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OHIO E.P.A.
JUN 10 2004
ENTERED DIRECTOR'S JOURNAL

BEFORE THE
OHIO ENVIRONMENTAL PROTECTION AGENCY

In the matter of:

United States Department of the Army	:	Director's Final
Ravenna Army Ammunition Plant	:	Findings and Orders
8451 State Route 5	:	
Ravenna, Ohio 44244-9297	:	

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.

I certify this to be a true and accurate copy of the official document as filed in the records of the Ohio Environmental Protection Agency

5. The purpose of these Orders is as follows:

   a. To require the Respondent to develop and implement:

      i. an RI/FS, a Proposed Plan, a Record of Decision or other appropriate document and a remedy for each AOC or appropriate group of AOCs at the RVAAP; and
      ii. a Facility-Wide Ground Water Investigation, Monitoring and Remediation Program at the RVAAP;

   in conformance with CERCLA, the NCP and these Orders, including the Appendices attached hereto.

   b. To exempt the Respondent from the requirements to:

      i. obtain a hazardous waste facility installation and operation permit, pursuant to ORC § 3734.02(E) for:
         (a) the storage and treatment (destruction) of MEC (excluding bulk storage of munitions and chemical and biological warfare materiel) at Open Detonation Area #2 (OD #2); and
         (b) the in-place treatment (destruction) of MEC (excluding bulk storage of munitions and chemical and biological warfare materiel) discovered at the RVAAP that cannot be safely transported to OD #2; and

      ii. comply with 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 and the Deactivation Furnace, and OAC rule 3745-27-10 for ground water investigation, monitoring and remediation activities conducted at the Ramsdell Quarry Landfill (RQL);

   provided that Respondent shall comply with the requirements of these Orders.

6. The Parties intend that any response action selected, implemented, and completed under these Orders shall be deemed by the Parties to be protective of human health and the environment such that remediation of releases covered by these Orders shall obviate the need for further corrective action under other applicable environmental laws and regulations.

IV. DEFINITIONS

7. Unless otherwise stated, all terms used in these Orders or in any of the Appendices attached hereto shall have the same meaning as defined in ORC Chapters 3734 and 6111 and rules promulgated thereunder, and CERCLA and the rules promulgated thereunder, including the NCP. Whenever the following terms are used in these Orders or in any of the Appendices hereto, the following definitions shall apply:

   a. "ARARs" shall mean applicable or relevant and appropriate requirements as those terms

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,

transportation, disposal, investigation or remediation of contaminants at or migrating from the RVAAP. The term, "document" shall be construed broadly to promote the effective sharing of information between the Army and Ohio EPA.

l. "Defense - State Memorandum of Agreement" or "DSMOA" shall mean the September 1992 agreement, and any modifications thereto, between the Department of Defense ("DoD") and Ohio EPA, to expedite the cleanup of hazardous waste sites on DoD installations in the State of Ohio and to ensure compliance with applicable State law and regulations. The 1992 DSMOA is attached hereto as Appendix D, and incorporated as if fully rewritten herein.

m. "Facility" or "RVAAP" shall mean the Ravenna Army Ammunition Plant, located at 8451 State Route 5 in Portage and Trumbull Counties near Ravenna, Ohio.

n. "Feasibility Study" or "FS" shall mean the development, evaluation, screening and analyses of remedial alternatives for cleanup conducted at an AOC or group of AOCs at the Site in accordance with State and Federal environmental laws.

o. "Funding Availability" or "Available Funds" shall mean: (1) the RVAAP's budget allocation, based on the current obligation plan, with respect to milestones for the current fiscal year (i.e., FY); and (2) the RVAAP's Environmental Management budget allocation, based on the current Installation Action Plan, for determinations with respect to target dates for future fiscal years (e.g., FY+1, FY+2).

