including assessment of residual asbestos
											60	
RVAAP-44	Load Line 11 (H)	RI/FS	40							40		finalize IRA and RI report
		LTM		449	20	20	20	20	20	549		10 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual
											589	closure report
RVAAP-46	Bldg F-15 & F-16 (H)	RI/FS	192	20	147					359		sampling 2 areas
		RD				34				34		design of RA
		RA					420	54		474		sediment removal 200cy for explosives & metals, closure docs
											867	
RVAAP-49	Central Burn Pits (H)	RI/FS	284	120						404		finalize RI, FS, Eco data gaps 60K
		RD		16						16		design of RA
		RA			804					804		metals fixation 1,000cy, removal 500cy
		LTM				552	30	30	90	702		8 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual
											1,926	closure report
RVAAP-51	Dump Along Paris Windham Rd. (H)	LTM	40	14						54		4 wells, quarterly for 2 yrs, semi-annual for 1 yr, annual for 2 yrs, closure reports
											54	
RVAAP-11	Load Line 4 (M)	RI/FS	50							50		finalize FS
		RD		10						10		design of RA
		RA		30	40	20				90		RA funded in FY03 under FPR= Soil removal ~2,000cy costs shown are in-house for COE
		LTM					168	20	80	268		8 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual
											418	closure report
RVAAP-29	Upper & Lower Cobbs Ponds (M)	RI/FS	49	204						253		Finalize RI, HH & Eco risk Eco sampling to be done as part of facility-wide surface water study.
		LTM		609	30	30	30	30	30	759		8 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
											1,012	
RVAAP-32	40 MM Firing Range (M)	RI/FS	20				284	30		334		sampling with UXO precautions
RVAAP-33	Load Line 6 Fuze and Booster (M)	RI/FS	136	40	40	100				316		RI/FS including GW, Eco data gaps 60K
		RD					17			17		design of RA
		RA						747		747		soil removal 2,000cy
		LTM						569	200	769		10 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
											1,849	
RVAAP-36	Pistol Range (M)	RD	22							22		design of RA
		RA		388						388		remove top foot of soil (~450cy), screen, fix, backfill, reveg



# Ravenna AAP Unconstrained (Required) Cost to Complete

DSERTS #	SITE TITLE (RRSE)	PHASE	FY04	FY05	FY06	FY07	FY08	FY09	FY10+	PHASE TOTAL	SITE TOTAL	DESCRIPTION OF WORK	
RVAAP-13	Bldg. 1200 (L)	RI/FS							686	686	1,304	complete a RI/FS	
		RD							5	5		design of RA	
		RA							213	213		200cy soil removal	
		LTM							400	400		4 wells, quarterly for 2 yrs, semi-annual for 1 yr, annual for 2 yrs, closure reports	
RVAAP-19	Landfill North of Winklepack Burning Ground (L)	RI/FS							611	611	1,916	Additional RI/FS including 4 wells	
		RD							41	41		design of RA	
		RA							988	988		Limit soil cover (2 ft) on ~2.5 acres	
		RA(O)							66	66		cap maintenance	
		LTM							210	210		4 wells quarterly for 2 yrs, semi-annual for 1 yr, annual for 2 yrs, closure reports	
RVAAP-28	Mustard Agent Burial Site (L)	RI/FS	162							162	162	install 4 wells	
RVAAP-40	Load Line 7 Fuze and Booster (L)	RI/FS							1,157	1,157	1,792	RI/FS including GW, Eco data gaps 60K	
		RD							8	8		design of RA	
		RA							258	258		soil/sump removal 20cy	
		LTM							369	369		6 wells quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report	
RVAAP-45	Wet Storage Area (L)	RI/FS							359	359	479	complete RI, site closure	
		RA							120	120		soil removal ~50cy	
FY TOTALS IN THOUSANDS OF \$			2,281	4,614	4,149	4,981	1,994	3,233	15,466	36,718	36,718		
Estimates have been based on the RACER system unless noted.												36,718	



**Ravenna AAP Constrained (Programmed) Cost to Complete**

DSERTS												
#	SITE TITLE (RRSE)	PHASE	FY04	FY05	FY06	FY07	FY08	FY09	FY10+	PHASE TOTAL	SITE TOTAL	DESCRIPTION OF WORK
		LTM						335	100	435	2,163	12 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-34	Sand Creek Disposal Road Landfill (H)	RI/FS	60							60	60	finalize IRA report, site closure including assessment of residual asbestos
RVAAP-44	Load Line 11 (H)	RI/FS	40							40	589	finalize IRA and RI report
		LTM			449	20	20	20	40	549		10 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-46	Bldg F-15 & F-16 (H)	RI/FS	51	161	147					359	867	sampling 2 areas
		RD				34				34		design of RA
		RA					420	54		474		sediment removal 200cy for explosives & metals, closure docs
RVAAP-49	Central Burn Pits (H)	RI/FS	284	120						404	1,926	finalize RI, FS, Eco data gaps 60K
		RD			16					16		design of RA
		RA			804					804		metals fixation 1,000cy, removal 500cy
		LTM				552	30	30	90	702		8 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-51	Dump Along Paris Windham Rd. (H)	LTM	40	14						54	54	4 wells, quarterly for 2 yrs, semi-annual for 1 yr, annual for 2 yrs, closure reports
RVAAP-11	Load Line 4 (M)	RI/FS	50							50	418	finalize FS
		RD		10						10		design of RA
		RA		30	40	20				90		RA funded in FY03 under FPR= Soil removal ~2,000cy, costs shown are in-house for COE
		LTM					168	20	80	268		8 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-29	Upper & Lower Cobbs Ponds (M)	RI/FS	49	204						253	1,012	Finalize RI, HH & Eco risk Eco sampling to be done as part of facility-wide surface water study.
		LTM			609	30	30	30	60	759		8 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-32	40 MM Firing Range (M)	RI/FS	20				284	30		334	334	sampling with UXO precautions
RVAAP-33	Load Line 6 Fuze and Booster (M)	RI/FS	136	40	40	100				316	1,849	RI/FS including GW, Eco data gaps 60K
		RD					17			17		design of RA
		RA						747		747		soil removal 2,000cy
		LTM						569	200	769		10 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-	Pistol Range (M)	RD	22							22		design of RA



### Ravenna AAP Constrained (Programmed) Cost to Complete

DSERTS											PHASE	SITE	DESCRIPTION OF WORK
#	SITE TITLE (RRSE)	PHASE	FY04	FY05	FY06	FY07	FY08	FY09	FY10+	TOTAL	TOTAL		
06		RD								33	33	3,345	design of RA
		RA								1,893	1,893		Soil removal ~5,000cy
		LTM								454	454		4 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-13	Bldg. 1200 (L)	RI/FS								686	686	1,304	complete a RI/FS
		RD								5	5		design of RA
		RA								213	213		200cy soil removal
		LTM								400	400		4 wells, quarterly for 2 yrs, semi-annual for 1 yr, annual for 2 yrs, closure reports
RVAAP-19	Landfill North of Winklepeck Burning Ground (L)	RI/FS								611	611	1,916	Additional RI/FS including 4 wells
		RD								41	41		design of RA
		RA								988	988		Limit soil cover (2 ft) on ~2.5 acres
		RA(O)								66	66		cap maintenance
		LTM								210	210		4 wells, quarterly for 2 yrs, semi-annual for 1 yr, annual for 2 yrs, closure reports
RVAAP-28	Mustard Agent Burial Site (L)	RI/FS	162								162	162	install 4 wells
RVAAP-40	Load Line 7 Fuze and Booster (L)	RI/FS								1,157	1,157	1,792	RI/FS including GW, Eco data gaps 60K
		RD								8	8		design of RA
		RA								258	258		soil/sump removal 20cy
		LTM								369	369		6 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-45	Wet Storage Area (L)	RI/FS								359	359	479	complete RI, site closure
		RA								120	120		soil removal ~50cy
FY TOTALS IN THOUSANDS OF \$			1,995	2,633	5,427	4,639	2,771	3,617	15,636	36,718	36,718		
POM \$s			2,381	2,763	5,512	4,842	3,343	3,828					
Difference			386	130	85	203	572	211				36,718	
Estimates have been based on the RACER system unless noted.													

**Appendix D**

**Department of Defense and State Memorandum of Agreement (DSMOA) dated  
September 1992**



**DEPARTMENT OF DEFENSE AND STATE  
MEMORANDUM OF AGREEMENT (DSMOA)**



**OhioEPA**  
State of Ohio Environmental Protection Agency

**Submitted by the Ohio Environmental Protection Agency  
September, 1992**

## B. SERVICES

State services that qualify for payment under this Agreement include the following types of assistance provided by the State commencing at site identification and continuing through construction, as well as any other activities that are funded by ER,D:

1. Technical review, comments and recommendations on all documents or data required to be submitted to the State under an agreement between the State and a DoD Component, all documents or data that a DoD Component requests the State to review, and all documents or data that are provided by a DoD Component to the State for review as a result of a request from the State made under applicable State law.
2. Identification and explanation of State applicable or relevant and appropriate requirements related to response actions at DoD installations.
3. Site visits to review DoD response actions and ensure their consistency with appropriate State requirements, or in accordance with site-specific requirements established in other agreements between the State and DoD Component.
4. Participation in cooperation with DoD in the conduct of public education and public participation activities in accordance with Federal and State requirements for public involvement.
5. Services provided at the request of DoD in connection with participation in Technical Review Committees.
6. Preparation and administration of a cooperative agreement (CA) to implement this Agreement, including the estimates of State costs.
7. Other services that the State will provide that are set out in this Agreement or are included in installation-specific agreements.

## C. ACCOUNTING PROCEDURES

1. Subject to the provisions of paragraphs D and E, reimbursement of eligible State costs incurred between October 17, 1986, and the date of this Agreement shall be paid if the costs have been documented using accounting procedures and practices that reasonably identify the nature of the costs



percent of the total project costs shall be adjusted based on the revisions of the total project costs since October 17, 1986. If the total project costs following the Record of Decision (ROD) or equivalent document are lower than previously estimated, the State remains entitled to payment as follows:

a. the State is entitled to payment of all services rendered prior to completion of the new estimate so long as they are within the ceiling of the previous estimate; and,

b. reimbursement of future incurred costs for providing services, at the option of the State, in an amount either:

1. up to a total of previous and future costs of one (1) percent of the revised estimate; or,
2. the lesser of:
  - i) one quarter (1/4) of one (1) percent of the post ROD or equivalent documents costs; or,
  - ii) the remaining balance of the one (1) percent entitlement under the previous estimate.

#### G. PROCEDURES FOR REIMBURSEMENT

Procedures for State reimbursement through cooperative agreements (CAs) are as described in Attachment B and in accordance with Office of Management and Budget (OMB) Circulars A-102, A-87, and A-128. After a CA is awarded, the OEPA may submit a request for advance or reimbursement to DoD on a quarterly basis. DoD will process the request and transfer funds in accordance with Circular A-102. Within sixty (60) days after the end of each quarter, the OEPA shall submit to DoD a status report, including cost summaries which directly relate allowable costs actually incurred by the State under this Agreement during the quarter for services at each installation. Allowable costs shall be determined in accordance with this Agreement and Circular A-87. DoD shall reconcile continuing awards and close out completed awards in accordance with Circular A-102. Auditing of States programs shall be accomplished in accordance with Circular A-128.

#### H. ADDITIONAL WORK

When an installation requests that a State perform a specific technical study or similar technical support that could otherwise be done by a contractor, and OEPA agrees to do the work, funding will be negotiated between the installation and the State outside of this Agreement.



C. Nothing in this Agreement shall be interpreted to require obligation or payment with regard to a site remediation in violation of the Anti-Deficiency Act (31 U.S.C. 1341).

### SECTION III LEAD AGENCIES

Each DoD Component shall designate an individual responsible for managing remedial and removal actions for each installation within the State. This individual shall be responsible for coordinating all tenant activities at the installation with regard to the remedial and removal action program. The individual will also act as remedial project manager (RPM) within the meaning of the National Contingency Plan (40 CFR Part 300).

The State shall designate a lead State agency for each DoD installation within the State. (This agency may vary by installation). The lead State agency for an installation shall coordinate among other State agencies to represent a single State position as to remedial/removal actions at the installation. The lead State agency shall designate a State Agency Coordinator (SAC) who shall be the single point-of-contact between the appropriate DoD component installation and the State regarding State involvement in the remedial and removal actions program at the installation.

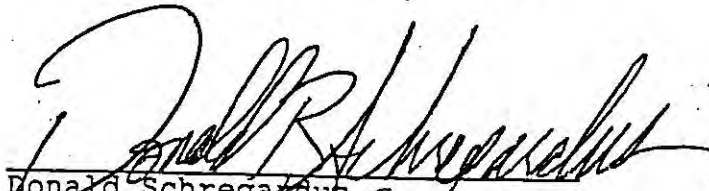
### SECTION IV DISPUTE RESOLUTION

A. The Remedial Project Manager (RPM) and the State Agency Coordinator (SAC) shall be the primary points of contact to coordinate the remedial and removal program at each military installation within the State, including the resolution of disputes. With regard to installations or sites for which there are executed Federal Facility Agreements under CERCLA Section 120, dispute resolution provisions as specified in those agreements shall govern. For other sites, it is the intention of the parties that all disputes shall be resolved at the lowest possible level of authority as expeditiously as possible within the following framework. All timeframes for resolving disputes below may be lengthened by mutual consent.


1. Should the RPM and SAC be unable to agree, the matter shall be referred in writing as soon as practicable but in no event to exceed ten (10) working days after the failure to agree, to the installation commander and the chief of the designated program office of the lead State agency or their mutually agreed upon representatives designated in writing.



dispute resolution methods may be used. Failing their agreement, this Agreement shall be considered terminated as of the date the cooperative agreement expires.

  
Donald Schregardus  
Director, Ohio Environmental  
Protection Agency

DATE: \_\_\_\_\_

  
Patrick J. Meenan, Jr.  
Principal Director,  
ODASD (Environment)

DATE: SEP 10 1992

**ATTACHMENT B to DSMOA**  
**PROCEDURES FOR STATE REIMBURSEMENT**

- The Deputy Assistant Secretary of Defense for Environment (DASD(E)) and the Head of the Agency signing on behalf of the State will sign the DSMOA.
- The DSMOA is the overarching agreement of commitment between the DoD and the State, but *does not* obligate or commit funds.
- Reimbursement will be accomplished, using Federal Procedures for cooperative agreements (CAs), with States that have signed DSMOAs. Eligible activities are limited to those authorized for the Defense Environmental Restoration Program (DERP), and funded by the Defense Environmental Restoration Account (DERA), Sections 2701 *et seq.*, of Title 10 U.S.C., and as specified in the DSMOA.
  - Reimbursement will commence as soon as possible with DERA funds.
- DoD policies and procedures for processing CA applications and payments will be developed with input from the States and announced in a *Federal Register* notice.
  - In general, these activities will be centralized in the ODASD(E).
  - It is anticipated that these policies and procedures will encompass the following: who may apply, what can be funded, evaluation criteria for awards, submission procedures and closing dates for receipt of applications, and State responsibilities.
  - Within this framework, it is anticipated that monitoring and quarterly reporting procedures for States' program status and financial status will be developed.
- Administration of CAs will be in accordance with Office of Management and Budget (OMB) Circular A-102, Grants and Cooperative Agreements with State and Local Governments, and Title 32 CFR 278, Office of the Secretary of Defense, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments.
  - A State will submit a complete application package for Federal assistance, consisting of Standard Form 424 (SF 424) and attachments, including a proposal narrative, the signed DSMOA, and a project management plan. The State's application must also include a description of the type and amount of support services



4. The Components will provide information, obtained from their Installations and Major Commands, to DASD(E) by State.
5. Each State contacts DASD(E) about its desire to have a DSMOA and CA, and works with DoD to have State-specific information inserted into the provisions where indicated in the model language and to fill out the CA application.
6. DASD(E) and the State sign the DSMOA and the CA.
7. The State submits requests for payment in advance based on anticipated workload or for reimbursement of services provided under the CA, on a quarterly basis.
8. Quarterly In-Process Reviews (IPRs), or alternative arrangements by mutual consent, will be held between DASD(E) staff and the State agency. IPRs will include State progress reports concerning activities and funding.
9. CA audits will be carried out in accordance with OMB Circular A-128.

negotiation and implementation of interagency agreements, and public participation activities.

Since the CAs will be centrally administered by DoD, we request Components to give my office the same total DERA cost information you provide the States. We would also like a summary of planned activities for the next two years (FY90/91) that the installation IRP representatives give to the States. Please try to provide this within four weeks of giving it to the States. Since the CAs are envisioned to encompass two years, the information on planned program activities and cost estimates will need to be updated every two years. During the CA period, if there is a significant change in response activities or estimated costs, the Component should notify the State as soon as possible. I will be providing you additional guidance on this matter in the next two weeks.

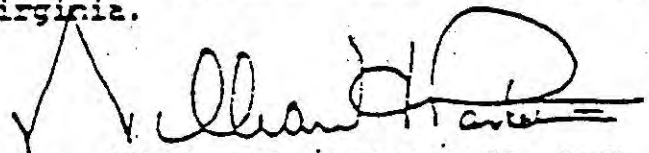
Please provide a copy of the attached model DSMOA language to those who will be responsible for providing the necessary information to the States.

We will also provide more detailed information in the following documents as they are developed:

- o DoD Policies and Procedures for the Cooperative Agreements Program under DSMOAs
- o Federal Register notice announcing the program and the availability of funds.

Cooperation and communication are paramount to the success of this program. I encourage you and your installations to make every effort to continually build a good working relationship with your counterparts in the State agencies. I believe that a cooperative effort with the States, to include mutual consideration of each others comments and program objectives, is the key to cost-effective and timely execution of the Defense Environmental Restoration Program.

Thank you for your continuing efforts in making the program a success. If you have questions or comments, Sam Napolitano remains my point of contact for DSMOAs, and LtCol Ken Cornelius has the lead in carrying out the CA Program. You may reach either of them at (202) 325-2211 (Autovon: 221-2214) in our offices in Alexandria, Virginia.



William H. Parker, III, P.E.  
Deputy Assistant Secretary of Defense  
(Environment)

Attachment



Attachment A of the DSMOA. Reimbursement under the DSMOA covers the entire period of DERA funded DoD activity including site discovery, the initiation of the preliminary assessment and site inspection through the installation of a remedial action system and operation and maintenance (O&M) expenses. It also includes all response actions (removal, remedial, and interim response actions) that are undertaken by the DoD on the installations. The Office of the Deputy Assistant Secretary of Defense for Environment ODASD(E) is only authorized to enter into agreements and provide reimbursement for funds under its direct control--the DERA fund, as provided for in 10 U.S.C. 2701 et seq. Any other expenditures or claims for reimbursement of funds not specified in this Agreement are specifically not included in the DSMOA. The State retains any rights it may have to seek reimbursement for claims not covered by the DSMOA, and for claims covered by the DSMOA if such claims were submitted to DoD pursuant to the DSMOA and reimbursement was denied in full or in part due to insufficient funds. Entering into a DSMOA does not constitute a waiver of such claims by the State of Ohio, nor does the DSMOA constitute an acceptance by the Office of the Secretary of Defense of the validity of such claims. The State agrees to use administrative procedures outlined in any installation specific agreements or in the DSMOA prior to seeking judicial remedies for such claims. The State also reserves any rights it may have to seek reimbursement of claims based on services provided or costs incurred after termination of the DSMOA. However, entering into a DSMOA does not constitute an acceptance by the Office of the Secretary of Defense of the validity of such claims.

5. State entry into a DSMOA signifies only that the State acknowledges that DoD will use a system to rank funding priorities for remedial actions in the event of a funding shortfall. To the extent that the State agrees, subject to the limitations set forth in the DSMOA, to try to abide by the priorities developed under the prioritization system, such agreement is effective only for the duration of this Agreement, and is predicated on the State's expectation that DERA will be fully funded, and that the system will be implemented in a manner which avoids inconsistent application and gives due consideration to general and site-specific State concerns. DoD currently provides and will continue to provide funding to the components to fully support work at all sites (NPL and non-NPL). The broader Defense Prioritization System and its component, the Defense Prioritization Model (DPM) will be used to facilitate the ranking of remedial actions and will solicit and incorporate, to the extent possible, comments from all states, the U.S. Environmental Protection Agency (EPA), and the public. Ranking will also be based on the NPL status, compliance with IAGs and other agreements that are entered into between DoD, the State, and/or EPA. DoD commits to link the funding available under the DSMOA to DERA funding in the State. Funding for State reimbursement will be available if DERA funds for installation response actions are being used. Entering into a DSMOA does not constitute a waiver of any claims the State of Ohio believes it



## Appendix E

### Open Detonation Area #2 Hazardous Waste Requirements

- i. Design, Maintenance and Operation of Facility, OAC 3745-54-31
- ii. General Waste Analysis Plan, OAC 3745-54-13
- iii. Security, OAC 3745-54-14
- iv. General Inspection Requirements, OAC 3475-54-15 & 3745-54-73
- v. Personnel Training, OAC 3745-54-16
- vi. General Requirements for Ignitable, Reactive, or Incompatible Waste, OAC 3745-54-17, including the following:
  - (a) the procedures for handling ignitable, reactive, and incompatible wastes set forth in Paragraph 1.a. - m. of the Director's July 30, 1992 Findings and Orders.
  - (b) electrical grounding for all containers and tanks, and transport vehicles during all operations involving the handling of ignitable or reactive wastes.
  - (c) the use of, spark proof tools during all operations involving the handling of all ignitable or reactive wastes.
  - (d) prohibit smoking and open flames in each area where ignitable, reactive or incompatible hazardous wastes are managed, and shall post appropriate signs.
- vii. Location Standards, OAC 3745-54-18

Operate and maintain the facility to prevent washout of any hazardous waste by a 100-year flood, and in the event of a 100-year flood, remove all hazardous waste, before flood waters can reach the facility, to a location where the wastes will not be vulnerable to the flood waters.
- viii. Required Equipment, OAC 3745-54-32

Maintain all facility equipment required by OAC Rule 3745-54-32 and the equipment set forth in the approved contingency plan.
- ix. Testing and Maintenance of Equipment, OAC 3745-54-33



With respect to spills and related toxic gas releases, the plan must describe the criteria to be used by the emergency coordinator to determine when the plan will be implemented. At a minimum, the plan must be implemented in the following situations:

- (a) any spill or release of hazardous waste or hazardous waste constituents greater than or equal to 55 gallons (or 220 pounds);
  - (b) any spill or release of hazardous waste or hazardous waste constituents less than 55 gallons that may result in a fire or explosion hazard, as determined by the Emergency Coordinator;
  - (c) any spill or release of material that exhibits the characteristics of reactivity as defined by OAC Rule 3745-51-23 and which results in the release of gases that may threaten human health or the environment;
  - (d) any spill on-site that may potentially cause on or off-site soil and/or ground or surface water contamination;
  - (e) any spill or release of hazardous waste or hazardous waste constituents that is reported to the National Response Center or local (city or county) emergency response center because the spill exceeded the "RQ" limits.
- xiv. Content of the Contingency Plan, OAC 3745-54-52
- xv. Contingency Plan - Released Material and Emergency Response Material and By-products, OAC 3745-54-56(G)
- All liquid or solid material resulting from fire, explosion, released material or emergency response material and by-products that must be evaluated to determine whether such material is hazardous waste in accordance with OAC Rule 3745-52-11, shall be collected and managed as a hazardous waste until a demonstration that such waste is not hazardous in accordance with OAC Rule 3745-51-03 (C), (D).
- xvi. Amendments to Plan, OAC 3745-54-54
- Review the approved contingency plan at least annually and upon the occurrence of any event listed in OAC Rule 3745-54-54. If necessary or appropriate, amend the contingency plan in accordance with OAC Rule 3745-50-51.
- xvii. Copies of Plan, OAC 3745-54-53
- (a) Comply with the requirements regarding contingency plan distribution.