p. "Installation Action Plan" or "IAP" shall mean the plan dated January 2004 as amended or revised annually, to define all Installation Restoration Program ("IRP") requirements, propose a comprehensive approach to conduct investigations and remedial actions, and identify possible removals and interim remedial actions at the RVAAP.

q. "Installation Restoration Program" or "IRP" shall mean the Army's program to identify and clean up, where necessary, contaminated lands at Army installations to an acceptable level.

r. "Investigation" shall mean any inquiry conducted by the Respondent in accordance with these Orders. Investigations can either be inspections to determine whether or not certain areas of the Site may be contaminated, or remedial investigations for the purpose of determining the nature and extent of contamination.

s. "Interim Removal Action" shall mean an 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.

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

behalf of the Respondent to implement the final cleanup remedy for an AOC at the Site selected pursuant to the Record of Decision.

dd. "Remedial Design" shall mean the preparation of detailed engineering plans, specifications and construction drawings needed to implement the selected remedial action, i.e., technical analysis and procedures that follow the selection of the remedial action for an AOC at the Site and result in detailed plans and specifications for implementation of the remedial action.

ee. "Remedial Investigation" or "RI" shall mean the investigation conducted by the Respondent, to determine the nature and extent of the contamination at an AOC or group of AOCs at the Site caused by the disposal, discharge or release of contaminants, and includes the gathering of necessary data to support the Feasibility Study and the selection of a remedy for each AOC or group of AOCs at the Site.

ff. "Response" shall mean response as this term is used in the CERCLA and the NCP.

gg. "Response Costs" shall mean those costs that are incurred by Ohio EPA with respect to oversight of the investigation or remediation of the Site.

hh. "Site" shall mean the areas at RVAAP, where the treatment, storage, accumulation, transportation or disposal, or the discharge into waters of the State, of contaminants has occurred, and any other area where such contaminants have migrated or threaten to migrate.

ii. "Section" shall mean a portion of these Orders identified by an upper case Roman numeral.

jj. "Suspect AOC" shall mean an area not currently on the RVAAP AOC list which based upon visual evidence, archival data or substantiated interview(s) represents an area which requires investigation.

kk. "Target Date" shall mean an anticipated completion date for a task that has not been designated as a milestone and shall be a goal for accomplishing a designated task. A target date is not a requirement and is not enforceable.

ll. "Unavoidable Delay" shall mean any event beyond the control of the Respondent which prevents or delays performance of any obligation required by an approved work plan and these Orders, and which could not be overcome by due diligence on the part of the Respondent.

mm. "Unexploded Ordnance" or "UXO" shall mean military munitions that (A) have been primed, fuzed, armed or otherwise prepared for action; (B) have been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations,

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

wastewater from munitions washdown operations at various facilities. Additionally, the RVAAP includes several areas associated with the burning, demolition, and testing of various munitions. These burning grounds and demolition areas are located at several large areas or in abandoned quarries at the RVAAP. Strategic ores and other materials were stockpiled at several locations at the Site; subsequent to removal by the Defense Logistics Agency, the residual materials may have left various contaminants in place. Potential contaminants at the Site include, but are not limited to: primary explosives, secondary explosives, propellants, metals, PCBs, pesticides, waste oils, sludge from load lines, various laboratory chemicals, sanitary waste, mustard agent and petroleum products.

d. At the RVAAP, Respondent generates "hazardous waste," as that term is defined by ORC Section 3734.01 and OAC rule 3745-51-03. Respondent notified U.S. EPA on November 19, 1980 of its hazardous waste activity at the RVAAP and was issued U.S. EPA Identification Number OH5-210-020-736. The RVAAP includes an open burning ("OB") area/unit, and an open detonation ("OD") area/unit (Open Detonation Area #2).

e. On November 8, 1988, Ravenna Arsenal, Inc. submitted a RCRA Part B hazardous waste facility installation and operation permit application for the RVAAP to Ohio EPA, and on June 22, 1992, Ravenna Arsenal submitted a revised Part B permit application to Ohio EPA.

f. At the RVAAP, the Respondent has conducted thermal treatment activities pursuant to exemptions granted on October 1, 1985, May 19, 1986 and July 30, 1992 and through numerous emergency permits which have been issued since 1987.

RVAAP Deactivation Furnace:

g. The RVAAP Deactivation Furnace, established in 1968, was located on the Winklepeck Burning Grounds in the north central portion of the Facility. The burning grounds area covers approximately 200 acres, of which 0.15 acres were designated for burning/detonation activities. On January 31, 1986, Ravenna Arsenal submitted a Part A hazardous waste facility permit application for the RVAAP's hazardous waste storage and treatment operations. The Part A hazardous waste permit application included high temperature munitions demilitarization activities performed in the deactivation furnace. Operation of the deactivation furnace ceased in 1983. By letter dated November 8, 1989, Ravenna Arsenal informed Ohio EPA of Ravenna Arsenal's intent to formally close the deactivation furnace.

h. On July 30, 1992, the Director issued Final Findings & Orders, which exempted Ravenna Arsenal, Inc. from the permitting requirements for OB and OD hazardous waste treatment activities conducted at the RVAAP, and for storage of all hazardous waste generated from such treatment at the RVAAP.

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.

q. By letter dated November 20, 1989, Respondent notified Ohio EPA that it would be unable to complete closure of the RQL by its original target date of November 24, 1989, and requested an extension to complete closure by June 22, 1990. Ohio EPA approved this extension in a letter dated March 6, 1990.

r. By letter dated July 3, 1990, Environmental Design Group, on behalf of the Respondent, notified Ohio EPA that closure of the RQL was completed in accordance with OAC 3745-27-10 (effective July 29, 1976). Ohio EPA confirmed completion of closure activities pursuant to OAC 3745-27-10 (effective July 29, 1976) by letter dated September 17, 1990.

s. OAC rule 3745-27-14(A), effective March 1, 1990, requires a licensee of a solid waste disposal facility that closed in accordance with paragraph (C) of OAC rule 3745-27-10 (effective July 29, 1976) to conduct post-closure care activities for a minimum of thirty years.

t. On July 20, 1998, the Director of Ohio EPA, pursuant to OAC rule 3745-27-13, granted Respondent authorization to conduct investigative activities at and in the vicinity of the RQL. This authorization specifically allowed Respondent to conduct surface and subsurface soil sampling, monitoring well installation, ground water sampling, and sediment sampling activities in order to gather supplemental landfill data and to investigate the surrounding quarry area. The investigative activities were to be conducted under the Department of Defense (DOD) Installation Restoration Program (IRP), and only allowed for activities identified in Respondent's OAC rule 3745-27-13 request, dated June 11, 1998 and June 23, 1998.

RVAAP Installation Restoration Program:

u. In January 2004, Respondent developed and adopted the most recent Installation Action Plan ("IAP") that outlines and defines a multi-year restoration program for the RVAAP. The IAP provides the guidance for a comprehensive approach and associated costs to conduct future investigations and remedial actions at each Area of Concern ("AOC") at the RVAAP.

v. The Respondent prepared and updated the Facility-Wide Sampling and Analysis Plan and Health and Safety Plan for the Site in March 2001. AOC-specific sampling and analysis plans and health and safety plans are developed to supplement and tier under the facility-wide documents. Neither can be implemented without the other and as such, the necessary planned activities and investigations provide for successful and consistent Site investigation.

w. By letter dated March 20, 2001, the Respondent submitted a request to Ohio EPA to exempt the Respondent from requirements to obtain certain environmental permits for cleanup activities to be conducted entirely on site at the RVAAP in order to complete the

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).

ee. Monitoring wells have been installed and sampled at the following AOCs: LL-1; LL-2; LL-3; LL-4; LL-6; LL-9; LL-11; LL-12; Central Burn Pits; Fuze and Booster Quarry pits; Upper and Lower Cobbs Ponds; Winklepeck Burning Grounds; OD#2; and the RQL.