APPENDIX F

**FINAL  
Conceptual Plan  
For a  
Facility-Wide Groundwater Monitoring Program Plan  
For the  
Ravenna Army Ammunition Plant,  
Ravenna, Ohio**

**Prepared for  
U.S. Army Joint Munitions Command  
Contract No. DAAA09-01-G-0009  
Delivery Order No. 0012**

**Prepared by  
SpecPro, Inc.  
8451 State Route 5  
Ravenna, Ohio 44266**

**December 2003**



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annual, or annual basis or other frequency as mutually agreed upon by Army and Ohio EPA.

- Conduct analysis of chemical data from the network to form a basis for remedial decision-making regarding groundwater at RVAAP.
- Effort should support and be coordinated with the Remedial Action (RA) process and long term monitoring.

To achieve the project DQOs, this conceptual plan includes a simplified description of the procedures to be followed in the implementation of the RVAAP FWGWMP (see figure 3.1).

## **1.2 FACILITY HISTORY AND CONTAMINANTS**

A comprehensive discussion of the RVAAP facility history and potential contaminants can be found in Section 1.1 of the current Facility-wide Sampling and Analysis Plan (FSAP) for Environmental Investigations at the Ravenna Army Ammunition Plant.

## **1.3 ENVIRONMENTAL SETTING**

A comprehensive discussion of the RVAAP environmental setting can be found in Section 1.2 of the FSAP.

## **2.0 PROGRAM ADMINISTRATION**

The FSAP presents the organization and responsibility for environmental investigations that are expected to be performed under the CERCLA process at RVAAP. The project organization and responsibilities to be followed under the FWGWMP will be based on the generic functional roles necessary to implement the field activities as described in the FSAP. Specific names of organizations or individuals assigned to administer the FWGWMP are not presented in this conceptual plan; however specific organization and responsibilities will be more fully described during development of the FWGWMP.

## **3.0 TECHNICAL APPROACH**

### ***3.1 Comprehensive Review of Existing Information***

A comprehensive review of existing geologic and hydrogeologic information, including a review of all existing monitoring locations and well logs, will be conducted during development of the FWGWMP to:



the techniques included in the most recent revisions of the FSAP and Ohio EPA's "Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring". Sampling and analysis of wells under the FWGWMP will focus on achieving the following objectives: 1) determination of the presence of contamination, 2) determination of the nature and extent of contamination, 3) identification of the connections between contaminant sources and pathway media.

### 3.3.1 Sampling Methods

Sampling methods will be performed in accordance with the most recent FSAP and Ohio EPA's "Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring".

### 3.3.2 Analytical Parameters

Analytical parameters to be monitored in the FWGWMP will be determined based upon the chemicals of potential concern (COPCs) for each individual AOC or the network. For AOC wells, all COPCs found to be below facility wide background values or at non-detect after the initial monitoring period of at least three consecutive quarters will be dropped from the list of applicable analytical parameters for that particular well should that well be included for further monitoring under the FWGWMP. In accordance with the Orders, wells at the RQL will continue to be monitored for target analyte list (TAL) metals, explosives, volatile organic compounds (VOC's), and cyanide. Wells at OD #2 will be monitored for TAL metals, explosives, propellants, cyanide, semi-volatile organic compounds (SVOCs), VOCs, pesticides, and polychlorinated biphenyls (PCBs) in accordance with the Orders. Analytical parameters for facility boundary monitoring wells will be determined based upon the chemicals of concern that pose a risk of exiting the facility at those locations.

### 3.3.3 Sampling Frequency

Initially, all wells included in the FWGWMP, with the exception of existing AOC wells with only one round of sampling completed, and the OD#2 and RQL wells, will be sampled on an annual basis. In accordance with the Orders, the OD#2 and RQL wells will continue to be sampled on a semi-annual basis to ensure that on-going activities or conditions are not adversely affecting groundwater quality at those units. The frequency of monitoring for all wells will continue to be reviewed and revised as part of the program's iterative annual review and modification process (Section 4.0).

Figure 3-1 presents a simplified illustration of the technical approach to be used for groundwater monitoring activities under the FWGWMP.

## **3.4 Identify Inputs to the Decision**

The decision process for permanently eliminating the wells originally considered for inclusion in the network will be detailed in the FWGWMP. "Inputs to the decision" will include results of the field investigation and data analysis,



#### **4.2 Annual Report**

By December 15th of each year, RVAAP will submit a summary report of all groundwater monitoring activities conducted during the previous year.

- A summary of any additional hydrogeological investigations that were conducted.
- A summary table of additional wells installed during the year, including the depth of the wells, the screen length, the formation in which the wells are screened, and the casing type and diameter.
- A summary of any contamination detected in any of the newly installed wells.
- Estimates of groundwater flow velocities and/or contaminant migration rates.
- An evaluation of the current groundwater flow direction(s) based upon the water level elevation data collected during the previous year.
- An evaluation of the trends of contamination detected in groundwater.
- An assessment of the effectiveness of any groundwater remediation activities.
- Plot of concentration trends.
- Facility map.
- Monitoring well network map.
- Groundwater flow map, where applicable.
- Well logs of any newly installed monitoring wells.
- Results of the visual inspection of the integrity of each FWGWMP well and a summary of any corrective actions taken if restorative work on any of the wells was required.

#### **4.3 Annual Review and Modification Process**

As part of the annual reporting process, the contractor will submit a review of the overall applicability and effectiveness of the FWGWMP. A description of any proposed modifications to the FWGWMP resulting from that review shall be submitted with the annual report to the team members from Army and Ohio EPA working on the FWGWMP. Modifications to the program plan may include changes in the sampling frequency, the addition or deletion of wells to or from the monitoring network, changes in the parameters to be analyzed, and changes to the decision rules. All proposed modifications to the FWGWMP will be subject to review and approval by the Ohio EPA prior to implementation.



Washington, DC 20515

February 3, 2004

The Honorable R. L. Brownlee  
Acting Secretary of the United States Army  
1600 Pentagon  
Washington, DC 20310-1600

SENT VIA FAX

Dear Secretary Brownlee:

This letter is to express our concerns about the use of ~~Guaranteed Fixed Price~~  
~~Remediation (GFPR)~~ at the Ravenna Army Ammunition Plant (RVAAP) in Portage  
County, Ohio. As Members of Congress for Ohio, we have strong reservations about the  
situation that is unfolding at the RVAAP.

The RVAAP is comprised of over 20,000 acres of land, with twelve World War II  
production load lines. These load lines contain more than one hundred reinforced  
concrete pads, connected by more than fifteen miles of concrete walkways, and underlain  
by miles of underground piping. The US Army began operations there during World War  
II, but began phasing out munitions manufacturing during the 1970s. Since that time,  
some remediation has been completed, but considerable work to clean up the residual  
chemicals and undetonated munitions remains to be done.

The Department of the Army currently has plans to remediate the site using a new  
program called GFPR, through its Business Initiatives Council. Through this program,  
contractors agree to remediate a site for the exact terms of the contract, regardless of the  
extent of the contamination that they find. To reduce their exposure for any cost overruns  
that would result from higher levels of contamination than anticipated, significant (and  
expensive) business insurance policies are required.

Our concerns about this situation are as follows:

- 1 Given the size and scope of the Ravenna project, this program is not an  
environmentally sound or cost effective approach. GFPR is perhaps a valid  
method for smaller sites with limited contamination that is well documented and  
well understood. Unfortunately, that is simply not the case here.
- 2 The current remediation plan does not include any provisions to remove the  
concrete pads, walkways, or underground piping. As a result, none of the  
contamination beneath the concrete, or in the piping will be remediated. The  
property will not meet most standards of "clean" and will be rendered worthless

for most possible future uses.

In fact, the Ohio Army National Guard is interested in obtaining the property to provide them with a venue for tracked vehicle maneuver training. However, they have indicated that they will not agree to take ownership of the property unless it is fully remediated. The property is unacceptable for use as a tracked vehicle maneuver area with the infrastructure remaining in place.

- 3 There is a question about the status of the clean-up once this process begins. By some interpretation of policy statements, as soon as the GFPR contract is signed for a number of environmental areas of concern (AOCs), the site will be reported in the Army Environmental Database as a single AOC. The single AOC will also be reported as Remedy In Place/Response Complete (RIP/RC), in spite of the fact that not a single shovel of dirt has been turned. It is unclear to us how such a position can really serve the best interest of the Army, the facility and the community in which it's located. We find it to be deceptive to imply to the Army or to Congress that a site is clean when only contracts have been signed. That is poor public policy from both an administrative and environmental standpoint.
- 4 GFPR minimizes the involvement of dedicated non-DoD stakeholders in the process, including the Ohio Environmental Protection Agency, and the general public as well.
- 5 GFPR contracts have higher costs associated with them than traditional clean-ups to cover both the uncertainties of the contract, as well as the insurance policies needed to protect the businesses from cost overruns that could result from dramatically higher levels of contamination than anticipated. It is our understanding that if a traditional remediation program were used at the RVAAP, the cost of the clean up would be low enough to also fund the removal of all the concrete and full remediation at the same price as the GFPR contract. This would allow the property to be considered "clean" at an acceptable standard to make it available for a broader range of future uses.

This is not the only facility where questions are being raised about the GFPR process. A recent memo from the Aberdeen Proving Ground Restoration Advisory Board (RAB) states that there is little evidence to suggest that GFPR "will add value to the clean-up process". In fact, they believe that "as demonstrated at Department of Energy sites, this would have a severe, negative impact to both environmental clean-up activities and military readiness goals."

As such, we are asking for your assistance to stop the implementation of the GFPR contract at the RVAAP until a more detailed study can be completed by the General Accounting Office about the appropriateness of this process for this site. We also request the GAO to investigate other and newer Performance-Based Contracting





(PBC) options for use at RVAAP, e.g. Fixed Price Remediation with Incentives (FPR).

We would welcome the opportunity to meet with you to discuss this issue further. We will be in touch with you to see if a meeting can be arranged. In the meantime, you can reach the Chief of Staff for Congressman Tim Ryan, Mary Anne Walsh, at 202-225-5261 if you want to discuss this matter further.


Thank you for your time and attention to this matter.

Sincerely,

  
Sherrod Brown  
Member of Congress

  
Tim Ryan  
Member of Congress

  
Ted Strickland  
Member of Congress

  
Mike DeWine  
U.S. Senator

C: Susan Bromm, Office of Site Remediation Enforcement, US EPA



DEPARTMENT OF THE ARMY  
OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY  
INSTALLATIONS AND ENVIRONMENT  
110 ARMY PENTAGON  
WASHINGTON DC 20310-0110

MAR 26 2004

The Honorable Tim Ryan  
United States House of Representatives  
Washington, DC 20515-1311

Dear Representative Ryan:

I am responding to your February 3, 2004 letter outlining your concerns for the use of ~~Guaranteed Fixed Price Remediation~~ contracting at the Ravenna Army Ammunition Plant (Ravenna). I have reviewed and considered your issues and my responses to each of your questions are attached.

We believe the course of action being taken by the Army is appropriate given the site conditions at Ravenna and the legal requirements governing the site cleanup. Based on these parameters, our approach best serves the interests of all parties involved.

Thank you for your letter and I trust that I have fully addressed your concerns. I am available to meet with you further discuss this issue.

Sincerely,

A handwritten signature in black ink, appearing to read "Raymond J. Fatz".

Raymond J. Fatz  
Deputy Assistant Secretary of the Army  
(Environment, Safety and Occupational Health)  
OASA(I&E)

Attachment



SUBJECT: Request to discuss the Fixed Price Remediation at the Ravenna Army Ammunition Plant

*1. Given the size and scope of the Ravenna project, this program (Guaranteed Fixed Price Remediation) is not an environmentally sound or cost effective approach. GFPR is perhaps a valid method for smaller sites with limited contamination that is well documented and well understood. Unfortunately, that is simply not the case here.*

Response - The Army is implementing performance based contracting mechanisms to improve cleanup effectiveness and efficiency. Guaranteed Fixed Price Remediation is just one available performance based contracting tool. The Congress urged the Army in FY02 to continue the use of Guaranteed Fixed Price Remediation for the cleanup of its contaminated sites. Specifically, pages 307-308 of Senate Report 108-46 stated: "The Senate Armed Services Committee noted the Army awarded a total of nine Guaranteed Fixed Price Remediation contracts and strongly urges the Secretary of the Army to continue exploring appropriate uses of this type of contracts for contaminated sites."

In the summer of 2002, the Army conducted a qualitative review of all its installations with sites requiring some level of environmental restoration funding to achieve Remedy in Place or Response Complete. The three criteria and rationale used for this review were: 1) no record of decision in place - the lack of an in-place record of decision means the Army and its contractor are not locked into a prescribed remedy and allows the flexibility to come up with innovative solutions to achieve regulatory closure; 2) the environmental investigation of the site was complete or nearing completion - site characterization needed to be at a stage where a large degree of uncertainty had been eliminated to avoid high cost swings; and 3) the estimated cost to complete was greater than \$2 Million - insurers generally will not provide policies for contracts with a value less than \$2 Million.

Based on this screening, installations that had a high percentage of sites that fit the three criteria were looked at more carefully to determine if there were opportunities for the implementation of performance based contracting. Because Ravenna met these criteria, it was selected as one of seven candidate installations.

*2. The current remediation plan does not include any provisions to remove the concrete pads, walkways, or underground piping. As a result, none of the contamination beneath the concrete, or in the piping will be remediated. The property will not meet most standards of "clean" and will be rendered worthless for most possible future uses.*

*In fact, the Ohio Army National Guard is interested in obtaining the property to provide them with a venue for tracked vehicle maneuver training. However, they*

*Attachment*

*have indicated that they will not agree to take ownership of the property unless it is fully remediated. The property is unacceptable for use as a tracked vehicle maneuver area with the infrastructure remaining in place.*

Response - The Army's goal is to ensure all parties with an interest in a property are represented in the cleanup process. At Ravenna this includes representatives from the installation, the US Army Environmental Center, the US Army Corps of Engineers (Louisville District), the Ohio Environmental Protection Agency (OH EPA) and the Ohio Army National Guard (OHARNG). All parties were consulted regarding Ravenna's ongoing program, and based on that consultation follow-up efforts were developed.

The existing Guaranteed Fixed Price Remediation contract involves only 4 of the 30 sites at Ravenna, specifically Load Lines 1-4. The decision to limit the contact to these four sites was based on the level of characterization completed at these locations. The investigation of the four sites included sampling and analysis of soils and sediments and included sampling around the production lines and concrete pads. The results of the investigation revealed that soils and sediments needed to be removed. The Guaranteed Fixed Price Remediation contract will fill data gaps in the Feasibility Study phase. At the end of this effort, sampling will be performed to confirm the elimination of contamination above risk levels.

We understand your concerns over leaving the concrete pads in place at the load lines and also the need for their removal for the ultimate development of the site by the OHARNG. We also recognize there could be inherent benefits in coordinating any concrete removal action with the cleanup process. However, the current site characterization of Load Lines 1-4 indicates that there is no known contamination under the concrete pads that requires a response. At this time, the restoration account is not an appropriate funding source for the removal of the concrete pads.

The remaining 26 sites are still being investigated to determine the nature and extent of contamination. We expect this investigation to be complete by the summer of FY05, and at that time there will be an evaluation of what cleanup actions are necessary and what contracting mechanism is most appropriate for achieving those goals.

Regardless of the cleanup effort implemented, the Army will conduct thorough sampling at each site to determine if any residual contamination is present. Please be assured that the Army will retain responsibility for the cleanup of any residual contamination if found.

*3. There is a question about the status of the clean-up once this process begins. By some interpretation of policy statements, as soon as the GFPR contract is signed for a number of environmental areas of concern (AOCs), the site will be reported in the Army Environmental Database as a single AOC. The single AOC*



*will also be reported as Remedy In Place/Response Complete (RIP/RC), in spite of the fact that not a single shovel of dirt has been turned. It is unclear to us how such a position can really serve the best interest of the Army, the facility and the community in which it's located. We find it to be deceptive to imply to the Army or to Congress that a site is clean when only contracts have been signed. That is poor public policy from both an administrative and environmental standpoint.*

Response - There was an initial proposal within the Army to account for facilities being cleaned under a fixed price performance based contract as completed at the time of award. This proposal was rejected; and no site is closed until the cleanup is complete. All of the Ravenna performance based contracting cleanup sites are reported as underway in the Army environmental database; and we will continue to track all sites at Ravenna.

*4. GFPR minimizes the involvement of dedicated non-DoD stakeholders in the process, including the Ohio Environmental Protection Agency, and the general public as well.*

Response - Under performance based contracting, the opportunities for regulatory agencies to participate in the cleanup process are expanded and encouraged. Regulators have the opportunity to attend scoping meetings, information sessions with installation personnel and contract teams, assist in developing performance measures for the PBC contract, comment on draft Performance Work Statements, participate in bidders conferences, and continue to maintain an active role by reviewing remedial activities prior to implementation. Ultimately the regulatory agencies must concur with the remedy completion.

Public involvement by members of the Restoration Advisory Board is, likewise, a critical component. The Army recently completed the Ravenna Community Involvement Plan and will assure that all Army staff and contractors working on Ravenna understand and comply with the public involvement requirements.

*5. GFPR have higher costs associated with them than traditional clean-ups to cover both the uncertainties of the contract, as well as the insurance policies needed to protect the businesses from cost overruns that could result from dramatically higher levels of contamination than anticipated. It is our understanding that if a traditional remediation program were used at the RVAAP, the cost of cleanup would be low enough to also fund the removal of all the concrete and full remediation at the same price as the GFPR contract. This would allow the property to be considered "clean" at an acceptable standard to make it available for a broader range of future uses.*

Response - Performance based contracts have shown significant promise in accelerating cleanup, capping the federal liabilities, and achieving regulatory closure objectives in a more timely manner. As a result of its initial success,

performance based contracting has become a significant business initiative for the Department of Defense. Consequently, all installations are being objectively evaluated for potential use of an appropriate performance based contracting mechanism for their cleanup. Insurance products will only be used for cleanup activities at installations where site characterization is not complete. At those locations, the insurance on a cleanup contract assures that any within-scope cost overruns will not come at a cost to the Army, as has occurred in the past. This is a significant improvement on the cleanup contracting process.

The Army has reviewed the challenges faced by the Department of Energy in implementing performance based contracting and we learned two valuable lessons. First, better knowledge of the nature, extent, and scope of the contamination reduces the risks associated with using performance based contracting. Second, sufficient funding is required to support the cleanup effort. The performance based contracting effort undertaken to date at Ravenna was limited to four load lines where the characterization was essentially complete and the contract was fully funded.

We are committed to completing environmental restoration nationwide in a timely and cost effective manner. We will achieve this goal with full public and regulatory agency involvement. The performance based contracting initiative is producing encouraging results so far, resulting in a cost avoidance of \$28 million on contracts with a total awarded value of \$138 million. We will continue to tailor our efforts to the specific installation conditions we encounter through partnering with all involved parties.





State of Ohio Environmental Protection Agency

## Southwest District Office

401 E. Fifth Street  
Dayton, Ohio 45402-2911TEL: (937) 285-4557 FAX (937) 286-6249  
www.epa.state.oh.usBob Taft, Governor  
Jennette Bradley, Lieutenant Governor  
Christopher Jones, Director**April 13, 2004**

Mr. Rick Newsome  
Department of the Army  
Office of the Assistant Secretary of the Army  
Installations and Environment  
110 Army Pentagon  
Washington, DC 20310-0110

Dear Mr. Newsome:

This letter is in response to the Army's March 26, 2004 letter from Mr. Raymond J. Farz (Deputy Assistant Secretary of the Army) to Senator Mike DeWine regarding the use of **Guaranteed Fixed Price Remediation (GFPR)** at the Ravenna Army Ammunition Plant (RVAAP). In this letter, the Army makes several statements about regulatory involvement under GFPR contracts and implies that this level of involvement was implemented during the development of the GFPR contract for RVAAP Load lines 1, 2, 3, and 4. In addition, Ohio EPA has been asked by stakeholders to discuss both Ohio EPA's concerns with GFPR and the contract that was issued at RVAAP. Ohio EPA therefore felt that we should provide our perspective on this issue, both to address stakeholder inquiries and ensure our position about GFPR was accurately portrayed. Our specific comments regarding GFPR implementation at RVAAP follow:

1. Ohio EPA is supportive of the Army's commitment to investigate and clean up RVAAP as quickly as possible so that the site can be reused as a training area for the Ohio Army National Guard. The use of Performance Based Contracting (PBC) is one mechanism by which that goal may be achieved. However, PBC and other streamlining initiatives must be in line with the overall strategy for investigation and cleanup at the installation. Cleaning up sites to standards inconsistent with the proposed reuse to either minimize Army costs or achieve cleanup goals more quickly is not acceptable to Ohio EPA. In addition, as work is accelerated at the site, we must work together to ensure stakeholder concerns (community, Restoration Advisory Board members, and the National Guard Bureau) are not ignored so that schedules are met.
2. The Army's March 26, 2004 letter states that "... the current site characterization of Load Lines 1 - 4 indicates that there is no known contamination under the concrete pads that requires a response." Ohio EPA disagrees with the Army's



Mr. Rick Newsome  
April 13, 2004  
Page 2

assessment. Ohio EPA feels that, due to the practice of sweeping explosives-laden water out of the doorways during production, contamination will be found under the building slabs and within the underground utilities associated with these four load lines. To date, only minimal sampling below the concrete pads has been completed, and based on experience with other federal facilities, until the building foundations are removed, one cannot effectively determine if contamination is present. The Army's March 26, 2004 letter also seems to recognize this potential, since it states that the Army will provide funding to remove contamination once the slabs are removed. Because there may be explosives contamination present under the slabs and within underground utilities, and since these structures must be removed to meet the Ohio Army National Guard's intended reuse, Ohio EPA's position continues to be that the scope of the current PBC for the four load lines is an interim action remedy only. Ohio EPA recognizes that the Army feels funding slab removal under the Defense Environmental Restoration Account is not appropriate, and intends to use other types of federal funding (that for building demolition) to remove these structures. However, until these structures are removed and it is verified that explosives contamination does not exist under the slabs and within underground utilities, Ohio EPA will not concur that all necessary remedial actions required at Load lines 1, 2, 3, and 4 are completed.