ff. In 1998, fourteen monitoring wells were installed in various locations around the RVAAP to provide background data for naturally occurring constituents (e.g., metals) for the CERCLA investigations at the Site. Seven wells are installed into the glacial materials and seven are installed into the bedrock.

gg. Presently, only the monitoring wells at OD#2 and the RQL are monitored on a regular schedule as per approved ground water monitoring program plans and in accordance with specific OAC rules.

hh. Additional monitoring wells are expected to be installed at the Site as investigations into soil and ground water contamination are completed at additional AOCs under the CERCLA program.

ii. An objective of the CERCLA process is to characterize the nature, rate, and extent of ground water contaminant migration to the extent necessary to select and implement response actions. This process is intended to ensure characterization and remediation of ground water for the Site, including OD#2, the Deactivation Furnace, and the RQL.

jj. In a March 20, 2001 submittal, the Respondent requested that the RVAAP be exempted from the ground water monitoring requirements included in OAC rules 3745-54-90 through 3745-55-01 at OD#2 and the Deactivation Furnace and OAC rule 3745-27-10 at the RQL. Respondent proposed that all ground water monitoring activities be conducted as part of the CERCLA activities at the Site.

kk. In a March 21, 2002 letter to the Respondent, Ohio EPA stated that in order to be exempted from OAC rules 3745-54-90 through 3745-55-01 and 3745-27-10, the Respondent must commit to "ensuring that the ground water and surface water will be regularly monitored at these units," and that a Facility-wide ground water monitoring program be instituted.

ll. Ohio EPA and the Respondent desire to avoid duplication and to integrate the ground water monitoring activities required by OAC rules 3745-54-90 through 3745-55-01 and 3745-27-10 with the Facility-wide CERCLA ground water investigation, monitoring, and remediation activities.

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.

VI. EXEMPTIONS

9. Respondent is hereby exempted from the following requirements, provided that Respondent fully complies with these Orders, including the requirements of Section VIII, Performance of Work by Respondent, and the following conditions:

   a. The requirement to obtain a hazardous waste facility installation and operation permit, as required by ORC § 3734.02 (E), for the storage and treatment (destruction) of MEC (excluding bulk storage of munitions and chemical and biological warfare materiel) at OD #2, and for the in-place treatment (destruction) of MEC (excluding bulk storage of munitions and chemical and biological warfare materiel) discovered at the RVAAP that can not be safely transported to OD#2, provided, however, that Respondent shall comply with all applicable requirements of ORC chapter 3734 and OAC chapters 3745-50 through 3745-68, including but not limited to the hazardous waste requirements set forth at Appendix E.

   b. The requirement to comply with 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 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. In the event that ground water contamination associated with OD#2 activities is detected, Respondent shall comply with the requirements set forth in Section VIII, Performance of Work by Respondent, paragraph 15.c.

      These Orders do not apply to the investigation and remediation of OD#2 soil contamination. The OD#2 soil contamination investigation and remediation will be conducted in accordance with the RCRA closure or other applicable requirements.

   c. The requirement to comply with OAC rules 3745-54-90 through 3745-54-99 and 3745-55-011 for ground water and soil investigation, monitoring and remediation activities conducted at the Deactivation Furnace, 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 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;

(b) Maintaining the integrity and effectiveness of the cap system, including making repairs to the cap system as necessary to correct the effect of settling, dead vegetation, subsidence, erosion, leachate outbreaks, or other events, and preventing run-on and runoff from eroding or otherwise damaging the cap system; and

(c) Conducting quarterly inspection of the RQL during each year of the post-closure care period and submitting a written summary to Ohio EPA not later than fifteen (15) days after each inspection, detailing the results of the inspection and a schedule of any actions to be taken to maintain compliance with subparagraphs (a) and (b) above.

10. The Director's Final Findings and Orders issued on July 30, 1992 regarding the RVAAP are hereby terminated.

VII. GENERAL PROVISIONS

11. Commitment of Respondent

Respondent shall perform the Work in accordance with these Orders, including but not limited to the documents listed in the RVAAP Document Compendium, Appendix B and the schedules set forth in the IAP (Appendix C) and future IAPs.

12. Compliance With Law

a. Respondent shall comply with all requirements and conditions of these Orders. Respondent's failure to so comply may result in revocation of the exemptions provided in these Orders and further legal action by Ohio EPA.

i. All activities conducted at the RVAAP shall be accomplished in compliance with all applicable state and federal laws and regulations, including but are not limited to, control of air emissions, control of leachate, surface water run-on and run-off, and protection of ground water.

ii. Any activities undertaken at the RVAAP shall not create a nuisance and shall not adversely affect public safety, human health or the environment.

iii. All solid or hazardous waste removed during intrusive activities shall be containerized and securely stored until such time as these materials are properly characterized and disposed of in accordance with *ORC* Chapter 3734 and regulations promulgated thereunder.

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

consultants retained to perform Work pursuant to these Orders also comply with the applicable provisions of these Orders.

14. Investigations and Remedial Activities

a. In accordance with the IAP schedule (Appendix C) and future IAP schedules, Respondent shall submit to Ohio EPA a Work Plan for each activity that will be initiated by the Army at the AOCs covered by these Orders. Each Work Plan shall describe all tasks that will be conducted for that activity, and shall include all necessary information to determine if the goals of the investigation or remediation project can be achieved. For example, a work plan that is developed for an RI/FS shall provide for the determination of the nature and extent of the contamination of the AOC caused by the disposal, discharge, or release of contaminants, and for the development and evaluation of remedial alternatives for the cleanup of the AOC.

b. Each Work Plan shall be developed in conformance with CERCLA and the guidance documents listed in Appendix B of these Orders, attached hereto and incorporated herein. If Ohio EPA determines that any additional or revised guidance documents affect the Work to be performed in implementing the investigation or remedial action, Ohio EPA will notify Respondent, and the Work Plan and other affected documents shall be modified accordingly

c. Should Respondent identify any inconsistency between any of the laws and regulations and guidance documents which it is required to follow by these Orders, Respondent shall notify Ohio EPA in writing of each inconsistency and the effect of the inconsistencies upon the Work to be performed. Respondent shall also recommend, along with a supportable rationale justifying each recommendation, the requirement Respondent believes should be followed. Respondent shall implement the affected Work as directed by Ohio EPA.

d. Ohio EPA will review the Work Plans pursuant to the procedures set forth in Section XVIII, Review of Submittals. Upon approval of a Work Plan by Ohio EPA, Respondent shall implement the Work Plan. Respondent shall submit all plans, reports, or other deliverables required under the approved Work Plan, in accordance with the approved schedule, for review and approval pursuant to Section XVIII, Review of Submittals.

e. At the time that the Work Plan is submitted for each activity covered by these Orders, Respondent shall also submit to Ohio EPA for review a health and safety plan developed in conformance with the Facility-Wide Health and Safety Plan, referenced in Appendix B. This health and safety plan shall cover all activities being performed under the Work Plan for which it is being issued.

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

the Site, and determine whether the detonation of such ordnance and explosives, unexploded ordnance, or ordnance and explosives waste at OD#2 has adversely affected the quality of ground water at the Site. In the event that contamination of the ground water associated with these activities at OD#2 is detected, Respondent shall submit for Ohio EPA review and approval, a work plan documenting the activities that will be conducted to determine the full rate, extent, and concentration of this contamination. After determining the full rate, extent and concentration of contamination at OD#2, the Respondent shall submit to Ohio EPA for review and approval, a report documenting the results of the determination and proposing additional activities that shall prevent the migration of such contamination from OD#2 through remediation and/or other controls. These additional activities shall commence immediately following Ohio EPA review and approval of the report. The remedial or other controls shall be in place and functional prior to resuming the detonation of such ordnance and explosives, unexploded ordnance, or ordnance and explosives waste at OD#2.