3. The Army's March 26, 2004 letter states that: "Under performance based contracting, the opportunities for regulatory agencies to participate in the clean-up process are expanded and encouraged"; followed by the listing of several examples of points in the process where the regulatory agencies could be involved. This includes using regulatory concurrence in remedy completion as the performance standard that must be met under these contracts. Ohio EPA is pleased that the Army used this standard, since it acknowledges the importance of the regulatory agencies' role in the investigation and cleanup of these facilities.
4. Ohio EPA is also encouraged that the Army's March 26, 2004 letter details other opportunities for regulatory involvement during development of the GFPR contract. Unfortunately, several of these opportunities were not provided to Ohio EPA when the GFPR contract was initiated at RVAAP. For example, Ohio EPA was not consulted prior to the Army's selection of Load Lines 1, 2, 3, and 4 as the first GFPR initiative to be undertaken at RVAAP. At the time this decision was made, Ohio EPA felt that smaller, less complex, Areas of Concern (AOCs), would be a more logical starting point for the first PBC initiative at the installation. We also proposed that the Army should focus the PBC contract on Load Line 1, which was further along in the Remedial investigation (RI) process than Load Lines 2, 3, and 4. Though the field work for these Phase II remedial investigations had been completed, Ohio EPA had not received or reviewed data from these efforts. Although Ohio EPA was involved in the review of the scope of work for the interim action remedy, we felt we were at a disadvantage



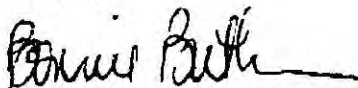
Mr. Rick Newsome  
April 13, 2004  
Page 3

over Army staff who did have time to review available data for these sites. Additionally, the Ohio EPA was not invited to participate in several meetings and conference calls during the early portion of the GFPR process. Then, to ensure interested contractors were provided with Ohio EPA's concerns prior to preparation of their bids, Ohio EPA was asked to review and comment on the three preliminary draft remedial investigation reports for these complex sites within two months. This created a major strain on Ohio EPA resources, since this work was in addition to other activities occurring at the installation as well. Finally, the selected contractor provided a presentation on October 15, 2003 to the Restoration Advisory Board on their proposed remedy for Load lines 1, 2, 3, and 4, which was also the first time the Agency had been briefed on the contractor's proposal. Ohio EPA understands that the PBC contracting initiative is relatively new and the Army is still developing guidance on how to involve the regulatory agencies in this approach. However, since the Army has a goal of 40% of environmental contracts being PBC by the end of FY 2005, and 80% by the end of FY 2007, it would be beneficial if the Army could provide guidance to its staff and the regulatory agencies that better describes this process.

Despite the above obstacles, the Ohio EPA remains committed to ensuring the PBC contract issued for Load Lines 1, 2, 3, and 4 is successful so that an effective interim remedy can be implemented. We also remain committed to continue to work with the Army, the National Guard Bureau, the Ohio Army National Guard, and other interested stakeholders to ensure that contamination at the RVAAP is investigated and, if necessary, cleaned up as quickly and effectively as possible.

If you have any questions concerning this correspondence or wish to discuss this matter further, please contact me at (937) 285-6469.

Sincerely,



Bonnie Buthker  
DSMOA Program Manager  
Office of Federal Facilities Oversight

cc: Chris Jones, Director, Ohio EPA  
Graham Mitchell, Ohio EPA, SWDO, OFFO  
Eileen Mohr, Ohio EPA, NEDO, DERR  
Mark Patterson, RVAAP  
Jo Ann Watson, AEC  
Colonel Tom Tadson, Ohio Army National Guard  
Major Kim O'Keefe, National Guard Bureau

**Congress of the United States**  
**Washington, DC 20515**

The Honorable R.L. Brownlee  
Acting Secretary of the United States Army  
1600 Pentagon  
Washington, DC 20310-1600

May 10, 2004

Re: Letter from Raymond Fatz regarding use of Guaranteed Fixed Price Remediation at  
Ravenna Army Ammunition Plant in Ravenna Ohio

Dear Secretary Brownlee:

Thank you for the recent response to our concerns about the use of ~~Guaranteed Fixed Price Remediation~~ (GFPR) at the Ravenna Arsenal. We sincerely appreciate Deputy Assistant Secretary Fatz's letter, and are pleased to see that the U.S. Department of the Army has altered its planned method of reporting. We believe that this new approach will better serve both the military, as well as the broader public interests associated with the remediation of former military installations.

However, there remain a number of issues that we believe merit further discussion.

First, in your response to us, you state that **"The Army's goal is to ensure all parties with an interest in a property are represented in the cleanup process. At Ravenna this includes ...the Ohio Environmental Protection Agency (OHEPA) and the Ohio Army National Guard (OHARNG). All parties were consulted regarding Ravenna's ongoing program, and based on that consultation follow-up reports were developed."**

While it is true that all parties have been included in most of the meetings concerning the GFPR, it is my understanding that (1) there have been a number of closed door meetings that neither the Ohio EPA or the OHARNG have been invited to and (2) that the substance of many of the meetings that have been conducted have simply been to advise the parties of the Department of the Army's intent, rather than conducting a dialogue

In fact, it appears the Ohio EPA does not support the GRPR approach for a project as large and complex as the remediation of Load Lines 1, 2, 3 and 4. A letter to your office from the Ohio EPA dated April 13, 2004 states that *"Performance Based Contracting (PBC) and other streamlining initiatives must be in line with the overall strategy for investigation and cleanup at the installation. Cleaning up sites to standards inconsistent with the proposed reuse to either minimize Army costs or achieve cleanup goals more quickly is not acceptable to Ohio EPA."* (see attached).

Second, also included in your response is a statement that **"We understand your concerns over leaving the concrete pads in place at the load lines and also the need for their removal for the ultimate development of the site by the OHARNG.... However, the current site characterization of Load Lines 1-4 indicates that there is no known contamination under**



**the concrete pads that requires a response."**

Unfortunately, an inadequate number of soil samples were taken from beneath the slabs to conclusively determine that contamination levels are negligible. In fact, for most of the buildings, when samples were taken at the edge of the slabs, the results indicated significant levels of contamination, which is presumed to have resulted from water run-off/sweeping during cleaning. Based upon the existing tests, we cannot know how serious this contamination is.

The Ohio EPA shares our concerns about the seriousness of this situation. The above referenced letter-states that *"[Based on experience with other federal facilities, until the building foundations are removed, one cannot effectively determine if contamination is present.... Because there may be explosives contamination present under the slabs and within underground utilities, and since these structures must be removed to meet the Ohio National Guard's intended reuse, Ohio EPA's position continues to be that the scope of the current Performance Based Contracting (PBC) for the four load lines is an interim action remedy only."*

Third, in your response, you state that **"Under Performance Based Contracting, the opportunities for regulatory agencies to participate in the cleanup process are expanded and encouraged. Regulators have the opportunity to attend scoping meetings, information sessions with installation personnel and contact teams, assist in developing performance measures for the PBC contract, comment on draft Performance Work Statements, participate in bidders conferences, and continue to maintain an active role by reviewing remedial activities prior to implementation."**

However, the opportunities for involvement by regulatory agencies have been intermittent and inconsistent. In fact, at the bid review for the initial GFPR/FPRI contract, neither Ohio EPA nor OHARNG were permitted to actively participate in the meeting. They could attend the meetings, but had no part in the decision making process.

Further, the Ohio EPA indicates that they were not consulted prior to the Army's selection of Loan Lines 1,2,3 and 4 for GRPR. The process continued in spite of Ohio EPA's objections that a smaller, less complex Area of Concern (AOC) was a better approach. Additionally, according to the OHEPA, *"Though the field work for the Phase II remedial investigations had been completed, Ohio EPA had not received or reviewed data from these efforts. Although Ohio EPA was involved in the review of the scope of work for the interim action remedy, we felt we were at a disadvantage over Army staff who did have time to review available data for these sites."*

In fact, the Ohio EPA was specifically eliminated from the procedure to "assist in developing performance measures for the PBC contract..."

Finally, your letter states that **"Ultimately the regulatory agencies must concur with the remedy completion."**

Both written and verbal communication with the Ohio EPA clearly indicates that they will NOT issue a "response complete," or "no further action" letter on Load Lines 1-4 based upon the terms of the existing contract.

Specifically, they state "*Because there may be explosives contamination present under the slabs and within underground utilities, and since these structures must be removed to meet the Ohio Army National Guard's intended reuse, Ohio EPA's position continues to be that the scope of the current PBC for the four load lines is an interim action remedy only.*"

It is our understanding that a "response complete" letter will not be issued until the slabs, underground piping and infrastructure have been removed as needed, and any residual explosives and other contaminants have been remediated.

Finally, in your response you note that "**The performance based contracting initiative is producing encouraging results so far, resulting in a cost avoidance of \$28 million on contracts with a total award value of \$128 million.**"

We are concerned that the figures quoted may not give the full picture. The \$28 million cost avoidance is based on a comparison of actual contract award costs compared to the old "swag" Installation Action Plan (IAP) estimated cost-to-complete (CTC) figures, rather than on the accurate Independent Government (cost) Estimate (IGE). A better measure would be to compare the actual contract award costs to IGE amounts, rather than IAP CIC. A further review of this difference is merited.

Thank you in advance for your further consideration of these issues. Should you wish to discuss them further, please contact Mary Anne Walsh, chief of staff for Congressman Tim Ryan at 202-225-5261. We look forward to hearing from you.

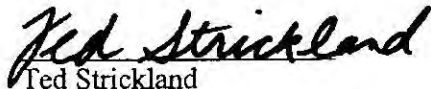
Sincerely,



Sherrod Brown  
Member of Congress



Tim Ryan  
Member of Congress



Ted Strickland  
Member of Congress



Mike DeWine  
U.S. Senator

TJR/ble  
enclosures

c: Susan Bromm, Office of Site Remediation Enforcement, US EPA  
Chris Jones, Director, Ohio EPA  
Raymond Fatz, Deputy Secretary of the Army





State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

March 04, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
PROJECT MANAGEMENT PLAN -  
FPRI LOAD LINES 1-4

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the following document: "Draft, Project Management Plan, Remediation of Soils at Load Lines 1 - 4, Ravenna Army Ammunition Plant, Ravenna, OH." This document, dated February 2004 and received by Ohio EPA on March 01, 2004, was prepared for the U.S. Army Corps of Engineers (USACE), Louisville District by Shaw Environmental and Infrastructure.

Enclosed with this cover letter are Ohio EPA's comments on the above-referenced document.

If you have any questions, please do not hesitate to contact me at 330-963-1221.

Sincerely,

Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

enclosure

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
LTC Tom Tadsen, OHARNG  
MAJ Kim O'Keefe, NGB  
Glen Beckham, USACE Louisville

John Jent, USACE Louisville  
Paul Zorko, USACE Louisville  
Dave Cobb, Shaw  
Mike Fitzgerald, Shaw

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR

**“Draft, Remedial Project Management Plan, Remediation of Soils at Load Lines 1-4, Ravenna Army Ammunition Plant,  
Ravenna, OH”; Contract Number DACA45-03-D-0026**

**Ohio EPA Reviewer: Eileen T. Mohr  
Date: March 04, 2004**

<b>Page/ Line #</b>	<b>Comment</b>	<b>Recommendation</b>	<b>Response</b>
pg 2, lines 15- 16	The text indicates that field investigation activities associated with the RIs have been completed. Technically this is correct, however, it does not address additional field work that may need to be conducted due to identified data gaps.	In the revised text reference the data gaps and that additional field work may be required.	
pg 2, lines 20- 26	The text references the SBHHRA and the need to finalize this prior to completing the LL 2-4 RIs. While this is correct, given that there is so much overlap between the SBHHRA and the sitewide risk manual prepared by USACE, there should be some mention of the sitewide risk manual.	In the revised text, please reference the USACE sitewide risk manual.	
pg 3, lines 1-2	The text references the sitewide human health risk assessment workplan.	In the revised text, use the correct name for the document; i.e. the “RVAAP’s Facility-Wide Human Health Risk Assessor Manual.” Also please delete the text in parentheses.	



pg 3, after line 5	The sitewide QAPP and community relations plan need to be referenced.	Please add these to the revised text.	
pg 3, lines 15-24	The text should clearly indicate that this is an interim remedy, given that at the completion of this project, the land will not be in the condition required by the OHARNG for mounted training-no digging, which is the final land use.	Add verbiage to the revised text to clearly indicate that the work under this contract will not result in a final remedy for these AOCs.	
pg 3, lines 21-24	The text indicates that the SOW does not include the designation and clearing of UXO and OEW. Does it include UXO avoidance?	Please clarify this in the revised text.	
pg 3, lines 33-37	The text references the preparation of various plans that will be submitted prior to conducting field work.	In the revised text, please reference the QAPP and the SAP.	
pg 3, line 39	The text indicates that Shaw will determine whether or not additional investigations would be required.	Although Shaw will necessarily be a part of the determinations, they are not the sole decision-maker. Please add Ohio EPA and the Army to the revised text.	
pg 3, lines 42-44	The text details how the RI reports for LL2-4 will be completed.	In the revised text, please add in a comment resolution meeting.	

pg 4, line 8	<p>The text states "...for remediation of Load Lines 1 through 4..."</p> <p>Also applicable to pg 4, line 11; pg 4 line 38.</p>	Put the word "interim" in front of the word remediation (or remedial).	
pg 4, line 14	The order of the reports is incorrect in the text. Also, there is no indication that the remedial design will result in an action that is interim in nature.	Revise the text such that the preliminary-draft report comes before the draft report. Also, clarify in the text that the remedial design will result in an action that is interim in nature.	
pg 4, line 24	The text references an "option 1" in the LTM section.	Please clarify what is meant by option 1."	
pg 4, line 29	The text indicates that Shaw is responsible for obtaining RVAAP and Ohio EPA concurrence on the proposed remedy.	Change "concurrence" to "approval."	
pg 5, lines 16-18	The text indicates that areas to be excavated would be delineated based upon available data and confirmation sampling. There is no mention of the data gap issue.	Identify when the issue of data gaps will be addressed and how the additional data will be utilized.	
pg 5, line 18	<p>The text indicates that Shaw will determine the level of effort for confirmation sampling activities.</p> <p>This concept is also applicable to the text on pg 10, line 36 (impact of new COCs), page 10, line 42 (evaluation of data gaps).</p>	Although Shaw will necessarily be a part of the determinations, they are not the sole decision-maker. Please add Ohio EPA and the Army to the revised text.	



pg 5, line 30	The text needs additional information regarding the disposal of the stockpiles of removed materials.	In the revised text make a notation that sampling protocols for the stockpiles will be presented in the removal workplans. Also add after line 30, the following text: "All stockpiled materials will be disposed of in accordance with all applicable State, Federal, and local regulations."	
pg 6, table 1	There is no indication that LTM workplans and reports will be prepared.  This is also applicable to page 9.	Add these tasks into the revised table and text as appropriate.	
pgs 6-8	The lack of comments on section 3.3 (remedy evaluation factors) should not be construed as Ohio EPA acceptance of the proposed remedial option.	No text change required.	
pg 8, lines 11-17	The text in this section and the schedule detailed in Appendix A do not mesh. The text indicates that Ohio EPA would be getting the internal (preliminary) draft, but the schedule shows activities where Ohio EPA does not get the preliminary draft.	Rectify the apparent discrepancy in the appropriate places.	
pg 8, lines 19-21	The text indicates that the turn around time for Ohio EPA has not been specified in the Findings and Orders. This is not correct.	In the revised text, please indicate that Ohio EPA has a 45 day review time for all documents.	

pg 8, lines 21-23	<p>The text indicates that the Ohio EPA review periods would be based upon prioritization of submitted documents as determined by USACE and RVAAP personnel.</p> <p>This is also applicable to page 10 lines 6-7.</p>	<p>In the revised text, please indicate that Ohio EPA is integrally involved in the determination of priorities for project reviews. Also Ohio EPA review time is 45 days. Prioritization of work on the part of Ohio EPA is also driven by which areas can be remediated and transferred more quickly to the OHARNG for training purposes.</p>	
pg 8, lines 35	<p>The text indicates that the preliminary-draft reports will be submitted to the information repositories. The RVAAP team decision has been to only put draft and final versions of reports, etc. into the repositories.</p>	<p>Remove the preliminary-draft documents from the list of those submitted to the repositories.</p>	
pg 9, lines 26-27	<p>The text indicates that Load Line 1 was historically the most productive of the load lines, and as such, the most complex. This is, and is not correct. Given the fact that most of Load Line 1 is situated on bedrock, and there is a minimal amount of unconsolidated materials present, in some ways the situation is simplified.</p>	<p>In the revised text, more clearly indicate what was meant by the statement that Load Line 1 is the most complex.</p>	



pg 10, lines 17-24	The text references regulatory acceptance issues that might impact upon the proposed schedule. The fact that the remedy has been assumed by the contractor, but not evaluated and accepted by the Ohio EPA as of this date, may also impact upon the schedule.	Add this information to the revised text.	
pg 10, lines 28-29	The text references a comprehensive field screening program that will be conducted by Shaw. Please be advised that as of this date, the only field methodology used at RVAAP is Jenkins testing for explosives, and that method cannot separate out the various explosives compounds.  This is also applicable to pg 24, lines 13-16.	Please clarify in the revised text what field methods are proposed and how it will be demonstrated that they can be used at RVAAP to provide accurate and needed information. (This is especially applicable to the issue of potentially using XRF techniques for metals determination.)	
pg 12, line 6	The text indicates that the final site use is negotiable. This is incorrect, as the OHARNG has clearly indicated that the training to be conducted in these areas is to be mounted training - no digging. Additionally, the remedy that will be in place at the end of this FPRI contract is not final, it is interim in nature.	Correct the text to reflect these comments.	

pg 12, after line 7	The text in line 7 references the negotiation of clean-up standards.	In the revised text, please state that the clean-up standards will be protective of human health and the environment.	
pgs 13 and 14	The project participant and OIP lists indicate that MKM is a participant organization and the NGB is an OIP.  Also applicable to pages 2 and 3 of the RVAAP Coordination Plan.	Please provide an explanation. At a minimum it would seem that NGB should be on the participant list. Additionally if NGB is listed as a project participant, they should be added to section 4.4.3 on page 14.	
pg 14 lines 15- 34	This portion of the text describes some of the responsibilities of the participant organizations, but does not provide a complete listing. (For example under Ohio EPA there is no mention of public involvement; review of design documents, etc.; for OHARNG there is no mention of review of investigation and design reports, etc.)	Revise the text on line 13 to read: "The following presents some of the roles..."	
pg 15, table 2	In the remedial reports section, there are 2 draft reports listed.	Change the second draft report to read final report.	
pg 15, table 2	In the Interim Remedy in Place section and IRIP Closure Documentation section, there are no Ohio EPA approvals listed.	Please add "x"s to all subsections in the Ohio EPA column.	
pg 15, table 2	This table does not mesh with page 4, section 5.2 of the RVAAP Coordination Plan.	Please revise each as necessary so there are no discrepancies.	



pg 17, table 3	The phone and fax entries for Todd Fisher have the wrong area code.	Please change 937 to 330.	
pg 17, table 3	Please add in information for Brian Tucker, Ohio EPA. He may do some risk assessment work on the FPRI projects.	Brian Tucker Ohio EPA - Technical Specialist Ohio EPA - Central Office Lazarus Government Center PO Box 1049 122 S. Front Street Columbus OH 43216-1049 Ph: 614-644-3120 Fax: 614-644-3146 brian.tucker@epa.state.oh.us	
pg 19, line 15	The text references that the first status report will be received in January 2004.	Provide an update on the status of this report.	
pg 19, lines 18-19	The text indicates that field screening data, once verified, will be added to the EIMS. Is this data that will be available to the public?	If the recommendation is to make this available to the public, we need to make sure that it is clearly indicated that this information does not represent "laboratory grade" data.	
pg 24, lines 10-12	The text references a excavation plan that is designed to minimize the generation of hazardous wastes. It is unclear as to how this proposed methodology of excavation will result in this outcome.	Please provide additional information in the revised text.	
pg 25, lines 1-4	The text identifies a notification procedure in the event that there are issues that impact the schedule.	Add Ohio EPA to the notification chain.	

pg 25, lines 35- 37	The text references employees who have stop work capabilities.	Add Ohio EPA to the list of people who have stop work capabilities. This is defined in the Findings and Orders XV(35)c.	
App A	Many of the entries in this appendix contradict the text on page 8 which discusses the distribution of documents. For example (probably not all inclusive) activity IDs 253, 330, 390, 510, 610, 670, and 890 basically indicate that a preliminary draft document will be going to the Army for review and then the draft document would be submitted to the Ohio EPA and OIPs.	Please clarify in the revised document. The Ohio EPA should be getting preliminary-draft, draft and final documents for review. If there is an internal draft that goes to the Army prior to the preliminary draft, then unnecessary time(Ohio EPA opinion) is being added to the schedule.	
App A	(Example, probably not all inclusive) On activity ID 690 the indication is that OIPs would be receiving the preliminary-draft RD plan. This is not correct, as preliminary-draft documents do not go to the public for review.	Please remove public review from any preliminary draft documents.	
App A	The schedule does not indicate that the Ohio EPA reviews final documents.	As the Ohio EPA reviews all final documents in order to ensure that all changes have been made such that the final approval letter can be sent to the appropriate parties, there may need to be more time added to the schedule.	