d. As ground water investigations are completed at each AOC, Respondent shall evaluate those AOC-specific wells for incorporation into the Facility-wide ground water monitoring network. Accordingly, the FWGWMPP will utilize an iterative process, with an annual review and revision cycle to accommodate the addition or deletion of wells from the ground water monitoring network. Any changes to the FWGWMPP shall be approved by Ohio EPA prior to implementation by the Respondent.

e. Provisions for Remediation. If Contamination exceeding the concentration limits is detected in the ground water at the compliance points established at the Site, the Respondent shall develop a Ground water AOC Workplan in accordance with Paragraph 14 of these Orders (Investigations and Remedial Activities).

f. Once remedial activities are determined to be complete, then Respondent may submit to Ohio EPA for review and approval, a request to amend the FWGWMPP for the RVAAP, or the affected portion of the RVAAP, to reduce the monitoring frequency, parameters or other components of the Facility-wide ground water monitoring program. If all other environmental investigations and remedial activities at the RVAAP have been completed when three consecutive years of ground water monitoring demonstrate no concentration limit exceedances, then Respondent may submit to Ohio EPA, for review and approval, a request to cease ground water monitoring activities at the RVAAP and to plug and abandon all remaining ground water monitoring wells at the RVAAP.

16. Plan Amendments

a. If Respondent or Ohio EPA identifies a need to amend an AOC Work Plan or the FWGWMPP, the Respondent or Ohio EPA shall provide written notification within 30 days of the identification of such need and the reasons for such amendment. The

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

comply with the Installation Action Plan for the RVAAP and these Orders. These discussions shall be conducted before the Respondent submits its annual budget request and supporting information to the Army Hampton Roads BRAC/Excess Property Field Office. Ohio EPA will consider funding availability in reviewing the Respondent's proposals for establishing and adjusting milestones and target dates pursuant to these Orders. Ohio EPA's comments to the Respondent may include those additional or accelerated activities recommended by Ohio EPA that are believed by Ohio EPA to be outside of environmental cleanup target funding levels for the RVAAP. The Respondent may revise its budget request and supporting documents to resolve the comments of Ohio EPA. The Respondent reserves the right to identify which activities it believes cannot be accomplished within the established target funding levels for the RVAAP. Nothing herein shall affect the Respondent's ultimate responsibility and authority to formulate and submit to the President appropriate budget requests and to allocate appropriate funds to serve the Respondent's missions.

19. At the conclusion of the IAP Workshop, the Respondent and Ohio EPA will establish milestones and target dates for Work to be performed under these Orders. Milestones shall be established for a one (1) year period consisting of the current federal fiscal year (FY). Enforceable milestones shall be established for the current federal fiscal year (FY), and non enforceable target dates shall be established for future federal fiscal years (e.g., FY+1, FY + 2). The FY+1 target dates shall become the current fiscal year (FY) milestones, and the FY+2 target dates shall become FY+1 target dates. However, milestones and target dates may be adjusted in accordance with paragraph 20 below. The agreed upon milestones and target dates will be set forth in the annual Installation Action Plan. The January 2004 Installation Action Plan is set forth at Appendix C.

20. During the annual IAP Workshop, Respondent and Ohio EPA shall conduct a good faith dialogue to determine whether the schedule and funding structure of these Orders should be modified. Such dialogue shall consider the experiences and perspectives of Respondent and Ohio EPA regarding the implementation of the IAP schedule during the previous federal fiscal year, and the most recent information on current and projected funding availability. If Respondent and Ohio EPA agree that amendment of the IAP milestones and target dates is warranted, Respondent and Ohio EPA shall complete and implement such amendments within six (6) months of the initiation of such dialogue. If the Respondent and Ohio EPA are not able to agree on amendment of the IAP milestones due to changed priorities or lack of funding, the Respondent shall be granted a 12 month extension of any disputed milestone dates. After the extension, any future requests for an additional extension of the milestone date will be obtained in accordance with Section X, Extensions. Unless otherwise agreed by the Ohio EPA, the 12 month extension may only be invoked once every three years. If the Respondent and Ohio EPA disagree regarding the amendment of a target date, either Respondent or Ohio EPA may invoke Section XIX, Dispute Resolution, to facilitate a resolution of the disagreement.