Coord Plan pg 1 lines 26-32	The text does not refer to the facility-wide QAPP and community relations plan.	Add these documents to the revised PMP.	
Coord Plan pg 1 line 32	The text references the sitewide groundwater monitoring program.	As a point of information, at this point in time the only established documentation for this initiative is the Facility-Wide Groundwater Monitoring Program Plan (FGWMPP).	
Coord plan pg 2 line 33	The text indicates that demolition activities are expected to be complete in July 2004.	Be advised that given the difficulties encountered at the Badger AAP that this date may not be achieved. No text change required.	
Coord plan pg 2 lines 40-41	The text indicates that Shaw will obtain approval, as necessary, on protocols etc. prior to conducting field work.	As a point of caution, please be advised that if additional work or field activities (etc.) are conducted without obtaining prior Ohio EPA approval, that the Agency reserves the right to require that additional work be conducted.	
Coord plan pg 2 lines 41-43	The text references notifying Ohio EPA prior to site mobilization.	In the revised text, please add the timeframe for notification which is generally 14 days. In addition, please revise line 43 to read: "... coordinate an observer or arrange for split sampling."	
Coord plan pg 4 lines 7-8	The text indicates that Shaw will coordinate public involvement activities under the direction and oversight of TolTest.	Please confirm that this is the case.	

Coord plan pg 4 lines 26-30	The text in this section does not correspond with table 2 on page 15 of the project management plan.	Please adjust the apparent discrepancy in the revised document.	
Coord plan pg 5 line 28	The text indicates that the weekly contractor meetings are held in Post 1.	In the revise text, change Post 1 to read Building 1037.	
Coord plan pg 6 line 4	The text indicates that TolTest will generate manifests.	Please confirm that this is the case.	
Coord plan pg 6 lines 26-26	The text in this section indicates that TolTest in Post 1 will be contacted at 330-358-1732 in the event of an emergency. Please confirm that this is correct.	Previously, in the event of an emergency, Post 1 was contacted directly at 330-358-2017.	





State of Ohio Environmental Protection Agency

Southwest District Office

401 E. Fifth Street  
Dayton, Ohio 45402-2911

TELE: 937-285-6357 FAX: 937-285-6249  
www.epa.state.oh.us

Bob Taft, Governor  
Jennette Bradley, Lieutenant Governor  
Christopher Jones, Director

April 13, 2004

Mr. Rick Newsome  
Department of the Army  
Office of the Assistant Secretary of the Army  
Installations and Environment  
110 Army Pentagon  
Washington, DC 20310-0110

Dear Mr. Newsome:

This letter is in response to the Army's March 26, 2004 letter from Mr. Raymond J. Fatz (Deputy Assistant Secretary of the Army) to Senator Mike DeWine regarding the use of Guaranteed Fixed Price Remediation (GFPR) at the Ravenna Army Ammunition Plant (RVAAP). In this letter, the Army makes several statements about regulatory involvement under GFPR contracts and implies that this level of involvement was implemented during the development of the GFPR contract for RVAAP. ~~Load lines 1, 2, 3, and 4.~~ In addition, Ohio EPA has been asked by stakeholders to discuss both Ohio EPA's concerns with GFPR and the contract that was issued at RVAAP. Ohio EPA therefore felt that we should provide our perspective on this issue, both to address stakeholder inquiries and ensure our position about GFPR was accurately portrayed. Our specific comments regarding GFPR implementation at RVAAP follow:

1. Ohio EPA is supportive of the Army's commitment to investigate and clean up RVAAP as quickly as possible so that the site can be reused as a training area for the Ohio Army National Guard. The use of Performance Based Contracting (PBC) is one mechanism by which that goal may be achieved. However, PBC and other streamlining initiatives must be in line with the overall strategy for investigation and cleanup at the installation. Cleaning up sites to standards inconsistent with the proposed reuse to either minimize Army costs or achieve cleanup goals more quickly is not acceptable to Ohio EPA. In addition, as work is accelerated at the site, we must work together to ensure stakeholder concerns (community, Restoration Advisory Board members, and the National Guard Bureau) are not ignored so that schedules are met.
2. The Army's March 26, 2004 letter states that "... the current site characterization of Load Lines 1 - 4 indicates that there is no known contamination under the concrete pads that requires a response." Ohio EPA disagrees with the Army's

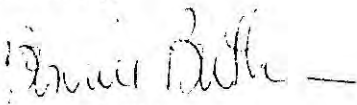


over Army staff who did have time to review available data for these sites. Additionally, the Ohio EPA was not invited to participate in several meetings and conference calls during the early portion of the GFPR process. Then, to ensure interested contractors were provided with Ohio EPA's concerns prior to preparation of their bids, Ohio EPA was asked to review and comment on the three preliminary draft remedial investigation reports for these complex sites within two months. This created a major strain on Ohio EPA resources, since this work was in addition to other activities occurring at the installation as well. Finally, the selected contractor provided a presentation on October 15, 2003 to the Restoration Advisory Board on their proposed remedy for Load lines 1, 2, 3, and 4, which was also the first time the Agency had been briefed on the contractor's proposal. Ohio EPA understands that the PBC contracting initiative is relatively new and the Army is still developing guidance on how to involve the regulatory agencies in this approach. However, since the Army has a goal of 40% of environmental contracts being PBC by the end of FY 2005, and 80% by the end of FY 2007, it would be beneficial if the Army could provide guidance to its staff and the regulatory agencies that better describes this process.

Despite the above obstacles, the Ohio EPA remains committed to ensuring the PBC contract issued for Load Lines 1, 2, 3, and 4 is successful so that an effective interim remedy can be implemented. We also remain committed to continue to work with the Army, the National Guard Bureau, the Ohio Army National Guard, and other interested stakeholders to ensure that contamination at the RVAAP is investigated and, if necessary, cleaned up as quickly and effectively as possible.

If you have any questions concerning this correspondence or wish to discuss this matter further, please contact me at (937) 285-6469.

Sincerely,



Bonnie Buthker  
DSMOA Program Manager  
Office of Federal Facilities Oversight

cc: Chris Jones, Director, Ohio EPA  
Graham Mitchell, Ohio EPA, SWDO, OFFO  
Eileen Mohr, Ohio EPA, NEDO, DERR  
Mark Patterson, RVAAP  
Jo Ann Watson, AEC  
Colonel Tom Tadson, Ohio Army National Guard  
Major Kim O'Keefe, National Guard Bureau





State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

August 6, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
CONSTRUCTION PLANS - **LOAD**  
**LINES 1-4**

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

Dear Mr. Patterson:

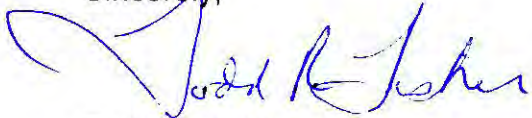
On July 01, 2004, the Ohio Environmental Protection Agency (Ohio EPA) received the following documents: "Draft, Construction Field Plans for the Remediation of Soils at Load Lines 1, 2, 3, and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio" and "Draft, Safety Health and Emergency Response Plan for the Remediation of Soils at Load Lines 1, 2, 3, and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio." These two documents will be designated as the "construction plans" throughout this correspondence. Both of these documents were prepared for the US Army Corps of Engineers (USACE) by Shaw Environmental, Inc..

The construction plans contain a disclaimer that "...some of the information contained in this document has not been given final approval by the Ohio EPA..." More clearly, in numerous telephone conversations and through written communications, the Ohio EPA has indicated that the excavation remedy selected by Shaw may or may not be the appropriate interim remedy for these Areas of Concern (AOCs). Load Lines 1, 2, 3, and 4 are following the CERCLA process, and as such, after the Remedial Investigation (RI) reports are finalized, these AOCs will go through the Feasibility Study (FS) phase where potential remedial options are evaluated based upon prescribed criteria. Additional stages of the CERCLA process allow for Agency and public input into the remedy that is ultimately selected. Given that none of these AOCs have been through the FS process, the position of the Ohio EPA is that it is premature to review the draft construction plans. The construction plans will be reviewed at the appropriate time after the Feasibility Studies (FS) have been finalized and approved. To review and comment on the construction plans prior to having an agreed-upon remedy would be imprudent and would additionally tax the Ohio EPA's already limited resources.



I trust that this correspondence clarifies Ohio EPA's position with respect to the review of the above-referenced documents. If you have any questions concerning 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

TRF:cla

pc: Eileen T. Mohr, Ohio EPA, NEDO, DERR  
Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Glen Beckham, USACE, Louisville  
John Jent, USACE, Louisville  
Dave Brancato, USACE, Louisville  
LTC Tom Tadsen, OHARNG  
Dave Cobb, Shaw  
Mike Fitzgerald, Shaw

ec: Mike Eberle, Ohio EPA NEDO DERR





State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

August 6, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
DATA GAP ANALYSIS AND ADDITIONAL  
SAMPLING WHITE PAPER

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR) has received and reviewed the document entitled: "White Paper Summarizing Data Gap Analysis and Additional Sampling for the Remediation of Soils at Load Lines 1, 2, 3, and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document dated July, 2004 and received at Ohio EPA on July 27, 2004 was prepared for the US Army Corps of Engineers (USACE), Louisville District by Shaw Environmental, Inc, under contract number DACA45-03-D-0026, delivery order 0001.

The Ohio EPA has the following comments on the draft document:

**GENERAL COMMENTS**

1. The additional sampling to define data gaps should be a stand-alone workplan. This document has cross-references to documents which have only recently been received and which have not been reviewed and/or approved, such as the construction plans (received July 1) and the proposed Remedial Goal Options (RGOs)(received July 26). This is not acceptable.
2. The data gap workplan should include not only proposed sample locations, but sampling methodologies, quality assurance/quality control procedures, health and safety plans, etc.. As such, it is not clear why this is in a "white paper" type format, and not a workplan format. In the absence of this information, please ensure that all sampling, investigation-derived waste (IDW) disposal, laboratory analysis, health and safety issues (etc.) follow the approved Ravenna Army Ammunition Plant (RVAAP) installation- wide sampling and analysis plans (SAPs), quality assurance project plans (QAPPs), health and safety plans (HASPs) and associated Area of Concern (AOC) - specific addenda.
3. Remove all references to the excavation of soils in this document. As of this date, there has not been any agreement between the stakeholders on the interim remedy for Load Lines 1, 2, 3, and 4. Please reference separate Ohio EPA correspondence on the draft construction plans dated August 6, 2004.





4. There are numerous references to the National Guard Trainee RGOs (NGTRGOs) in this document. Again, this document was received at Ohio EPA on July 26, 2004 and has not been reviewed by the Ohio EPA (see comment #1 detailed above). Whether the RGOs are approved as currently written, may have an impact on soil sampling locations with respect to both vertical and horizontal extent.
5. In the revised workplan, please provide a map of the various Load Lines with the proposed sampling locations. Additionally, there should be data boxes connected to the points sampled during the Phase II RI nearest to the proposed sample locations that detail the constituents of concern (COCs) and their laboratory reported concentrations. As the white paper is currently formatted, there is too much cross-referencing that needs to be done by the reviewer with the Phase II text, the tables that detail soil sample location and rationale (i.e. that document refusal or field explosives < 1.0 mg/kg), maps with constituents, and the appendices (that contain the data). It is incumbent upon the contractor to provide the needed information to the reviewer in a format which is readily understood and defensible. As such, the Ohio EPA requests that this information be revised and presented in a manner such that the Agency does not have to go on a point by point basis to numerous places in the RI reports to determine whether or not the proposed sampling is adequate.
6. During the Phase II RI, great emphasis was placed on the use of field determination of explosives to define whether or not samples were collected not only for laboratory explosives analysis, but also for metals, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), pesticides and PCBs. Although this approach may have been stated in Load Line specific sampling plans, this is not consistent with how sampling at RVAAP has been conducted in the past (or will be in the future) at other AOCs. As such, it is requested that the samples which are obtained during this additional field effort contain, at a minimum, Method 8330 explosives and target analyte list (TAL) metals. The Ohio EPA does not agree that the samples obtained during this field effort should be analyzed for the minimum number of COCs detailed in Attachment 1.
7. The attachment to the document indicates that additional investigative activities are scheduled for August, 2004. The document was received at the Ohio EPA on July 27, 2004. The Army, USACE and all RVAAP contractors are reminded that the Ohio EPA has 45 days to review documents both under the Defense-State Memorandum of Agreement (DSMOA) and the Orders which were journalized on June 10, 2004. As such, it is not clear how the contractor expected to be in the field during the month of August, 2004. Field work to investigate data gaps should be conducted only after an approved workplan is in place, otherwise the Army, USACE and contractor are proceeding at their own risk.

#### **SPECIFIC COMMENTS**

8. Remove the reference to the Phase I Remedial Investigation (RI) dated 2003 (SAIC) that appears in the introduction. The documents that were prepared in 2003 by SAIC were Phase II RIs.



9. At any place where the NGTRGOs are mentioned, add the word "proposed" before each reference. This comment is applicable to the entire document.
10. In section 2, please substitute "potential data gaps" for "perceived data gaps" in two places.
11. Section 2 indicates that the majority of data gaps that need to be addressed are related to Load Line 4. Attachment 1 does not seem to support this assertion. Please provide an explanation.
12. Section 3 references the use of field screening techniques. The text is correct in stating that, currently, the only field screening technique utilized at the RVAAP is explosives screening. The use of x-ray fluorescence (XRF) for metals determination (both in-situ and ex-situ) has been tested at RVAAP and has not been demonstrated to be a viable field screening technique. The USACE prepared a report a couple years ago that basically concluded that the use of XRF at RVAAP was not a viable option. The use of this field technique requires further discussion.
13. In section 3, the Ohio EPA does not agree with the approach that "samples will be analyzed in the field and laboratory for only those compounds that exceed the NGTRGO in the RI sample." First, the NGTRGOs are proposed and will most likely not be finalized and approved prior to this additional sampling effort. Second, please cross reference Ohio EPA comment #6 detailed above regarding the analytical suite. (This comment is applicable to both the text in this section and Table 3.)
14. In section 3, please substitute the facility-wide workplans and related addenda for the SAP and QAPP (Shaw, 2004). As stated in Ohio EPA's correspondence dated August 6, 2004, the construction plans will not be reviewed until the remedy has been selected in accordance with the CERCLA process.
15. Section 4 regarding disposal characterization seems to be referring to excavation/stockpile sampling and not IDW characterization from this proposed field event to further define the extent of contamination. As such, this section is not applicable to the document, and the contractor is directed to the approved installation-wide workplans and the Load Line specific Phase II RI addenda for details on handling IDW.
16. In section 5, please add the facility-wide workplans and Load Line specific addenda to the reference list.
17. With respect to Attachment #1 - please cross reference comments # 4, 5, 6, 7, 8, 11, and 12, as they have a direct bearing on the proposed sampling locations that are detailed. As such, this attachment will be reviewed when the revised document is received.

If you have any questions concerning 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

TRF:cla

pc: Eileen T. Mohr, Ohio EPA, NEDO, DERR  
Bonnie Buthker, Ohio EPA, NEDO, DERR  
Glen Beckham, USACE, Louisville  
John Jent, USACE, Louisville  
LTC Tom Tadsen, OHARNG  
Dave Cobb, Shaw

ec: Mike Eberle, Ohio EPA, NEDO, DERR





State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

September 9, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
DRAFT PROPOSED REMEDIAL GOAL  
OPTIONS FOR SOIL AT **LOAD LINES 1, 2,  
3, AND 4, PORTAGE & TRUMBULL CO.**

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

Dear Mr. Patterson:

On July 26, 2004, the Ohio Environmental Protection Agency (Ohio EPA) received and reviewed the following document: "Draft, Proposed Remedial Goal Options for Soil at Load Lines 1, 2, 3, and 4, July 2004." The document was prepared by SAIC and Shaw Environmental for the U.S. Army Corps of Engineers, Louisville District, under Contract No. DACA-45-03-D-0026 and Delivery Order No. 0001.

Ohio EPA has generated no comments on this document and considers it to be a final document.

If you have any questions regarding this response, 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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

cc: Dave Cobb, Shaw Environmental  
Eileen Mohr, Ohio EPA, DERR, NEDO  
Laurie Moore, Ohio EPA, OFFO, SWDO  
Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Brian Tucker, Ohio EPA, DERR, CO  
John Jent, USACE, Louisville  
Glen Beckham, USACE, Louisville  
Dave Brancato, USACE, Louisville  
LTC Tom Tadsen, OHANG, RTLS

ec: Mike Eberle, Ohio EPA, DERR, NEDO





State of Ohio Environmental Protection Agency

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2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

~~October 21, 2004~~

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE AND TRUMBULL COUNTIES  
DATA GAP SAMPLING FOR PBC AT  
~~LOAD LINES 1-4~~

Mr. Mark Patterson  
Environmental Program Manager  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, Ohio 44266

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the following documents:

1. Draft, Sampling and Analysis Plan for the Data Gap Analysis and Additional Sampling in support of the Remediation of Soils at Load Lines 1, 2, 3, and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio; and
2. Draft, Security, Emergency Response, and Contingency Plan for the Remediation of Soils at Load Lines 1, 2, 3, and 4 at the Ravenna Army Ammunition Plant.

These documents, dated October 2004 and received at Ohio EPA, NEDO, on October 12, 2004, were prepared for the U.S. Army Corps of Engineers (USACE), Louisville District, by Shaw Environmental, Inc.

Enclosed with this cover letter, please find Ohio EPA, NEDO, DERR, comments on the above-referenced documents.

If you have any questions, please do not hesitate to contact me at (330) 963-1221.

Sincerely,

Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

enclosure

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Laurie Moore, Ohio EPA, SWDO, OFFO  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville

JoAnn Watson, AEC  
LTC Tom Tadsen  
Dave Cobb, Shaw  
Kelly McQueeney, Shaw







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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

November 1, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
FINAL DATA GAP SAP AND HASP

FOR LL1-4

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the following documents:

1. Final, Sampling and Analysis Plan for the Data Gap Analysis and Additional Sampling in support of the Remediation of Soils at Load Lines 1, 2, 3, and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio; and
2. Final, Security, Emergency Response, and Contingency Plan AND Safety, Health and Emergency Response Plan for the Remediation of Soils at Load Lines 1, 2, 3, and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio.

These documents, dated October 2004 and received at Ohio EPA, NEDO, DERR on October 29, 2004, were prepared by Shaw Environmental, Inc. for the U.S. Army Corps of Engineers (USACE) - Louisville District, under contract number DACA45-03-D-0026, task order number 0001.

The above-referenced documents were compared to the draft documents (dated October 2004); Ohio EPA comments, dated October 21, 2004; and agreements reached during a comment resolution conference call on October 28, 2004. All Ohio EPA comments were addressed, with the exception of: # 16, # 21 (page 4, lines 29 and 30), # 26, and # 45 (calls should go through Post 1); however, none of these comments would impact upon the proposed work. As such, the documents are approved, and work may commence, as scheduled on November 01, 2004 (UXO survey, clearing, and mobilization) and November 08, 2004 (soil sampling).



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
NOVEMBER 1, 2004  
PAGE 2

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Laurie Moore, Ohio EPA, SWDO, OFFO  
Jo Ann Watson, AEC  
LTC Tom Tadsen, RTLS  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville  
Dave Cobb, Shaw  
Kelly McQueeney, Shaw

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR





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Northeast District Office

2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

January 14, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
~~LOAD LINES 2, 3, 4 PRE~~ PRELIMINARY  
DRAFT REPORTS - RISK COMMENTS

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Southwest District Office (SWDO), Office of Federal Facilities Oversight (OFFO), has received and reviewed the following two volume documents:

- a. "Preliminary-Draft, Phase II Remedial Investigation Report for the Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio."
- b. "Preliminary-Draft, Phase II Remedial Investigation Report for the Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio."
- c. "Preliminary-Draft, Phase II Remedial Investigation Report for the Load Line 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio."

These documents, dated May 2003 and received by Ohio EPA on May 02, 2003, were prepared for the U.S. Army Corps of Engineers (USACE) - Louisville District by Science Applications International Corporation (SAIC), under contract number F44650-99-D-007, delivery order number CY01.

The enclosed comments solely represent the review of the above-referenced documents by Ohio EPA risk assessment personnel and are focused on the human health risk assessment. Any potential issues regarding ecological risk assessment will be identified more clearly during the draft report stage. Comments from Ohio EPA's Division of Emergency and Remedial Response (DERR) and Division of Drinking and Ground Waters (DDAGW) were previously sent to your attention on June 30, 2003. This set of comments completes Ohio EPA's review of the three preliminary-draft Remedial Investigation (RI) reports.



Mr. Mark Patterson  
January 14, 2004  
Page 2

If you have any questions concerning this correspondence, please do not hesitate to contact me at 330-963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

enclosure

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Laurie Moore, Ohio EPA, SWDO, OFFO  
Brian Tucker, Ohio EPA, DERR, CO  
LTC Tadsen, RVAAP  
JoAnn Watson, AEC  
Glen Beckham, USACE Louisville  
Paul Zorko, USACE Louisville  
John Jent, USACE Louisville  
David Brancato, USACE Louisville  
Kevin Jago, SAIC  
Dave Cobb, Shaw





State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

April 21, 2004

RE: RAVENNA ARMY AMMUNITION PLANT,  
PORTAGE/TRUMBULL COUNTIES,  
REVISED PROJECT MANAGEMENT  
PLAN - ~~FPRI~~ FOR LOAD LINES 2, 3, 4

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document: "Project Management Plan, Remediation of Soils at Load Lines 1 - 4, Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated April 2004 and received at Ohio EPA's Northeast District Office (NEDO) on April 16, 2004, was prepared for the U.S. Army Corps of Engineers, Louisville District, by Shaw Environmental and Infrastructure (Shaw), under contract number DACA45-03-D-0026.

The above-referenced document was reviewed compared to the draft document, dated February 2004, and Ohio EPA comments, dated March 04, 2004, on the draft document.

Ohio EPA has the following comments on the revised Project Management Plan (PMP). These comments can be incorporated into the next iteration of the PMP, as it is a living document that is to be periodically updated.

1. Prior to the issuance of the next version of the PMP, please provide written responses to Ohio EPA comments, much like what was done with the Load Line 2, 3, and 4 comments.
2. In the next version of the PMP, please number the lines in the text.
3. Page iv, change the definition of the acronym TCLP to read: Toxic Characteristic Leaching Procedure.
4. Section 3.1 (page 3), please change the language in the revised PMP to read: "Additional work associated with the remaining building slabs and underground utilities required to bring these areas into compliance with the requirements of specified land use will be addressed by others under a separate contract."



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
APRIL 21, 2004  
PAGE 2

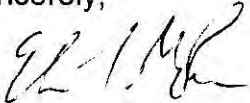
5. Section 3.1, page 4, 3<sup>rd</sup> bullet: Revise text to read as follows - "If necessary, perform supplemental site investigation activities within Load Lines 1 - 4 as determined by the RVAAP environmental team to further evaluate COC nature and extent."
6. Section 3.1, page 4, 8<sup>th</sup> bullet: The number of iterations regarding the Decision Documents (DDs) do not agree with Table 1 on page 7. Additionally, the text on page 10 (section 4.2) agrees with the text on page 4, but not table 1. Please adjust the discrepancies between the text and table.
7. Section 3.2, page 6, second paragraph: I inadvertently gave you the wrong language during the last comment cycle. Please adjust the text to read: "Stockpiled materials designated for off-site disposal will be disposed of in accordance with all applicable Federal, State, and local rules, laws, and regulations."
8. Section 4.1, page 9: In the second paragraph, remove the first sentence that indicates that review times are based upon prioritization of submitted documents as determined by USACE and RVAAP personnel. This is not correct.
9. Section 4.3, page 11: Please remove the last sentence of the second paragraph, which indicates that Ohio EPA's priorities are determined by USACE and RVAAP.
10. Section 4.3, page 12 (soil volume section): The new text discusses the use of XRF at the RVAAP. Please be advised that Ohio EPA has serious reservations about the use of XRF for any investigatory work, based upon conclusions drawn from previous use at the installation. Whether or not, or how, XRF is utilized requires additional discussion by the environmental project team. This comment is also applicable to section 7 on page 27.
11. Section 4.3, page 12 (results of additional investigation section): Please revise the text to indicate that the RVAAP environmental project team will "evaluate the validity of perceived data gaps." This is not a decision that is made solely by Shaw.
12. Table 3, page 18: Please add an "x" to the following activities (Ohio EPA column): IRA LL1-4 Exc/Stockpile/Disp/Sample; IRA LL1-4 Exc Backfill/Seed; and IRA LL 1,2,3,4 Sealing Slabs.
13. Table 4, page 20: Please change the P.O. Box number for Brian Tucker to read 1049.
14. Section 7.3, page 28: Please change (second line) RVAPP to RVAAP.
15. Appendix A, Project Schedule, is not showing that preliminary-drafts are sent to Ohio EPA. Please revise the schedule to indicate that Ohio EPA receives the preliminary-drafts and that these follow the 45 day review cycle.



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
APRIL 21, 2004  
PAGE 3

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
LTC Tom Tadsen, OHARNG  
MAJ Kim O'Keefe, NGB  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville  
Dave Cobb, Shaw  
Mike Fitzgerald, Shaw

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR



State of Ohio Environmental Protection Agency

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

~~June 1, 2004~~

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
DRAFT LOAD LINES ~~6, 9, AND 11~~  
HHRA WHITE PAPER

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the document entitled: "White Paper Human Health Risk Assessment Approach for Load Lines 6, 9, and 11 Remedial Investigations, Ravenna Army Ammunition Plant, Ravenna, Ohio, Rev. 0." This document, dated April 20, 2004 and received at Ohio EPA on April 21<sup>st</sup>, was jointly prepared by MKM Engineers and Tetra Tech Nus, Inc. The following comments were generated from the review of the above-referenced document:

**COMMENTS**

- Comment # 1: General Comment/Introduction: The white paper was clearly written and thoroughly illustrated how the FWHHRAM will be applied at these AOCs. The author did a good job pointing out where there are deviations from the risk manual and explaining why these deviations are recommended.
- Comment # 2: Section 2.0, Data Evaluation, Line 27: The proposed surrogates for 1,2-dichloroethene (total) and endosulfan II are acceptable. Ohio EPA recommends using the Region 9 PRG for benzo(a)pyrene as the surrogate for phenanthrene and benzo(g,h,i)perylene. This approach is consistent with past practices.
- Comment # 3: Section 3.0, Potentially Exposed Populations, Exposure Media, and Exposure Pathways, Page 4, Line 22; and Page 6, Lines 10-18: Ohio EPA agrees that the hypothetical future land use scenario should include the hypothetical future resident and the national guard trainer/resident. This information is indeed very helpful to risk managers and remedial decision makers and allows for a comprehensive evaluation of the potential need for land use controls, remedial alternatives, and risk management options by decision makers. Inclusion of this receptor allows the risk managers to determine if unrestricted use is a potential option at some sites and, also, allows managers to evaluate the need for minimal land use controls and long term monitoring and stewardship activities. It





also reduces the need to "reevaluate the risk assessment" in the future, if the Ohio National Guard increases use of the sites to an exposure greater than what is currently considered in the FWHHRAM.

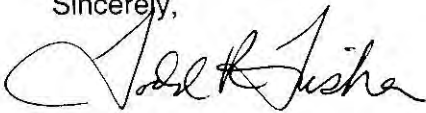
- Comment # 4: Section 3.0, Potentially Exposed Populations, Exposure Media, and Exposure Pathways, Page 5, Line 23-24: How often was TCE detected in surface water samples at LL11?
- Comment # 5: Section 3.0, Potentially Exposed Populations, Exposure Media, and Exposure Pathways, Page 6, Lines 118-20: Ohio EPA agrees that the future land use scenario should include the national guard trainer/resident receptor. This receptor was originally presented in the LL 1-4 HHRA. Ohio EPA recommends that this receptor be presented in the main text of the report, along with the other receptors evaluated per this white paper. Therefore, the inclusion of this receptor does not have to be limited to the uncertainty section.
- Comment # 6: Section 3.0, Inhalation Rate for National Guard Trainee, Page 7, Lines 18-23: Ohio EPA recommends using the inhalation rate that is listed in the FWHHRAM for this receptor. The assumptions in the FWHHRAM were developed by Ohio EPA and USACE, to be site-specific and protective of current and future exposures. This value was partly based on the Voluntary Action Program (VAP) standard default assumptions for a construction worker.
- Comment # 7: Section 3.0, Exposure Time for National Guard Trainee Exposed to Surface Water, Page 7, Lines 31-34: While it seems reasonable that the national guard trainee would not be sleeping in surface water and, thus, it's reasonable to assume that this receptor's surface water exposure time is less than 24 hours/day. However, please provide the basis or justification for recommending a two hour/day exposure time, since this rationale is not presented.
- Comment # 8: Section 3.0, Exposure Time for National Guard Trainee Exposed to Surface Water, Page 7, Lines 31-34: While it seems reasonable that the national guard trainee would not be sleeping in surface water and, thus, it's reasonable to assume that this receptor's surface water exposure time is less than 24 hours/day. However, please provide the basis or justification for recommending a two hour/day exposure time, since this rationale is not presented.
- Comment # 9: Section 3.0, Exposure Time for National Guard Trainee Exposed to Surface Water, Page 7, Lines 31-34: While it seems reasonable that the national guard trainee would not be sleeping in surface

MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
JUNE 1, 2004  
PAGE 3

water and, thus, it's reasonable to assume that this receptor's surface water exposure time is less than 24 hours/day. However, please provide the basis or justification for recommending a two hour/day exposure time, since this rationale is not presented.

If you have any questions regarding these comments, 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](mailto:Todd.Fisher@epa.state.oh.us)

TRF/kss

cc: Eileen Mohr, Ohio EPA, DERR, NEDO  
Laurie Moore, Ohio EPA, OFFO, SWDO  
Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Brian Tucker, Ohio EPA, DERR, CO  
Richard Callahan, MKM, RVAAP  
Stan Levenger, MKM, RVAAP  
Brian Stockwell, MKM, RVAAP  
Glen Beckham, USACE, Louisville  
John Jent, USACE, Louisville  
David Brancato, USACE, Louisville

ec: Mike Eberle, Ohio EPA, DERR, NEDO





State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

April 27, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
ARCHIVE SEARCH REPORT (ASR)

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document entitled: "Defense Environmental Restoration Program, Ordnance and Explosives, Archives Search Report for the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated March 2004 and received at Ohio EPA on April 23, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) Louisville District by the USACE Rock Island District.

Comments on the document from Ohio EPA, NEDO, DERR, are provided in the enclosed table. Please provide responses to the enclosed comments at your earliest convenience, and advise Ohio EPA as to when a revised report might be expected. Overall, the report was well written and provided some much needed and interesting historical information.

If you have any questions or concerns regarding the comment table, please do not hesitate to contact me at (330) 963-1221.

Sincerely,

Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

enclosure

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
John Jent, USACE Louisville  
JoAnn Watson, AEC

Glen Beckham, USACE Louisville  
LTC Tom Tadsen, OHARNG

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR





State of Ohio Environmental Protection Agency

Northeast District Office

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

June 24, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
ARCHIVE SEARCH REPORT (ASR)  
REVISION 1

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document entitled: "Defense Environmental Restoration Program, Ordnance and Explosives, Archives Search Report for the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated June 2004 and received at Ohio EPA on June 14, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) Louisville District by the USACE Rock Island District.

This revision was compared to the draft report, dated March 2004; Ohio EPA's comment letter on the draft report, dated April 27, 2004; and the comment response table (CRT) provided in the revised document.

The Agency has the following comments on the revision:

1. On Table 3-1, the "current usage" column was revised to indicate that the majority of the listed areas of concern (AOCs) are in "remediation." This is not correct. The correct usage/status of each AOC should be specified.
2. On page 23, the text was revised to indicate that: "All of the approximately 2,500 rounds fired on this range have been accounted for (reference B-70)." The text on page 37 m(1) states: "Supporting a finding of potential ordnance presence are the facts that there is no documentation of the range being swept when it was closed, and the RDX pellets contained in the M407A1 projectile are often overlooked in a surface sweep." Please rectify the apparent discrepancy. Additionally, if only a surface sweep was conducted, what is the potential for there to be subsurface ordnance?
3. On page 37(j), please confirm that the soil samples obtained during the Phase 1 Remedial Investigation (RI) did not have any analyses for explosives.
4. On page 37(m), please provide an explanation for the text change which removed the reference to the 1969 Explosive Ordnance Demolition (EOD) action at the suspected Mustard Agent AOC. Revise the language in this revision to reflect the verbiage utilized in the draft report.





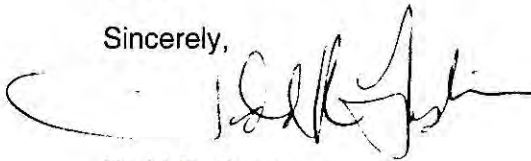
MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
JUNE 24, 2004  
PAGE 2

5. Appendix M indicates that Ohio EPA received three copies of the draft ASR. This is not correct, as the Agency was supplied one copy by the USACE Louisville. Please revise.
6. With respect to Ohio EPA comment # 24 of the draft report (leaking magazines reported 20 October 1950), although no text change is required, this is an issue that needs to be discussed/addressed by the Ravenna Army Ammunition Plant (RVAAP) environmental team.

Ohio EPA would be agreeable to receiving replacement pages which rectify the above-referenced comments, rather than re-printing the entire submission. Please advise the Agency as to when the replacement pages may be received. Additionally, please supply Ohio EPA with one additional copy of the final version (this revision plus replacement pages) when it is available.

If you have any questions concerning 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

TRF/kss

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Eileen Mohr, Ohio EPA, NEDO, DERR  
John Jent, USACE Louisville  
Glen Beckham, USACE Louisville  
LTC Tom Tadsen, OHARNG  
JoAnn Watson, AEC

ec: Mike Eberle, Ohio EPA, NEDO, DERR



DEFENSE LOGISTICS AGENCY  
DEFENSE NATIONAL STOCKPILE CENTER  
8725 JOHN J. KINGMAN ROAD, SUITE 3229  
FT. BELVOIR, VIRGINIA 22060-6223

IN REPLY  
REFER TO

DNSC-E

28 15 2004

Mark Paterson  
Ravenna Facility manager  
Ravenna Army Ammunition Plant  
8451 State Route 5, Bldg.1037  
Ravenna, OH 44266-9297

Dear Mr. Patterson:

The Defense National Stockpile Center (DNSC) has stored stockpile materials at your Ravenna, OH site for nearly fifty years, specifically, ~~chromite ore and manganese ore~~. As you and I have discussed on several occasions, the DNSC is very interested in assisting Ravenna in its dealings with the Environmental Protection Agency (EPA) and the Ohio Department of Environmental Protection (OHEPA) as it relates to our past storage of naturally occurring manganese and chromite ore. As we discussed, the DNSC does not feel the residual ore that remains after out-loading the ore poses an environmental problem.

Attached for your review are several pieces of correspondence that confirm this conclusion that naturally occurring manganese and chromite ore can be safely left in place or used for other beneficial purposes and not present a problem. For example, one of the letters enclosed documents the fact that Pennsylvania Department of Environmental Protection has allowed the manganese and chromite ore to be used as beneficial fill material at a Bethlehem, PA site. Also attached are two other letters from regulators from Arkansas Department of Environmental Quality (ADEQ) and from the Nevada Department of Environmental Protection (NDEP) and the Clark County Department of Air Quality Management to allow the same type of beneficial use of these ores. At the Nevada site, the Bureau of Reclamation (BOR) is using our manganese ore as a "dust palliative", with the concurrence of the NDEP. You already have our data on the leach ability of this material, noting the material does not leach hazardous constituents into the environment. The only possible available pathway for a problem is through inhalation of a "vast" amount of residual ore of extremely fine particles



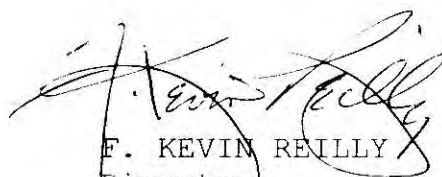


sizes to pose a risk to human health and/or the environment.

Again, I repeat these are naturally occurring ores/minerals that have been in storage for nearly fifty years and have not posed an environmental problem to date. Currently, we are removing the vast majority of ore through our sales program and now it is perceived that the residual ores left behind poses an environmental problem? Just because concentrations of total manganese and chromium may be higher than background levels in the footprint of these former ore storage location does not make it an environmental problem and due to the non availability of these metals to environmental receptors, these ores pose no real concern.

Please review the attached documents and let's continue our discussions on this issue. You can reach me at  
703-767-6522.

Sincerely,

A handwritten signature in black ink, appearing to read "F. Kevin Reilly", is written over a circular stamp or seal.

F. KEVIN REILLY  
Director,

Directorate of Environmental  
Management Division

Enclosures

EXECUTIVE OFFICE OF THE PRESIDENT  
Office of Emergency Preparedness

Prepared and Issued by the Industrial Resources Division  
Bureau of Domestic Commerce  
Department of Commerce

NATIONAL STOCKPILE  
PURCHASE SPECIFICATIONS

MANGANESE - METALLURGICAL  
(ORE, NODULES, AND SINTER)

P-30-R2  
Effective Date  
August 31, 1971  
(Supersedes issue  
of March 14, 1958)

I. DESCRIPTION

These Specifications cover manganese ore, nodules, and sinter suitable for use in the manufacture of commercial grades of ferromanganese and special manganese alloys, and for the production of chemicals which do not require ore of high manganese dioxide content.

II. CHEMICAL AND PHYSICAL REQUIREMENTS

A. Chemical Requirements:

Each lot of metallurgical manganese ore, nodules, and sinter purchased under these Specifications shall conform to the following applicable chemical requirements:

			Percent by Weight (Dry Basis)			
			Grade A	Grade B	Grade C	Grade D
Manganese	(Mn)	Min	48.00	48.00	46.00	44.00
Iron	(Fe)	Max	4.00	5.00	7.00	9.00
Alumina	(Al <sub>2</sub> O <sub>3</sub> )	Max	6.00	7.00	7.00	8.00
Alumina-plus-Silica	(Al <sub>2</sub> O <sub>3</sub> +SiO <sub>2</sub> )	Max	9.00	11.00	12.00	15.00
Phosphorus	(P)	Max	0.05	0.10	0.15	0.20
Arsenic	(As)	Max	0.05	0.08	0.20	0.35
Copper-plus-Lead-plus-Tin	(Cu+Pb+Sn)	Max	0.20	0.30	0.30	0.30
Chromium	(Cr)	Max	0.30	0.30	0.30	0.30

The chemical analysis methods shall be in accordance with applicable A.S.T.M. Designations or other methods mutually agreed upon, for example:

Manganese in manganese ore by the Pyrophosphate (Potentiometric) Method: A.S.T.M. Designation E-248-64T.

Iron in manganese ore: A.S.T.M. Designation E-316-67T.

Silica in iron ores and manganese ore: A.S.T.M. Designation E-247-67T, (in 1968 edition).





State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

March 29, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
**MONAZITE PHASE 4** REVISED FINAL  
STATUS SURVEY PLAN

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR); and the Ohio Department of Health (ODH), have received and reviewed the document entitled: "Revised Final Status Survey Plan, Ravenna Army Ammunition Plant, Former West Tank Farm Area, **Monazite Sand Removal Project**, Phase IV." This document, dated March 11, 2004 and received at Ohio EPA, NEDO, DERR, on March 15, 2004, was prepared by New World Technology (NWT) under project number USA-00-005.

The Agencies have the following comments on the document:

1. Section 4.1 indicates that composite water samples will be obtained and analyzed for Th-232. Is there the potential for any other constituents of concern (COCs) to be present in the impounded water? Explain and justify. The analytical suite may need to be expanded. (Pages 8 and 10)
2. Section 4.1 - Additional details are required as to the composite sampling proposal. For example (not all inclusive), how many composite samples will be obtained, how many sub-samples will comprise each sample, how will the samples be composited, etc. (Page 8)
3. Section 4.2 - On the top of page 9, please add ODH to the list of regulatory agencies from which regulatory approval (not concurrence) is required.
4. In Section 4.2 (technical approach), only two options were evaluated, i.e., surface pumping the standing water, or draining the standing water. A third alternative of pumping and containerizing the standing water into poly tanks or frac tanks, followed by obtaining a composite sample for characterization, should also be evaluated.
5. Section 4.2 - Assuming that the analytical results indicate that the water is acceptable for discharge within the area of concern (AOC), it can only be done with prior approval from Ohio EPA. The water cannot be discharged into drainage ditches, creeks, or any other surface waters of the State. The water must be discharged, at a metered rate, to prevent

Mr. Mark Patterson  
Ravenna Army Ammunition Plant  
March 29, 2004  
Page 2

ponding and run-off. Discharge must be into a grassy, uncontaminated area. A spreader bar is recommended to prevent channeling. The end of the hose/discharge device should contain a filter to trap any potential sediments. These are standard practices adhered to by other contractors at RVAAP.

6. Please provide a map that delineates the Class 2 perimeter area/75% coverage area.
7. This document, as currently written, does not address any potential groundwater contamination issues. This is an outstanding issue that Ohio EPA has raised several times and which requires discussion and resolution.

Although the Agencies do not have regulatory authority over health and safety plans (HASPs), the following comments are offered for your consideration:

8. Page 8 - In the project name box, please change "III" to "IV." (Also applicable to page 60 - change Phase 3 to Phase 4.)
9. Page 18 (Section 3.2.4) - Change the text to read: "...and all local, state and federal rules, laws, and regulations." (Also applicable to page 52, Section 11.3.6)
10. Pages 25 - 26 (Biological Hazards - Section 4.4) - Add in discussions of stinging insects, the West Nile Virus and Histoplasmosis.
11. Page 31 (Section 5.1) - Is it NWT policy that employees cannot wear contacts with a respirator? OSHA has relaxed the "no contact" rule.
12. Page 40 (Section 7.5) - The text indicates that "aqueous cleaning/rinse solutions can be returned to the site." The intent of this verbiage is unclear. Used decon solutions are containerized and characterized prior to proper disposal.
13. Page 42 (Section 8.3) - Please complete the sentence that starts out "Limits are stated in."
14. Page 42 (Section 8.5) - The text indicates that after personal monitoring results are received, if the employee's exposure exceeds the PEL that the notification "...must state that the PEL was exceeded, and must provide a description of the corrective action taken to reduce exposure to a level below the PEL." It is unclear as to how corrective action can be taken after the fact. Please provide clarification.
15. Page 52 (Section 11.4) - Change "medial" to "medical" in the first sentence.
16. Page 65 (table 2) - Define N/A in the revision.
17. Page 66 (table 3) - Add in the maintenance schedules for the Ludlum Model 3, Ludlum Model 19, Ludlum Model 2200, and Model H-9400 Hi-Vol Air Sampler.

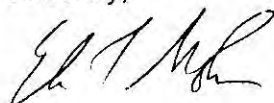


Mr. Mark Patterson  
Ravenna Army Ammunition Plant  
March 29, 2004  
Page 3

18. Page 75 - In the hazard task analysis for construction/heavy equipment, there are several unfinished sentences. Please revise.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Joe Crombie, ODH  
Irv Venger, RVAAP  
LTC Tadsen, RVAAP  
JoAnn Watson, AEC  
Dan Spicuzza, NWT

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR



State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

April 19, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
MONAZITE PHASE 4, REVISION 5

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


Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the documents entitled: "Revised Final Status Survey Plan, Ravenna Army Ammunition Plant, Former West Tank Farm Area, Monazite Sand Removal Project, Phase IV" and "Project Health and Safety Plan, Monazite Sand Removal Phase IV, Ravenna Army Ammunition Plant, Ravenna, OH." These documents, dated April 09, 2004 and received at Ohio EPA on April 14, 2004, were prepared by New World Technology (NWT) for the U.S. Operations Support Command (OSC), under project number USA 2000-005.

These documents were reviewed compared to revision 4, dated March 11, 2004, and Ohio EPA comments, dated March 29, 2004. The documents were revised in accordance with Ohio EPA comments and are considered final.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,

  
- ETC -

Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Irv Venger, RVAAP  
JoAnn Watson, AEC

Joe Crombie, ODH  
LTC Tadsen, RVAAP  
Dan Spicuzza, NWT

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR







State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

December 08, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
DRAFT FINAL MONAZITE PHASE IV  
REPORT

Mr. Irv Venger  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, OH 44266

Dear Mr. Venger:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR) has received and reviewed the document entitled: "Draft Final Report, Ravenna Army Ammunition Plant, Former West Tank Farm Area, Monazite Sand Removal Project, Phase IV." This report (project number USA 00-005), dated October 26, 2004 and received at Ohio EPA, NEDO, DERR on November 26, 2004, was prepared by New World Technology (NWT) for the U.S. Army Field Support Command (AFSC).