21. It is the Respondent's position that any requirement for payment or obligation of funds by the Army established by the terms of these Orders shall be subject to the availability of appropriated funds, and no provision herein shall be interpreted to require obligation or payment of funds in violation of the

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.

c. Prior to disapproving a requested extension of a milestone, Ohio EPA will consult with the Respondent regarding disapproval of the requested extension. The Respondent and Ohio EPA shall attempt to resolve any disagreement with respect to a requested extension, pursuant to the provisions of Section XIX, Dispute Resolution. A determination by Ohio EPA to disapprove a requested extension of a milestone will be accompanied by a written statement detailing the reasons for the disapproval.

XI ADDITIONAL WORK

23. Ohio EPA or Respondent may determine that, in addition to the tasks defined in an approved Work Plan, additional work may be necessary to accomplish the objective of the Parties as set forth in Paragraph 4 of these Orders. If Ohio EPA determines that additional work is required, Ohio EPA will provide written notice explaining the basis for the determination and the scope of the additional work.

24. Within sixty (60) days of receipt of written notice from Ohio EPA that additional work is necessary, Respondent shall submit a work plan for the performance of the additional work. The work plan shall conform with the standards and requirements set forth in Paragraph 14. of these Orders. Upon approval of the work plan by Ohio EPA pursuant to Section XVIII, Review of Submittals, Respondent shall implement the work plan for additional work in accordance with the schedules contained therein.

25. In the event that Respondent determines that additional work is necessary, Respondent shall submit a work plan for the performance of additional work. The work plan shall conform with the standards and requirements set forth in Paragraph 14 of these Orders. Upon approval of the work plan by Ohio EPA pursuant to Section XVIII, Review of Submittals, Respondent shall implement the work plan in accordance with the schedules contained therein.

XII. AOC CLOSEOUT

26. Following the completion of an AOC-specific remedial investigation and feasibility study, that concludes that further investigation or remediation of the AOC is not necessary, the Respondent shall submit a Record of Decision or other appropriate documentation to Ohio EPA for review, indicating no further action is warranted. The Record of Decision or other appropriate documentation 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 no further action is warranted. Ohio EPA will review Respondent's Record of Decision or other appropriate documentation pursuant to Section XVIII, Review of Submittals. If Ohio EPA, through

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;

a. Monitoring the Work;

b. Conducting sampling;

c. Inspecting and copying records, operating logs, technical aspects of contracts, and/or other documents related to the implementation of these Orders;

d. Conducting investigations and tests related to the implementation of these Orders; and

e. Verifying any data and/or other information submitted to Ohio EPA.

31. To the extent that the Site or any other property to which access is required for the implementation of these Orders is owned or controlled by persons other than Respondent, Respondent shall use its best efforts to secure from such persons access for Respondent and Ohio EPA as necessary to effectuate these Orders.

32. Notwithstanding any provision of these Orders, the State of Ohio retains all of its access rights and authorities, including enforcement authorities related thereto, under any applicable statute or regulation.

XV. PROJECT MANAGERS

33. The Ohio EPA Project Managers for the Site are Eileen Mohr and Todd Fisher. The Respondent's Project Manager is Mark Patterson. If a designated Project Manager is changed, the identity of the successor will be given to the other Party at least ten (10) days before the changes occur, unless impracticable, but in no event later than the actual day the change is made.