Ohio EPA has the following comments on the document:

*send note to  
Derr*

1. On December 01, 2004, an email was sent to your attention inquiring as to whether or not Mr. Joe Crombie of the Ohio Department of Health (ODH) had received a copy of this report. As of this date, a response has not been received. Please confirm whether or not a hard copy of the report was sent to Mr. Crombie's attention. Again, the ODH is the lead regulatory agency for Ohio on this project.
2. As previously mentioned, the issue of potential groundwater contamination has not been addressed and resolved. (Page 6, Section 2.0)
3. Please clarify why no confirmation samples were collected in the area where it was suspected that the cardboard drums were buried. (Page 8, third paragraph, Section 3.0)
4. Please clarify whether or not the correct text is found under header 5.2.2 (equipment and tools) on pages 13 - 14.
5. On Figure 2, there appears to be two survey units # 2. Please clarify.
6. On Figure 3 (page 19), please use different colors to differentiate the class 1 from the class 2 grids.



MR. IRV VENGER  
RAVENNA ARMY AMMUNITION PLANT  
DECEMBER 08, 2004  
PAGE 2

7. On Figures 4 - 7, please use different colors to denote the areas requiring remediation. The selected symbols blend too much together. Also, the meaning of the small round dot should be explained.
8. On Figures 8 - 11, please use different colors to denote the symbols marking the sample location points, the random start points, and the remediation control sample points. Also, please provide information as to how the sample locations were selected and add a footnote to the figure.
9. The text on page 28 (Section 5.7.2) indicates that the analytical result for sample SU3-RCS-7 was above the DCGL. Provide additional information as to what potential impact this has on the remediation.
10. On Figure 12, please use different colors to denote the random start point and the sample locations.
11. Was page 39 intentionally left blank?
12. On Figures 13 - 17, please use different colors to denote the random start points and the sample locations.
13. On page 47 (figure 18), please clarify what is meant by "Series 1."
14. On pages 48 (figure 19) and 52 (figure 23), please clarify what is meant by "#95337."
15. On pages 49 (figure 20), 50 (figure 21), and 51 (figure 22), please clarify what is meant by "# 134743."
16. Section 7.4 (data management) is missing from the report. Please provide this section in the revised text.
17. Section 8.0 (conclusions) is missing from the report. Please provide this section in the revised text.
18. In Appendix G, numerous problems are noted:
  - a. There are several chain of custody (COC) forms that are missing pages;
  - b. There are numerous instances where the proper protocol for making changes was not followed (specifically, one line strike-out with initials);
  - c. Several sample receipt forms indicate that lids were missing from sample jars or cracked, that mud was present on the outside of the containers, that it was



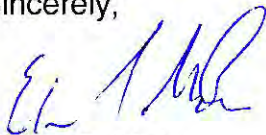
MR. IRV VENGER  
RAVENNA ARMY AMMUNITION PLANT  
DECEMBER 08, 2004  
PAGE 3

difficult to determine whether or not there was any cross-contamination from samples, etc. The case narratives then go on to declare that "no problems were encountered with the client samples." It is unclear as to how this declaration could have been made. Additionally, it is unclear as to whether or not this had any impact upon the project.

This entire appendix needs to undergo a thorough review and revision. Most especially, item 18c needs to be explained in detail, and the lab's conclusion that the data wasn't impacted, thoroughly justified.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
Joe Crombie, ODH  
Mark Patterson, RVAAP  
JoAnn Watson, AEC  
John Jent, USACE Louisville  
LTC Tom Tadsen, OHARNG, RTLS  
Dan Spicuzza, NWT

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR



State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

February 24, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
PRIORITIZATION OF PROJECTS

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA) has, on numerous occasions, expressed concern regarding the apparent shifting of investigation and cleanup priorities at the Ravenna Army Ammunition Plant (RVAAP). Concerns regarding shifting priorities have been raised not only at Area of Concern (AOC) specific meetings and master schedule conference calls, but at previous Installation Action Plan (IAP) meetings as well. For example, most recently, the Agency learned that the Army now views Load Line 11 as a priority project, although the reason for this change was not made clear. As preparations begin for this year's IAP meeting scheduled for March 9 - 10, 2004, the Agency would like to present/reiterate to both the RVAAP and the Army Environmental Center (AEC) what we think should be the top three priority projects at the installation.

There are two main reasons why Ohio EPA feels that we should establish priorities at the March IAP meeting. The first reason is the pending finalization of the Findings and Orders between the Army and Ohio EPA for the RVAAP. According to Paragraph 19, Section IX, Funding and Schedule, at the conclusion of the IAP workshop, the Army and Ohio EPA will establish milestones and target dates for work under the Orders. Since we feel that the amount of work proposed to occur may be more than can be realistically accomplished in the next year, Ohio EPA feels that we should establish milestones based on priorities jointly agreed to by both the Army and Ohio EPA. The second reason concerns Ohio EPA's limited resources at RVAAP. We feel that it is in the best interest of both our agencies to ensure that our limited resources are first allocated to projects that are priorities for both Ohio EPA and the Army at RVAAP. Even if there was an abundance of resources available to do the work, it does not make sense to have competing, conflicting, or unclear priorities.

Ohio EPA has clearly indicated that any of the projects that would turn over land to the OHARNG for training purposes more quickly would be our top priority. Additionally, the Agency would try and prioritize projects for which funding has already been allocated. Given this, Ohio EPA's top priorities for RVAAP are as follows:

1. **Winklepeck Burning Grounds** - this includes all the necessary regulatory requirements (ex. Feasibility Studies, Proposed Plans, Record of Decision, Remedial





Mr. Mark Patterson  
Ravenna Army Ammunition Plant  
February 25, 2004  
Page 2

Design/Remedial Action, public meetings, etc.), as well as range complex documents and designs that will be submitted by the OHARNG. This is the top priority, given that not only has funding been allocated for unexploded ordnance (UXO) surveillance and removal, but funding has also been obtained for the design of the range complex.

2. **Load Lines 1, 2, 3, and 4** - the removal of the concrete slabs and investigation and remediation of any potential contamination under the slabs, and the investigation and remediation (if necessary) of the underground utilities. Ohio EPA is aware that currently there are no funds for slab removal and utility investigation, but the Agency believes that obtaining the necessary funds should be a top priority for the Army and AEC. The OHARNG has clearly indicated the condition that these four AOCs need to be in, such that they can be used for mounted training - no digging.
3. **Building 1200** - this AOC is located in the area where there is a proposal to construct a national training academy for first responders. Given the interest of numerous state and local agencies, the current partnering that exists between governmental, military, private, and educational sectors, as well as the potential for obtaining funding under Homeland Security, the investigation and cleanup of this AOC should be prioritized.

Ohio EPA would be more than willing to discuss the priorities listed above during the IAP to be held in March. In the interim, if you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
LTC Tom Tadsen, OHARNG  
MAJ Kim O'Keefe, NGB  
JoAnn Watson, AEC  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR



State of Ohio Environmental Protection Agency

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

March 5, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
~~MULTI-INCREMENTAL SAMPLING~~

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

Dear Mr. Patterson:

Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO) and Central Office (CO), Division of Emergency and Remedial Response (DERR) and Southwest District Office (SWDO), Office of Federal Facilities Oversight (OFFO) have received and reviewed the document (and supporting papers) entitled "Draft # 3, Guidance for Multi-Incremental Sampling." This information was prepared and compiled by the US Army Corps of Engineers (USACE) Louisville District and was received at Ohio EPA on January 26, 2004.

Ohio EPA recognizes the value of performing Multi-Incremental (MI) sampling in order to provide a repeatable, accurate, and defensible measure of the average concentrations of constituents within a sample area. The information presented in the January 2003 course "Planning for Environmental Decision Making" and in the papers attached to the MI guidance submission have provided the entire Ravenna Army Ammunition Plant (RVAAP) team with some key data and insights into how the characterization and closure sampling at the installation could potentially proceed. The draft guidance prepared by USACE is a good first step in laying the framework for MI sampling; however, it is not complete enough at this point in time to institute at the RVAAP.

Additionally, Ohio EPA is aware that there is a great deal of interest in utilizing this type of sampling at other Department of Defense (DoD) sites within the State of Ohio. Specifically, the potential for utilizing this type of sampling has been brought up in conjunction with Formerly Utilized Defense Sites (FUDS) including Nike installations and other Army depots. Although this correspondence is specific to the RVAAP submission, many of these comments have applicability to the other DoD sites.

This correspondence represents a compilation of comments from all Ohio EPA reviewers:

1. Since this guidance document is presenting a new sampling approach, it would be prudent to include an introduction or background information that explains why this approach is being proposed over the approach that has always used at this installation.
2. The draft guidance does not address the issue of how any MI sampling data that would be collected at RVAAP would be compared to the discrete data that has already been obtained at the Areas of Concern (AOCs) currently under study. Can these two types of data be compared, and if so, what (if any) adjustments would need to be made? Can the MI data be readily compared to the background concentrations that were determined for the installation? What is the impact on risk assessment?



3. The draft guidance does not give enough specifics to contractors on issues such as: how to control compositional and distributional heterogeneity; the types of sampling tools that should be utilized for different media; whether or not saturated material should be completely air dried; the appropriate sieve size for sediment samples; the criteria for determining whether or not the materials should be ground; how to deal with groundwater, surface water, sub-surface soil samples and pit samples; training of the contractors on this technique, etc.. This type of information is key to having a successful sampling program. If these over-arching questions need to be asked and answered for every AOC under study, we will be adding preparation and review time to the AOC-specific workplans. It is recommended that issues that would most likely remain fairly constant across the AOCs be memorialized in one, more detailed, guidance document or workplan.
4. The document should discuss whether or not this sampling method can be used to sample media other than surface soil, such as subsurface soils, groundwater, and surface water. If this method can not be used for these other media, then describe what benefit there may be to support the use of this sampling approach only in surface soil.
5. The text should discuss how adjustments can be made to the number of samples (or sub-samples) that may be necessary to collect in order to account for compositional heterogeneity. If the costs associated with collecting the 30 sub-samples are too great, what recommendations will be made for proceeding?
6. On page 1, section d should be revised to read: "...unrepeatable, and at times, legally indefensible..." as there have been cases settled using the traditional approach for the detection of "hot spots." The second sentence may also be revised to incorporate this point.
7. On page two, a value of 1/4 acre is given as the maximum area to be sampled if an unrestricted land use is assumed for the site. Please note that the example that RAGS A (U.S. EPA 1989) uses for a potential exposure area in a residential setting is 1/8 of an acre. So the maximum area could be 1/8 of an acre. The revised text needs to clearly state that the exposure unit must be decided upon and agreed to up front between all stakeholders.

Secondly, the text suggests that land use may be known prior to sampling. In some cases this may be true. However, it should be noted that if the sampling is being conducted to support a Remedial Investigation / Feasibility Study (RI/FS), then the land use may not have been decided at this time and the sampling plan must incorporate the possibility of multiple land uses to support the feasibility study. If sampling is based only on one potential future land use, then the data would likely be insufficient for a use FS. Therefore, multiple sampling areas may be needed that overlap one another. Please note this in the text.

At RVAAP, there have been several instances in which what was thought to be the known land use, ultimately was changed. If this occurs, what impact might there be on the interpretation or evaluation of the data that was collected as part of a MI sampling effort?

8. The second paragraph of page two discusses the ideas regarding the selection of sampling areas. One idea that should be considered for incorporation in the revised text is the use of colorimetric assays or other sampling methods in conjunction with the multi-incremental



sampling. For example, one could use the colorimetric assays to help define the extent of explosives contamination. This information could then assist in the selection of areas to be sampled using the MI techniques. This will likely be an important point of consideration when using the MI approach. All proposed methodologies must be reviewed and approved by Ohio EPA.

9. The text on page 3 (section 3) indicates that generally 30 sub-samples should be taken within a given area, and that if the spatial or compositional variability is more extensive, then more sub-samples should be obtained. There should be a discussion of whether or not the number of sub-samples could be reduced if the material is more uniform in nature.
10. Section 4 should contain more information for the contractor on the proper selection of sampling equipment. For example, it would be important for the contractor to have an idea of the center of gravity issue (i.e., the dimension of the sampler should be 3X greater than the dimension of the largest particle). Also, please confirm that a 21 inch stainless steel probe was used at Ramsdell Quarry Landfill and Erie Burning Grounds. (Is this the probe length v. diameter?)
11. The text on page 4 (section 4) indicates that for VOC analyses that the samples would need to be stored in methanol. The Ohio EPA questions whether or not this is practical not only from a logistical standpoint, but whether or not the contractors and RVAAP would want to have a specified volume of methanol on the installation. (This comment is especially applicable to a number of FUDS within Ohio.)
12. The text on page 5 (section 6A) indicates that duplicate samples should be "done as a minimum for each type of environmental media and on a pre-selected basis of 1 in 10 where there are more than 15 samples of a given media." Revised guidance should terminate this sentence after 1 in 10.
13. There should be some discussion in the revised text that explains the attachments provided in the guidance. For instance, Attachment 1 Melt Pour Building Sample Area Determination is a great drawing, but what does it mean?
14. It is unclear as to what is being depicted on attachment 1. Do some of the numbers represent sub-samples?
15. On the Joliet Army Reserve Center data attachment, there is no detail to indicate soil types, number of sub-samples etc.. This information should be provided.
16. The attached references to the draft guidance were informative. However, in several cases some of the proposed sub-sample numbers, depths, etc. do not agree. There should be some information in the text that these papers are for informational purposes only, so as to not create confusion.
17. On reference 10 (publication date 2002), page 1272, there is an indication that research was on-going into methods for collecting explosives-contaminated soils in a repeatable manner. Please provide any additional, updated information.



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
MARCH 5, 2004  
PAGE 4 of 4

18. Additional explanation or removal of the attached sediment data is needed. Those not familiar with the sampling methods used to collect the samples are not benefitted by their inclusion in the guidance document. Please revise as appropriate.


Ohio EPA has demonstrated their willingness to look at and utilize MI sampling at RVAAP, as MI sediment samples were collected during the sitewide surface water assessment program. The Agency further acknowledges that the limited RVAAP sediment data presented in the draft guidance shows good reproducibility. However, given the comments and concerns presented in this correspondence, Ohio EPA feels that it is premature to implement MI sampling during the investigatory phase of work at the installation.

Ohio EPA recommends the following:

- A. Revise the MI guidance document to reflect resolution of the issues and concerns presented in this correspondence.
- B. Conduct additional evaluation of MI sampling at RVAAP in sediment, surface and sub-surface soils and trenches.
- C. Subsequent to the above-referenced evaluation and acceptance, consider using MI sampling for confirmation sampling in order to demonstrate that the appropriate remediation of an AOC or exposure unit has occurred.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/ams

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Laurie Moore, Ohio EPA, OFFO, SWDO  
Brian Tucker, Ohio EPA, Central Office, DERR  
LTC Tom Tadsen, RVAAP  
John Jent, USACE Louisville  
Glen Beckham, USACE Louisville  
JoAnn Watson, AEC

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR



State of Ohio Environmental Protection Agency

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

August 23, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
WORK PLAN FOR THE THERMAL  
DECON/DEMO OF LL-11 BUILDINGS,  
F-15, 1200, S-4605, T-4602; PORTAGE  
AND TRUMBULL COUNTIES

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

Dear Mr. Patterson:

On July 12, 2004, the Ohio Environmental Protection Agency (Ohio EPA) received the following document: "Work Plan for the Thermal Decomposition and Demolition of Load Line 11, Buildings F-15, 1200, S-4605, and T-4602, dated June 2004. The following comments were generated from the review of this document:

**General Comments:**

- Comment # 1: The title on the jacket cover of the document (i.e., "Thermal Decomposition and Demolition...") does not match the title page inside the document (i.e., "Thermal Decomposition and 5x Certification ...). Please change either title so that both of them are the same.
- Comment # 2: The document's jacket cover and spine does not specify whether it is a "Preliminary Draft, Draft, or Final" document. Since this is a construction/demolition related work plan, the document should be marked "Preliminary Draft."

**Specific Comments:**

- Comment # 3: Acronyms, pages v through vi - The following acronyms were omitted from the list: AOC; BRAC; NGB; ESS; GOCO; MOA; IRA; NSCMP; USATEU; USEPA; CSHM; NOTAM; OHARNG; RAB; TCLP; TPH-DRO; TAL; CRZ; SZ; TNT; GPS; and RTLS. Please make the appropriate changes to the text.
- Comment # 4: Section 1.1.4, Changes to the Work Plan, number 5, page 2 - Any changes to the work plan should be reported to Ohio EPA, regardless of environmental impacts. Please make the appropriate changes to the text.
- Comment # 5: Section 1.6, Buildings 1200, S-4605, and T-4602, page 5 - The text states that "ammunition was demilled at buildings 1200, S-4605, and T-4602 by steaming munition rounds." Did any of these buildings serve other purposes (i.e., sectionalization of rounds while under water, etc.). If so, please update the text.





- Comment # 6: Section 2.2.1, Hazard Classification, pages 7 and 8 - How will transite painted with PCB contaminated paint be sampled, handled, and properly disposed of?
- Comment # 7: Section 2.2.2 Thermal Decontamination and Demolition Overview, number 8 - The text states that "heat sensing devices will be strategically placed in and around the buildings being burned, to document complete decomposition of explosives." Please further elaborate on what kinds of devices will be used, or add a reference to where this information may be found elsewhere in the text.
- Comment # 8: Section 2.2.2 Thermal Decontamination and Demolition Overview, number 9 - The text states that "floor drains will be included within the det cord ring main configuration for the burning operations." Please further elaborate on the use of "det cords," or add a reference to where this information may be found elsewhere in the text.
- Comment # 9: Section 2.4.3.1 Submission of Notification, Emergency Response and General Notifications, pages 17 and 18, bulleted list - In addition to Eileen Mohr, please add Todd Fisher, Ohio EPA, (330) 963-1148.
- Comment # 10: Section 5.4.2 Waste Water, page 43 - The text states, "Direct discharge to any surface water body will require prior approval from the Ohio EPA Division of Surface Water (DSW)." Please be advised, the DSW will likely not approve any such discharge to surface water bodies.
- Comment # 11: Section 5.6 Protection from Sound Intrusions, page 44 - The text states that "perimeter noise monitoring will be performed during the burn operations in order to record noise levels associated with these actions" and that an effort to "minimize damage to the environment by noise" will occur. At what level of noise (action limit) will corrective measures be required? What kind of corrective measures will be initiated?
- Comment # 12: Figure 1-1. Ravenna Army Ammunition Plant Location Map - Please add a North arrow to the figure.
- Comment # 13: Figure 2. Thermal Decon and Demo of LL-11, Building F15, and Building 1200 area Facility Map - It is not clear on this figure where Buildings S-4605 and T-4602 are located.
- Comment # 14: Figure 3. Load Line 11 Site Map - Please label all roads, surface water bodies, and other geographical features, including adjacent AOCs.
- Comment # 15: Figure 4. Building F15 Site Map - Please label all roads, surface water bodies, and other geographical features, including adjacent AOCs.

MR. MARK PATTERSON  
RAVANNA ARMY AMMUNITION PLANT  
AUGUST 23, 2004  
PAGE 3

- Comment # 16: Figure 5. Building 1200 Area Site Map - Please label all roads, surface water bodies, and other geographical features, including adjacent AOCs.
- Comment # 17: Figure 6 A. Load Line 11 MSD Location Map - Please label all roads, surface water bodies, and other geographical features, including adjacent AOCs.
- Comment # 18: Figure 6 B. Building F15 MSD Map - Please label all roads, surface water bodies, and other geographical features, including adjacent AOCs.
- Comment # 19: Figure 6 C. Building 1200 Area MSD Location Map - Please label all roads, surface water bodies, and other geographical features, including adjacent AOCs.

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

Sincerely,



Todd R. Fisher  
Project Coordinator  
Division of Emergency and Remedial Response

TRF/kss

cc: Eileen Mohr, Ohio EPA, DERR, NEDO  
Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Brian Stockwell, MKM Engineers, RVAAP  
James Panozzo, MKM Engineers, RVAAP  
Richard Callahan, MKM Engineers, RVAAP  
John Jent, USACE, Louisville  
Glen Beckham, USACE, Louisville  
LTC Tom Tadsen, OHANG, RTLS

ec: Mike Eberle, Ohio EPA, DERR, NEDO





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Bob Taft, Governor  
Christopher Jones, Director

September 7, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
14 AOCs - DRAFT SAMPLING AND  
ANALYSIS PLAN ADDENDUM

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document entitled: Draft Sampling and Analysis Plan Addendum for the Characterization of 14 RVAAP AOCs for the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated August 5, 2004 and received at Ohio EPA on August 9, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) Louisville District by MKM Engineers, Inc.

Comments on the document from Ohio EPA, NEDO, DERR, are provided in the enclosed table. Please provide responses to the enclosed comments at your earliest convenience, advise Ohio EPA as to when a revised plan might be expected, and determine the date for the comment resolution meeting.

If you have any questions or concerns regarding the comment table, please do not hesitate to contact me at (330) 963-1249.

Sincerely,

Andrew C. Kocher  
Site Coordinator  
Division of Emergency and Remedial Response

ACK/kss

enclosure

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO, CO  
John Jent, USACE Louisville  
Eileen Mohr, Ohio EPA, DERR, NEDO  
LTC Tom Tadsen, OHARNG  
JoAnn Watson, U.S. Army Environmental Center  
Glen Beckham, USACE Louisville

ec: Mike Eberle, Ohio EPA, DERR, NEDO  
Todd Fisher, Ohio EPA, DERR, NEDO



**DRAFT SAMPLING AND ANALYSIS PLAN ADDENDUM FOR THE CHARACTERIZATION OF 14 RVAAP AOCs**  
**WRITTEN BY MKM ENGINEERS, INC.**  
**RECEIVED ON AUGUST 9, 2004**

**REVIEWER: ANDREW C. KOCHER**  
**DATE: SEPTEMBER 3, 2004**

<b>Cmt. No.</b>	<b>Page #/ Line #</b>	<b>COMMENT</b>	<b>RECOMMENDATION</b>	<b>RESPONSE</b>
1.	General #1	With respect to geophysical survey at the AOCs, the Work Plan (Draft Sampling and Analysis Addendum for the Characterization of 14 RVAAP AOCs) should explicitly state the criteria in place for a geophysical survey at the RVAAP.	Provide additional information: 1) type and model of instruments to be used, 2) spacing and frequency at which readings will be collected, 3) depth at which tanks are expected to be present, 4) any possible physical interferences, etc. Please provide a map.	
2.	Pg 8, line 22-27	With respect to trenching at the AOCs, the Work Plan should explicitly state that the criteria in place for trenching at the RVAAP must be strictly adhered to during the study.	Add maximum depth of trench (12 feet) if bedrock or ground water is not encountered, describe the required information that will be obtained, explain how you will determine that ground water has been encountered (verses a small perched aquifer), and locations where test trenching will occur. Please provide a map. Please reference SOP-34 and include in the Work Plan. Perimeter air monitoring should be conducted during trenching activities. Explain how a soil stratification profile will be obtained without entering the trench.	
3.	Pg 8, line 22-34	This section refers to test trenching at selected RVAAP AOCs.	Please reference Section 4.4.2.4.2 of the FWSAP. In accordance with this section, samples should be collected and analyzed for physical and geotechnical properties.	



4.	Pg 8, line 30-31	This section refers to the placement of trenched material returned to the trench.	Include a bullet discussing that all potentially hazardous solid IDW will be recovered and containerized in accordance with Section 7.1 of the FWSAP. In addition, any non-hazardous solid waste can be placed back into the trench pending it remains unexposed and the leaching potential has not been increased (e.g., re-compact the soil above the former trench area, re-vegetate the trenched area).	
5.	Pg 10, line 8	Ohio EPA agrees that daily task order meetings take place in the morning. These tasks should be written down and the following morning reviewed to see if that task was accomplished.	Please provide copies of daily task orders to Ohio EPA immediately following the daily task order meeting. A location/box will be designated for these orders.	
6.	Pg 10, line 33	Please remember that it may be necessary to excavate ballast, debris, or rubble from ditches prior to collection of a multi-incremental dry or wet ditch sample.	Please include a discussion of this in Section 4.2.1 and include the procedure for regrading after samples have been collected.	
7.	Pg 11, line 7	The text references that the following bullets apply to sediment samples.	Remove "sediment samples" from this portion of the text and describe in a separate paragraph. See following comment.	
8.	Pg 11, line 22	The text states, "The incremental pond samples will be collected in accordance with Section 4.5.2.2.2 of the FWSAP (using a hand core auger)".	Please rewrite, "The multi-incremental sediment samples will be collected in accordance with Appendix O; each of the thirty aliquots will be collected in accordance with Section 4.5.2.2.2 of the FWSAP." Follow this up with bullets similar to the soil multi-incremental sampling above in the text.	
9.	Pg 12, line 12	The text references a subset of bedrock wells to be cored.	Please describe the locations and number of wells where this will take place.	

10.	Pg 12, line 13	This section refers to ground water sample collection.	This section is incomplete. Please expand to describe purging, water level measurements, field measurement procedures, type of sampling technique, make and model of pump, materials, laboratory parameters, etc. In most cases, please reference the appropriate section in the FWSAP. Also, describe the sample numbering system and sample documentation. Please reference Section 4.3.2.3.10, 5.3, and 5.4 of the FWSAP.	
11.	Pg 12, line 16	This section refers to collecting geotechnical information from well cores.	Please include the wells that are to be selected for coring. Describe the locations and number of wells where this will take place. The cores must represent the complete stratigraphic sequence for the AOC. In the selection process, consideration must be given to the locations of the wells such that pertinent cross-sections, fence diagrams, etc. can be constructed.	
12.	Pg 21, line 7-9	This section refers to the staging of auger cuttings at the Site.	Please further describe the locations where the drums or roll-off boxes are to be staged, which AOCs will be consolidated if a roll-off box is used, the maximum staging time for the waste, the type and number of samples to be taken for waste characterization (if necessary), and the procedure to be used to sample the roll-off boxes. As a reminder, Ohio EPA requires that waste be shipped off-site within 90 days from the beginning of waste generation.	
13.	Pg 21, line 7-9	This section refers to the containerized auger cuttings at the Site.	It may be beneficial to segregate the top six feet from the rest of the auger cuttings to better characterize the waste.	



14.	Pg 21, line 14-16	This section refers to the staging of auger cuttings at the Site.	Please further describe the locations where the poly tanks are to be staged, which AOCs will be consolidated in a single poly tank, the maximum staging time for the waste, and the type and number of samples to be taken for waste characterization.	
15.	Pg 21, line 21-23	This section refers to potentially hazardous IDW.	Further explain how MKM will determine the IDW stream is hazardous or non-hazardous without sampling the containers for TCLP. As a reminder, based on size of the container and quantity of waste within, more than one composite sample may be necessary to characterize that waste.	
16.	Pg 21	This section refers to potentially hazardous IDW.	Please include information for removing potentially hazardous waste found from trenching activities, and segregating potentially contaminated personal protective equipment and disposable sampling equipment, as described in Section 7.0 of the FWSAP.	
17	Pg 23, line 4-12	This section refers to draft and final Work Plan.	Be advised that Ohio EPA will review the revised/final Work Plan to ensure that all comments have been incorporated as agreed-upon. Field work should not commence until correspondence from all agencies is received which will indicate that the final Work Plan has been accepted.	
18.	Pg 23, line 4-12	This section refers to draft and final Work Plan.	The SOW indicates that copies of the final Work Plan will be submitted to the two information repositories. Please add these repositories to the text in this section.	

19.	Pg 23, line 20	This section refers to draft and final characterization report.	The SOW indicates that copies of the final characterization report will be submitted to the public for review and comment. Please add text to this section stating the number of copies to be submitted, the locations of the repositories, and the time allotted for public review.	
20.	Pg 23, line 19-27	This section refers to draft and final characterization report.	In addition to the items listed, please include the following in the draft final report: tabulated monitoring well measurements (e.g., depths, depth to water, etc), potentiometric surface maps, cross-sections, geophysical data, geophysical drawings and /or maps, geophysical interpretations, ground water plume maps (if necessary), and all field change orders.	
21.	Pg 23, line 28-31	This section refers to monthly/weekly project status reports.	In addition to the information to be provided, include: any changes in key personnel, an updated time line for remaining activities, and any explanations for deviations from applicable schedules. Also provide a sample tracking table that includes the following, but not limited to: how many samples were collected, where from they were collected, and when the samples were shipped off-site. Also provide a IDW tracking table that includes the following, but not limited to: where the IDW was collected/staged, the container it was placed, when it was sampled, and when it the waste is expected to be shipped off-site for disposal.	
22.	Appendix C, Pg 1, line 37	This section refers to the number of monitoring wells to be installed at Building 1200. The text indicates that "...four monitoring wells will be installed."	Please restate that 3 monitoring wells will be installed and one existing monitoring well will be sampled. Add existing monitoring well sample to the table on page 2 of this appendix.	



23.	Appendix D	This section refers to the Landfill North of Winkle Peck.	Please include in Section 1.3 a summary of test trenching activities to be conducted at this AOC. In addition, a permit may be required to conduct test trenching at this AOC, in accordance with OAC 3745.27.13 (Rule 13 - Authorization from the Director).	
24.	General for Appendices A-N	These appendices have discrepancies within Section 1.3 and following table.	Please describe in more detail the activities planned for each specific AOC. In addition to the samples to be collected, include any test trenching, geophysical, and groundwater data. For example, Appendix D, Section 1.3 does not mention test trenching activities to be conducted at this AOC. For example, Appendix F, information concerning the test trenches is missing from the table. For example, Appendix N, Section 1.3 is missing information concerning the geophysical survey.	
25.	General for Appendices A-N	These appendices are missing map information.	Please include maps showing the locations of the test trenches and geophysical survey in the revised Work Plan.	
26.	QAPP Addendum, Table 1-15	This table refers to the sampling and analytical requirements for Atlas Scrap Yard.	Please add a VOC sample for each former service station and one for the former tar cleaning tank location. As a reminder, add PCPs to the SVOC list for the samples collected near the ammunition boxes and the ground water monitoring wells.	
27.	QAPP Addendum, Table 1-1 to Table 1-16	These tables refer to the sampling and analytical requirements for the 14 RVAAP AOCs.	Include all required geotechnical analyses for the sediment samples. Include TOC analysis as required in the text of the SOW, Section 2.2.3.	

28.	QAPP Addendum, Table 3-1	This table is entitled Analytical Methods, Parameters, and Project Quantitation Levels for the 14 RVAAP AOCs.	Please provide copies of this table in the revised Draft Sampling and Analysis Addendum for the Characterization of 14 RVAAP AOCs.	
29.	QAPP Addendum, Table 4-1 and Table 4-2	These tables are entitled Container Requirements for Soil and Water Samples, and Container Requirements for Groundwater and All RI Rinsate Samples.	Please provide copies of these tables in the revised Draft Sampling and Analysis Addendum for the Characterization of 14 RVAAP AOCs.	
30.	Figure 4	The figure shows a graph of the project schedule.	Due to the amount of comments and additional time needed to undergo finalization of the Work Plan, it may be necessary to update this figure.	
31.	General	To assist with sample coordination, a large table for sample tracking could be placed on the wall in the Building 1036. As each step is completed, the date could be filled into a blank cell. This would then be electronically revised each week to be placed in the weekly report.		
32.	General	Since floor sweep samples have been excluded from this project, it may be possible to temporarily expose the underground storage tanks at Atlas Scrap Yard, and collect grab samples from the contents or subsurface soil.		



33.	General	<p>Due to the amount of information in the Work Plan, please include a caveat which allows specific sampling procedures to revert to the SOW and FWSAP, pending a future conflict of information. In other words, if any discrepancies are found between the Work Plan, SOW, and FWSAP during field activities, the agencies will be immediately notified and a resolution will occur.</p>		
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State of Ohio Environmental Protection Agency

Northeast District Office

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

September 20, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
TD HASP FOR LL11, BLDGS. F-15,  
1200, S-4605 AND T-4602

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document entitled: "Site Safety and Health Plan for the Thermal Decomposition and Demolition of Load Line 11, Buildings F-15, 1200, S-4605 and T-4602." This document, dated June 2004 and received on July 12, 2004, was prepared by MKM Engineers, Inc. for the U.S. Army TACOM.

Although Ohio EPA does not have regulatory jurisdiction over health and safety plans (HASPs), the following comments are offered for your consideration. I apologize for the delay in providing these comments.

1. The Environmental Safety Submission (ESS) for this initiative references additional areas of concern (AOCs) not included in the current and previous HASPs and workplans (WPs) for thermal decomposition (TD). Specifically, the ESS was prepared for the following additional AOCs: Load Lines 1, 5, 7, 8, and 10. Will future HASPs and WPs be prepared for these additional AOCs? Or would it be more beneficial to revise the current HASP and WP to include these additional AOCs?
2. Pg 13, section 3.4.2: As a point of information, with respect to the Phase I Remedial Investigation (RI) for the 11 high priority AOCs, please be advised that the metals list that was used for analysis of environmental samples was not the Target Analyte List (TAL) of metals. The Phase I list contained the eight (8) Resource Conservation and Recovery Act (RCRA) metals of concern.
3. Pg 14, section 3.4.2: Please note that the river otter is no longer on the state endangered species list.
4. Pg 21, section 4.5: Please add the following to the list of potential biological hazards: Histoplasmosis, West Nile Virus, and Lyme's disease.





5. Pg 32, section 5.7.1: This section indicates that soil/sand inside the blast walls will be removed and stockpiled; however, the testing, transportation, and disposal of the wood and soil/sand materials is not included in the scope of work. Please provide information as to when this additional work will be conducted, how it will be determined that none of the materials are potentially hazardous, what erosion and sedimentation controls will be implemented, etc. The same comment also applies to the telephone poles that will be removed and stockpiled in Load Line 11.
6. Pg 36, section 5.12.1: Please provide additional information regarding the construction of the sump at Load Line 11. Specifically, is it a lead/asbestos lined sump? If so, the proposed method for dealing with the sump may not be appropriate. Additionally, any water that is present in the sump must be tested prior to application to the ground surface (following previous Ohio EPA specifications and conditions).
7. Pg 37, section 5.14.1: The text indicates that "all explosives disposal operations will be conducted on-site within the load line. No MEC items will be removed from the site for disposal." According to the Director's Final Findings and Orders, journalized on June 10, 2004, MEC that cannot be safely transported to OD#2 can be blown in place. If it is determined that it is safe to transport the MEC, it should be destroyed at OD#2.
8. Pg 46, section 7.4, Table 4: With respect to the sampling of wall paint in the existing structures, it is recommended that Level C personal protective equipment (PPE) be utilized.
9. Pg 53, sections 8.5.1 and 8.5.2: As a point of information, please be advised that not all local ambulance services will be able to provide advanced life support (ALS) services, however, they will be able to provide basic life support (BLS) services. This comment is also applicable to page 73, section 12.9.1.
10. Pg 60, section 11.1.2: The first sentence in this section should be revised to read: "In order to minimize the potential...."
11. Pg 61, section 11.1.3: On the footnote to the table, it should be emphasized that the patient should not be transferred from the Exclusion Zone (EZ) stretcher to a "clean" stretcher, if there is a potential to provide further harm to the patient or aggravate existing injuries.
12. Pg 72, section 12.8.4: The first bullet on this page should be revised to read as follows: "The severity of the illness/injury will be assessed..."
13. Pg 72, section 12.8.4: The third bullet on this page should be revised to read as follows: "If additional medical attention is required, but BLS/ALS is not required...."

MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
SEPTEMBER 20, 2004  
PAGE 3

14. Pg 74, section 12.11.2: In the event of a spill, please add Ohio EPA to the notification list.
15. Pg 84, section 13.18: This section references the MKM Biological Hazards SOP-14 in Appendix C. However, no SOP-14 was found in Appendix C. Please provide this SOP.
16. Appendix B: For the sampling of paint hazard task analysis, please consider having personnel in Level C PPE.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
LTC Tom Tadsen, RTLS  
JoAnn Watson, AEC  
Rick Callahan, MKM  
Brian Stockwell, MKM  
Mark Lamb, MKM

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR





State of Ohio Environmental Protection Agency

Northeast District Office

2110 E. Aurora Road  
Twinsburg, Ohio 44087-1969

TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

September 24, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
SITEWIDE SURFACE WATER  
INITIATIVE - PONDS

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

Dear Mr Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), and Southwest District Office (SWDO), Office of Federal Facilities Oversight (OFFO), have received and reviewed the document entitled: "Biological and Water Quality Study of Ravenna Army Ammunition Plant - Ponds, 2003." The document, dated June 25, 2004 and revised by Ohio EPA's Ecological Assessment Unit (EAU) on August 16, 2004, was received via e-mail by Ohio EPA, NEDO, DERR, on August 18, 2004.

**General Comments:**

1. The cover page indicates that the report was prepared for the United States Army Corps of Engineers (USACE) - Louisville District by Ohio EPA. The cover page should accurately reflect that the USACE was to be the main author of the report, while Ohio EPA was to provide the technical field, laboratory, and assessment work. This was the agreement that was reached between all stakeholders prior to the initiation of the surface water effort. In addition, remove the "DSW/EAS 2004-6-4" header from the report, since this is a tracking number specific to Ohio EPA/DSW.
2. Ohio EPA notes that this draft report does not contain the additional data collected at Kelly's Pond during Summer 2004. As such, the report will need to be re-drafted and re-reviewed in light of the additional data.
3. Please clarify whether or not the analytical data collected from all of the sampling efforts will be presented in appendices in the revised report.
4. In future submissions, please number the lines for ease of review and comment. Also, please run spell check prior to submission, to check for typographical errors.



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
SEPTEMBER 24, 2004  
PAGE 2

5. In the revised document, please add in the appropriate table, appendix, figure (etc.), numbers.

**Specific Comments:**

6. Format/grammatical/spelling changes:
  - a. In the Executive Summary (ES), move the RVAAP to directly after Ravenna Army Ammunition Plant.
  - b. In the ES remove the extra "s" in the word metals. This is also applicable to section 4.2.
  - c. In section 2.4, please revise the sentence to read: "PCP was the preservative of choice for treating wood crates..."
  - d. Add the ending parentheses after "Stoddard's Solvent" in section 2.6 (Administration Pond).
  - e. Change the text in section 2.7 to read: "...The activities conducted at these locations are not conducive to..."
  - f. Change the text in section 2.7 to read: "....prior to shipment to other load, assemble, and pack facilities."
  - g. Please revise the second sentence in section 2.10 to read: "The pond is directly south of a series of finished product..."
  - h. In section 5.2, in the section discussing the sediment from Lower Cobbs Pond, revise the language to read: "....reported as non-detect."
  - i. In section 5.5 (Macroinvertebrate Community Assessment), please revise the text to read: "Snow Pond was sampled as a reference wetland..."
  - j. In section 5.5, change the text to read: "Franks Pond showed similarity to..."
7. In the ES, (Non-Reference Ponds/Wetland) that discusses Kelly's Pond, please reference the additional sampling that was conducted in Summer 2004.
8. Section 1.0 Introduction: In the second objective, please define the term "energetic?" It is assumed that this term refers to explosives.



9. In section 2.4, there is reference made to the Portage Ordnance Depot. To most readers, the term Portage Ordnance Depot will not have much meaning. Either describe what constitutes the Portage Ordnance Depot or provide a different reference point for the sample location.
10. Please provide a narrative for section 2.5 (Erie Burning Ground Wetland/Pond).
11. In section 2.6 (Administration Pond), the first paragraph is not clear. The text moves from a discussion of run-off from the laundry to pesticide formulation and utilization. Please provide revisions to this paragraph.
12. In section 2.6 (second paragraph), please revise the text to read: "...mercury fulminate, and the components of black powder which are..."
13. In section 2.7 (Upper and Lower Cobbs Pond), in the revised text, please provide the sample interval designation adjacent to the Sand Creek Sewage Treatment Plant.
14. In section 2.8 (Load Line 4 Pond), please revise the text in the second sentence to indicate that the Anchor Test Area is scheduled for investigation in October 2004.
15. In section 3.2 (Sediment Sampling/Assessment), please add text that describes the disposition of any generated investigation-derived waste (IDW).
16. In section 3.3 (Surface Water Sampling/Assessment), please provide a reference to the additional sampling event conducted at Kelly's Pond in Summer 2004.
17. In the revised document, please add Figure 11-1, which details pond sampling locations.
18. On Table 11-1, please provide descriptions for REFPOND - 3, UPPERCobb POND and ADMINPOND.
19. On Table 11-1, please provide clarification regarding the description for LL4POND. Specifically, the description indicates that this pond catches drainage from future explosives composting. Currently, any potential composting activities are scheduled to be conducted in a building. As such, it is difficult to comprehend how/why drainage would be allowed to emanate from the building.
20. On Table 11-1, please add a footnote to the table that indicates what a blank box means. Also add a footnote to explain what the "1993 Sample Station" and "1999 Sample Station" columns mean. Also, define acronyms that are used in this table. For instance, DS is not defined. Does this mean downstream?

21. Section 4.1 Surface Water Quality: First sentence states that surface water samples were collected from eleven (11) ponds at RVAAP, however, only nine (9) are listed in Table 11-1. Please clarify what the other two ponds are and why are they not listed in table 11-1.
22. In Table 12-1 (Exceedences of Ohio Water Quality Standards), please add the data from the additional sampling event at Kelly's Pond. Also, the title of this table states that this is data from the "reference ponds at the RVAAP." Please clarify that this table includes data from the reference and study ponds at RVAAP. Also check the title on other tables in this report for clarity.
23. In section 4.2 (Surface Water Sampling/Assessment), please provide a reference to the additional sampling event conducted at Kelly's Pond in Summer 2004.
24. On Table 12-2 (Reference Pond), please add a footnote to the table that indicates what a dash means.
25. On Table 12-3 (Non-Reference Pond), please provide an explanation for the lack of a silver analysis from the Kelly's Pond sample.
26. On Table 12-3 (Non-Reference Pond), please add the data from the additional sampling event conducted at Kelly's Pond.
27. On Table 12-3 (Non-Reference Pond), please add the meaning of a "dash" to the footnotes.
28. In Table 13-1, in the revised table, please add in the detection limits, rather than reporting the concentrations as ND (non-detect).
29. On Table 14-1:
  - a. Remove the extra two columns.
  - b. In the footnotes to the table, please add in the meaning of a dash and blank box.
30. Please rectify the disconnects between the information presented in Section 6.0 (Conclusions) and other sections in the text regarding the surface water and sediment. For example, in the conclusions section, the text indicates that several ponds had no environmental impact due to prior military activity. However, (for example) Lower Cobbs Pond had chromium contamination; Upper and Lower Cobbs Pond,



MR. MARK PATTERSON  
RAVENNA ARMY AMMUNITION PLANT  
SEPTEMBER 24, 2004  
PAGE 5

Administration Pond, and Kelly's Pond had low levels of explosives in surface water, etc. As such, this section needs to be revised to accurately reflect the obtained data.

31. Section 6.0: Explain how the correlation between chemistry and biological parameters was conducted and evaluated. If there are four reference ponds, why were some study ponds compared to only one and two reference ponds? Was a weight of evidence approach used to make conclusions based on this correlation analysis?
32. Section 5.0 Discussion, first and second paragraphs: Could runoff contaminated with explosives (for example, TNT, etc.) contribute to the extensive plant growth in some ponds at RVAAP?
33. Section 6.1 (Recommendation): This section needs to be revised, given that the proposed additional sampling has already been conducted.

If you have any questions concerning this correspondence, please do not hesitate to contact me at (330) 963-1221.

Sincerely,



Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Laurie Moore, Ohio EPA, OFFO, SWDO  
Dave Altfater, Ohio EPA, CO, EAU  
Mike Grey, Ohio EPA, CO, EAU  
Brian Tucker, Ohio EPA, CO, DERR  
LTC Tom Tadsen, RTLS  
JoAnn Watson, AEC  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville  
Dave Brancato, USACE Louisville  
Elizabeth Ferguson, USACE

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR



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Bob Taft, Governor  
Christopher Jones, Director

October 19, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
14 AOCS - FINAL SAMPLING AND  
ANALYSIS PLAN ADDENDUM

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document entitled: Final Sampling and Analysis Plan Addendum for the Characterization of 14 RVAAP AOCs for the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated October 7, 2004 and received at Ohio EPA on October 8, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) Louisville District by MKM Engineers, Inc.

Comments on the document from Ohio EPA, NEDO, DERR, are provided in the enclosed table. Please provide responses to the enclosed comments at your earliest convenience and advise Ohio EPA as to when a revised plan might be expected.

If you have any questions or concerns regarding the comment table, please do not hesitate to contact me at (330) 963-1249.

Sincerely,

Andrew C. Kocher  
Site Coordinator  
Division of Emergency and Remedial Response

ACK/kss

enclosure

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
John Jent, USACE Louisville  
Eileen Mohr, Ohio EPA, DERR, NEDO  
LTC Tom Tadsen, OHARNG  
JoAnn Watson, U.S. Army Environmental Center  
Glen Beckham, USACE Louisville

ec: Mike Eberle, Ohio EPA, DERR, NEDO  
Todd Fisher, Ohio EPA, DERR, NEDO





**FINAL SAMPLING AND ANALYSIS PLAN ADDENDUM FOR THE CHARACTERIZATION OF 14 RVAAP AOCs**  
**WRITTEN BY MKM ENGINEERS, INC.**  
**RECEIVED ON OCTOBER 8, 2004**

**REVIEWER: ANDREW C. KOCHER**  
**DATE: OCTOBER 19, 2004**

<b>Cmt. No.</b>	<b>Page #/ Line #</b>	<b>COMMENT</b>	<b>RECOMMENDATION</b>	<b>RESPONSE</b>
		Thanks for line numbering...it really helps.		
1.	Pg. 13, line 38 to Pg. 14, line 3	If $\leq 5$ NTU's cannot be achieved, development can stop if: (1) a minimum of 10 well volumes has been removed, (2) several procedures have been tried, (3) proper well construction has been verified, and (4) temperature, conductivity, and pH have stabilized to $\pm 10\%$ over at least three successive well volumes.	Please include this text in the Final Sampling and Analysis Plan Addendum and supply this information when 5 NTU's cannot be achieved.	
2.	Pg. 14, line 2-3	The text is unclear as to the FWSAP concerning purging and development of a monitoring well.	Once installed, a monitoring well must be developed between 2 and 7 days. After development is complete, the monitoring well must remain undisturbed for 14 days before purging and sampling may occur. Please update text.	

3.	Pg. 23, line 21-23	The text says the exhaust hood will be vented to the outside.	During a walk though of Building 1036, it was noted that the exhaust hoods would not be vented outside, but filtered inside, due to a possible pressure difference, which would draw cold air in from outside. Please update text, if necessary.	
4.	Appendix A, Section 1.3	This comment refers to the structural orientation of the bedrock.	Suggestion: It may be useful to obtain the fracture directions at C-Block Quarry, to determine whether ground water flow direction is interrelated.	
5.	Appendix B, pg. 1, line 18	Typo	Remove the second "terminated."	
6.	Appendix D, Figure D-2	The MI sample around the former barn is missing from the map.	Unless the use of the barn can be documented, please update Figure D-2 to include a MI soil sample and update sampling tables as necessary.	
7.	Appendix G, pg. 1, line 26, and Appendix H, pg. 2, line 5	This comment refers to COPC.	Remove the word "potential" before COPCs or change COPCs to COCs.	



8.	QAPP, pg. 3-6 and pg. 7-1, and Appendix A, pg. 2.	This comment refers to the analytical methods for hexavalent chromium in soil.	Please include Method 3060A digestion procedure in Table 3-1 in the soil column. Please add a bullet to include this digestion method in Section 7.1. Revise Appendix A as necessary.	
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State of Ohio Environmental Protection Agency

Northeast District Office

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

November 02, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE AND TRUMBULL COUNTIES  
DRAFT PWS FOR FPRI AT 6 RVAAP AOCs

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document entitled: "Draft PWS for FPRI of 6 RVAAP AOCs." This document was received via e-mail on October 28, 2004, and was prepared by the U.S. Army Corps of Engineers (USACE) - Louisville District.

Enclosed with this correspondence, please find Ohio EPA's, NEDO, DERR comments.

If you have any questions, please do not hesitate to contact me at (330) 963-1221.

Sincerely,

Eileen T. Mohr  
Project Coordinator  
Division of Emergency and Remedial Response

ETM/kss

enclosure

cc: Bonnie Buthker, Ohio EPA, SWDO, OFFO  
JoAnn Watson, AEC  
Randy Nida, NGB  
LTC Tom Tadsen, RTLS  
Glen Beckham, USACE Louisville  
John Jent, USACE Louisville

ec: Mike Eberle, Ohio EPA, NEDO, DERR  
Todd Fisher, Ohio EPA, NEDO, DERR





**DRAFT PWS for FPRI of 6 RVAAP AOCs**

**Reviewer: Eileen T. Mohr, Ohio EPA**

**Date: November 02, 2004**

<b>Cmt. #</b>	<b>Page #/ Line #</b>	<b>Comment</b>	<b>Recommendation</b>	<b>Response</b>
1	pg 1/line 9	Text currently states: "... based e for completion..."	Revise for clarification.	
2	pg 1/line 12	Spelling change requested.	Change "provid" to "provide."	
3	pg 1/lines 13 and 19	The text of the PWS indicates that the overall purpose of the PWS is to obtain "regulatory closure" of the 6 high priority AOCs. Especially with respect to ODA2, it is unclear how the goal to achieve regulatory closure can be achieved by 30 Sept 2007, when the intent is to continue to use this AOC for periodic demolition activities throughout the IRP process (which won't end in 2007).	Provide clarification.	
4	pg 2/lines 1-3	The text references the four potential separate options as funding becomes available.	Provide a cross reference to the portion of the PWS text where these options can be found.	
5	pg 2	Project coordination section change requested.	Add NGB to the list of major parties.	

6	pg 2/lines 1-3	The text indicates that all work conducted as part of this effort will be in accordance with specified guidance (including the facility-wide guidance).	In the most recent PBC, there have been numerous discussions regarding issues that have been already discussed and settled in facility-wide documents, such as icing samples, use of specified decon procedures, etc.. These types of issues are better addressed by revising any needed facility-wide plans, otherwise the Ohio EPA (and others) spend more time discussing the issues, bringing other contractors on site up to speed (so that things are consistent), etc. Frankly, this wastes time. Ohio EPA requests that the contractor be very familiar with facility-wide documents and be cognizant of the fact that Ohio EPA will not negotiate these types of issues with individual contractors.	
7	pg 2/lines 28-29	The text indicates that all surface soil and sediment sampling will be conducted using MI techniques.	Further discussion is warranted. At many of the AOCs covered under this PWS, any conducted sampling has been discrete in nature. At a minimum, the risk assessors and data evaluators would all need to be on the same page ahead of time to determine how the data can be used, whether or not it can be legitimately or easily compared, etc. At the LL1-4 PBC, the PBC contractor is utilizing discrete sampling techniques.	
8	pg 3/line 35	The text references that paint used at the RVAAP contained lead and PCBs. More than lead (in terms of RCRA metals) has been found in various paint colors.	Either adjust the text to include other metals, or make the text less specific, i.e., "...contained lead (among other metals) and..."	



9	pg 3/lines 20-21	The preliminary-draft ODA2Phase II RI report has not yet been received.	Remove the text that indicates that this document was received in Sept 2004.	
10	pg 3/lines 222-23	The preliminary-draft ODA2Phase II RI report has not yet been received. AS such, it is highly unlikely that comment review will occur in Jan 2005.	Remove the text that indicates that comment will review in Jan 2005.	
11	pg 3/line 24	A document entitled, "Report of UXO Removal" has a bunch of question marks after it.	Add the correct title and date of this report (if the RCRA unit removal is being referenced).	
12	pg 3/after line 31	Although the data won't be back by the time this PWS goes out for bid, the selected contractor must also utilize the groundwater information that will be obtained from additional LL12 mw installation and sampling occurring as part of the 12 AOC PBC project.	USACE needs to provide this information, when available, to the contractor.	
13	pg 3 - general	Please be advised that Ohio EPA will not conduct expedited reviews on documents that are currently outstanding and that form the basis for this proposed contract. Specifically, these include the ODA2, Fuze and Booster Quarry Pits, and Central Burn Pits RI reports.	No text change required. Inform the contractor that they are not to ask for expedited reviews.	
14	pg 4, line 23	Text change requested.	Change text to read: "...activities, such as facility-wide..."	
15	pg 4, line 37	Text change requested.	Change text to read "... summarizes his/her overall..."	
16	pg 6/line 28	Regulatory closure is referenced.	Refer to comment 3 above.	

17	pg 8, line 26	Text change?	Should this read (100% or 150%)?	
18	pg 8, line 42	Text change?	Should this read (100% or 150%)?	
19	pg 9, line 1	Text change?	It is not clear how the contractor will get from the stage we are in (RI) to completion of RDs. Any intervening steps proposed?	
20	pg 9, line 20	Text change?	Should this read (100% or 150%)?	
21	pg 9, lines 15-18	Text change?	It is not clear how the contractor will get from the stage we are in (RI) to completion of RAs and AOC-specific close-out reports. Any intervening steps proposed?	
22	pg 9, line 42	Text change?	Should this read (100% or 150%)?	
23	pg 9, line 12	Text change?	Should this read (100% or 150%)?	
24	pg 11, line 12	Text change requested.	Add RAs to the list of reports.	



25	pg 11, lines 21-24	Clarification required.	The text as currently written would suggest that the selected PBC contractor would require "expressed agreement for each contact" with the regulators from the FPRIPM. This seems overly cumbersome. After the contractor is selected, shouldn't they be able to contact either Todd or me directly for information? Contact could only be with designated project managers, and not other staff of Ohio EPA. (I don't want to see any "answer shopping" on the part of the contractor.)	
26	pg 13, line 38	Text change.	Change to "...prepare and submit preliminary time line..."	
27	pg 13, line 39	Text change requested.	Change text to read "... as part of his/her contract proposal..."	
28	pg 13, line 42	Clarification of acronym.	What is meant by an "ACO?"	
29	pg 14, lines 32-35	Text change requested.	Ohio EPA also has stop work authority, per the Director's Findings and Orders Section XV(35)C.	
30	pg 15, line 17	Text change?	Should this read (100% or 150%)?	
31	pg 15, lines 25-26	Provide clarification as to why the term load line appears in this PWS.	Make text change if necessary.	
32	pg 15, line 30	Provide clarification as to why the term load line appears in this PWS.	Make text change if necessary.	

33	Attach. A	General	Make any necessary changes to this attachment based upon previous comments. (Especially with respect to the process to be followed and deliverables.)	
34	Attach B	General	It would appear that although there are 4 factors that will be weighed in selecting a contractor, that the over-riding factor is cost. Please confirm.	
35	Attach B	General	Appendix A is referenced numerous times in this attachment. This is the Director's Findings and Orders. Please clarify whether this should be Attachment A.	





State of Ohio Environmental Protection Agency

Northeast District Office

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TELE (330) 425-9171 FAX (330) 487-0769

Bob Taft, Governor  
Christopher Jones, Director

November 3, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
PORTAGE/TRUMBULL COUNTIES  
14 AOCS - FINAL SAMPLING AND  
ANALYSIS PLAN ADDENDUM

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

Dear Mr. Patterson:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Emergency and Remedial Response (DERR), has received and reviewed the document entitled, "Final Sampling and Analysis Plan Addendum for the Characterization of 14 RVAAP AOCs for the Ravenna Army Ammunition Plant, Ravenna, Ohio." This document, dated October 7, 2004 and received at Ohio EPA on October 8, 2004, was prepared for the U.S. Army Corps of Engineers (USACE) Louisville District by MKM Engineers, Inc.

Comments on the document from Ohio EPA, NEDO, DERR, were provided on October 19, 2004. Responses to these comments were received by Ohio EPA on October 22, 2004 via electronic mail. Ohio EPA discussed the responses with the project manager of MKM Engineers Incorporated on October 22, 2004. As a result, Ohio EPA has agreed to include the responses as an attachment and has approved the Final Sampling and Analysis Plan Addendum for the Characterization of 14 RVAAP AOCs.

If you have any questions, concerns, or problems, please do not hesitate to contact me at (330) 963-1249.

Sincerely,

Andrew C. Kocher  
Site Coordinator  
Division of Emergency and Remedial Response

ACK/kss

cc: Bonnie Buthker, Ohio EPA, OFFO, SWDO  
Eileen Mohr, Ohio EPA, DERR, NEDO  
JoAnn Watson, U.S. Army Env. Center

John Jent, USACE Louisville  
LTC Tom Tadsen, OHARNG  
Glen Beckham, USACE Louisville

ec: Mike Eberle, Ohio EPA, DERR, NEDO  
Todd Fisher, Ohio EPA, DERR, NEDO





State of Ohio Environmental Protection Agency

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Bob Taft, Governor  
Christopher Jones, Director

May 26, 2004

RE: RAVENNA ARMY AMMUNITION PLANT  
OH5-210-020-736, PORTAGE COUNTY  
CEI NOTICE OF COMPLIANCE

Mark Patterson  
Commander's Representative  
Ravenna Army Ammunition Plant  
8451 State Route 5  
Ravenna, OH 44266-9297

Dear Mr. Patterson:

On April 29, 2004, I, representing the Ohio Environmental Protection Agency's (Ohio EPA), Division of Hazardous Waste Management (DHWM), conducted a hazardous waste compliance evaluation inspection (CEI) of Ravenna Arsenal Ammunition Plant (RVAAP), located at 8451 State Route 5, Ravenna, Ohio. The purpose of the inspection was to determine RVAAP's compliance with Ohio's hazardous waste laws and rules as adopted under the Ohio Revised Code (ORC) Chapter 3734 and Chapter 3745 of the Ohio Administrative Code (OAC). Jim McGee and Christy Esler, of TolTest, Inc. represented the facility.

From April 1, 1950 through September 30, 1993, RVAAP operated the facility, located at the address above. The facility, owned by the United States Army, engaged in the storage and treatment of munitions and munition derivatives. RVAAP operated an Open Burning ("OB") area, an Open Detonation ("OD") area, a deactivation furnace, pinkwater treatment plants and a hazardous waste storage area in accordance with the interim standards found in the Ohio Administrative Code ("OAC") Chapters 3745-65 et seq. since 1980. Currently, RVAAP is undergoing closure under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), and the Resource Conservation and Recovery Act (RCRA) at this site. Hazardous waste generated at the site include: lead-based paint chips, mercury switches, lead anchors, acetone, and explosive material.

A copy of our checklist is enclosed for your information. At the time of the inspection, RVAAP was evaluated for compliance with applicable Hazardous Waste Regulations. No violations of Ohio's hazardous waste laws were found during this inspection.

Failure to list specific deficiencies in this communication does not relieve RVAAP from the responsibility of complying with all applicable regulations. Please be advised that present or past instances of non-compliance can continue as subjects of pending or future enforcement actions.

Should you have any questions or concerns, please do not hesitate to call me at (330) 963-1189.

Sincerely,

Gregory Orr  
Environmental Specialist  
Division of Hazardous Waste Management

GO:cl  
Enclosure

ec: Natalie Oryshkewych, DHWM, NEDO  
Todd Fisher, DERR, NEDO  
Eileen Mohr, DERR, NEDO

Jarnal Singh, DSIWM, NEDO  
cc: Tammy McConnell, DHWM, CO



b. *If so*, what hazardous wastes have been addressed?

- ☐ Solvents
- ☐ Paint related wastes
- ☐ Industrial process wastes (sludges, slags, contaminated waste waters, etc.)
- ☐ Contaminated oils/hydraulic fluids
- ☐ Off-spec chemicals
- ☐ Fluorescent light bulbs
- ☐ Used batteries
- ☐ Shop rags
- ☐ Other (specify): \_\_\_\_\_

c. *If not*, why hasn't the company considered P2?

- ☐ The company just never thought about it.
- ☐ Lack of information about practical alternatives.
- ☐ Lack of capital to make process changes.
- ☐ Lack of internal management support.
- ☐ The company does not generate enough hazardous waste to consider P2.
- ☐ Other reason given (specify): \_\_\_\_\_

2. Does the company plan to do P2 activities in the future? Yes\_\_\_No\_\_\_ N/A X RMK#\_\_\_
3. Would the company be interested in receiving additional information from Ohio EPA about P2? Yes\_\_\_No\_\_\_ N/A X RMK#\_\_\_
4. Did you give the company information about P2 during the inspection? ☐Yes ☐No ☐N/A X RMK#\_\_\_
5. Would the company like a P2 assessment? Yes\_\_\_No\_\_\_ N/A X RMK#\_\_\_

***If the company would like a P2 assessment done at their facility, the inspector must give the company representative a copy of Pollution Prevention Assessments for Hazardous Waste Generators document and discuss it with them.***

6. If the company does not want a P2 assessment, why not?

REMARKS

CONDITIONALLY EXEMPT SMALL QUANTITY GENERATOR REQUIREMENTS

**WASTE EVALUATION**

1. Have all wastes generated at the facility been evaluated? Yes ☒ No ☐ N/A ☐ RMK# ☐  
[3745-52-11]

**GENERATOR CLASSIFICATION**

2. Does the generator produce <100 kg. Of hazardous waste per month? [conditionally exempt small quantity generator ("CESQG")] Yes ☒ No ☐ N/A ☐ RMK# ☐ 1

OCCASIONALLY RVAAP ACTS AS A EPISODIC LQG. AT THE TIME OF THE INSPECTION ALL OF THE LQG REQUIREMENT WERE BEING MET (i.e. TRAINING, CONTINGENCY PLAN, INSPECTIONS, MANIFESTS/LDRS, ETC...) NO HAZARDOUS WASTE HAD BEEN GENERATED SINCE FEBRUARY 2002.

**NOTE:** If quantities of hazardous waste accumulated on-site at any one time exceed 1,000 Kg. - or the generator produces between 100 and 1,000 Kg of hazardous waste per month, it is operating as a Small Quantity Generator ("SQG"). If so, complete the Small Quantity Generator Requirements checklist.

**NOTE:** To convert from gallons to pounds:

Amount in gallons x Specific Gravity x 8.345 = Amount in pounds

**OFF-SITE SHIPMENT OF HAZARDOUS WASTE**

3. Does the CESQG ensure delivery of hazardous waste(s) to an off-site permitted TSD? [3745-51-05(G)(3)] Yes ☒ No ☐ N/A ☐ RMK# ☐

**REMARKS**

AT THE TIME OF THE INSPECTION, RVAAP HAD NOT GENERATED ANY HAZARDOUS WASTE. RVAAP WAS EVALUATED FOR ALL LQG REQUIREMENTS (IN THE EVENT THAT THEY MAY BECOME ONE). THERE WERE NO VIOLATIONS NOTED DURING THE INSPECTION.



# RCRA HAZARDOUS WASTE GENERATOR INSPECTION CHECKLIST

Company: RAVENNA ARSENAL AMMUNITION PLANT EPA ID#: OH5-210-020-736

Street: 8451 STATE ROUTE 5 City: RAVENNA

County: PORTAGE State: Ohio Zip: 44266-9297

Mailing  
Address:

SAME

(If different from above)

Telephone: 330-359-7311

Fax #: 330-358-7314

Owner/

Operator:

SAME

(If different from above)

Street:

City:

State: Ohio Zip: \_\_\_\_\_

Inspection Date(s): APRIL 29, 2004

Time(s): \_\_\_\_\_

Inspection Announced? \_\_\_\_\_ Yes ☒ NO If so, how much advance notice given? \_\_\_\_\_

Name

Affiliation

Telephone

Inspectors:

GREG ORR

OHIO EPA

330-963-1200

Facility

Representative:

JIM McGEE

TOLTEST, INC.

330-358-3005

CHRISTY ESLER

TOLTEST, INC.

330-385-3005

Generator Classification	Waste Management Activity
<input checked="" type="checkbox"/> Conditionally Exempt SQG (CESQG)	<input checked="" type="checkbox"/> Containers
<input type="checkbox"/> Small Quantity Generator (SQG)	<input type="checkbox"/> Tank(s)
<input type="checkbox"/> Large Quantity Generator (LQG)	<input type="checkbox"/> Other (specify)
<input type="checkbox"/> No Generation	

CESQG: < 100 Kg. (approximately 25-30 gallons) of waste in a calendar month







SQG: Between 100 and 1,000 Kg. (about 25 to under 300 gallons) of waste in a calendar month

LQG: >1,000 Kg. (~300 gallons) of waste in a calendar month or > 1 Kg. of acutely hazardous waste in a calendar month

NOTE: To convert from gallons to pounds: Amount in gallons x Specific Gravity x 8.345 = Amounts in pounds

## POLLUTION PREVENTION

**Note to the Inspector:** This checklist has been developed to help the division in gathering general information about the pollution prevention (P2) practices that the company may have initiated or attempted to initiate. The checklist is also used to:

-  Facilitate P2 discussions;
-  Identify barriers to P2;
-  Define the P2 universe;
-  Identify the need for future P2 initiatives;
-  Identify partnership opportunities; and
-  Link companies with better P2 resources.

**P2 IS NOT APPLICABLE AT THE RVAAP FACILITY. THEY ARE UNDERGOING CLOSURE AT THE FACILITY, AND WASTE IS GENERATED FROM REMEDIAL ACTIONS.**

As a prelude to completing this checklist the inspector should use the following list of questions as a way to initiate a dialogue concerning P2:

1. Have you tried to reduce the volume of waste (hazardous and nonhazardous) that you generate?
2. What is the largest waste stream that you generate?
3. How important would it be to you to eliminate that waste stream?
4. Does your company understand the reduced regulatory burden and cost saving benefits that eliminating or reducing a waste stream can have?
5. Could you use better housekeeping practices to reduce the amount of waste that you generate?

If the company responds with one of the canned answers below, the appropriate box should be checked. If the company's response does not correspond to one of the options below, please record the answer in the space provided for in the remarks section.

1. Has the company undertaken any P2 activities to reduce the amount of hazardous waste generated? Yes\_\_\_No\_\_\_ N/A X RMK#\_\_\_
  - a. *If so*, what has the company done to minimize hazardous waste generation?
    - ☐ A change in the process resulting in less waste.
    - ☐ A change in the product resulting in less waste.
    - ☐ Use of fewer and less toxic hazardous raw materials.
    - ☐ Better operations/improved housekeeping.
    - ☐ On-site recycling/reuse of hazardous materials.
    - ☐ Sending waste off-site for recycling/reuse.
    - ☐ Other activities (specify): \_\_\_\_\_