34. To the maximum extent practicable, except as specifically provided in these Orders, communications between Respondent and Ohio EPA concerning the implementation of these Orders at a particular AOC shall be made between the Project Managers. Respondent's Project Manager shall be available for communication with Ohio EPA regarding the implementation of these Orders for the duration of these Orders. Each Project Manager shall be responsible for assuring that all communications from the other Party are appropriately disseminated and processed. Respondent's Project Manager or alternate shall be present on the Site or on call during all hours of work at the Site.

35. Without limitation of any authority conferred on Ohio EPA by statute or regulation, Ohio EPA Project Manager's authority includes, but is not limited to the following:

a. Taking samples and directing the type, quantity and location of samples to be taken by Respondent pursuant to an approved work plan;

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.

37. Respondent's progress reports (one copy) shall be submitted to Ohio EPA's RVAAP Project Manager at the following address: Ohio EPA, Northeast District Office, 2110 East Aurora Road, Twinsburg, Ohio 44087, ATTN: Eileen Mohr.

XVII. NOTICE

38. All documents required to be submitted pursuant to these Orders shall be submitted to the following persons at the following addresses:

Ohio EPA:

Ohio Environmental Protection Agency
Northeast District Office
Attn: RVAAP Project Manager
2110 East Aurora Road
Twinsburg, OH 44087

RVAAP:

U.S. ARMY Ravenna Army Ammunition Plant
Attn: Environmental Program Manager
8451 State Route 5
Ravenna, Ohio 44244-9297

or to such persons and addresses as may hereafter be otherwise specified in writing. For technical reports and other documents that are submitted to Ohio EPA for review, comment, approval or other action, three copies of such documents shall be submitted to Ohio EPA.

XVIII. REVIEW OF SUBMITTALS

39. Ohio EPA will review any work plan, report, or other item required to be submitted pursuant to these Orders ("submission") within 45 days from the date of actual receipt of such submission by the Project Manager. This time limitation may be extended by mutual written agreement of the Project Managers. Upon review, Ohio EPA may in its sole discretion: (a) approve the submission in whole or in part; (b) approve the submission upon specified conditions; (c) modify the submission; (d)

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.

46. 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. Elements of the Work not affected by the dispute shall be completed in accordance with applicable schedules and time frames.

XX. REIMBURSEMENT OF COSTS

47. Ohio EPA has incurred and continues to incur Response Costs in connection with the Site. Respondent shall reimburse Ohio EPA for all Response Costs incurred both prior to and after the effective date of these Orders.

48. All costs incurred by Ohio EPA under these Orders shall be reimbursed in accordance with the procedures set forth in the DSMOA (Appendix D).

49. Respondent shall not be required to reimburse Ohio EPA under these Orders for any formal enforcement activities that may be taken by Ohio EPA, i.e., notices of violation, administrative enforcement orders, and litigation by Ohio EPA to seek sanctions against Respondent for violations of state law or regulations. However, Ohio EPA regulatory and compliance assurance activities at the Site, including permitting to the extent required by law and inspection activities, shall be reimbursable services.

XXI. RESERVATION OF RIGHTS

50. Upon completion of the Dispute Resolution Process (Section XIX), Ohio EPA reserves the right to seek legal and/or equitable relief to enforce the terms and conditions of these Orders, including penalties against Respondent in accordance with ORC § 3734.13 and ORC § 6111.09 for noncompliance with these Orders. Except as provided herein, Respondent reserves any rights it may have to raise any legal or equitable defense in any action brought by Ohio EPA to enforce the terms and conditions of these Orders.

51. Nothing contained herein shall be construed to prevent Ohio EPA from exercising its lawful authority to require the Respondent to perform additional activities at the RVAAP, pursuant to ORC Chapter 3734 or 6111 or any other applicable law in the future. Nothing contained herein shall restrict the right of the Respondent to seek administrative or judicial review, or raise any administrative, legal or equitable claim or defense with respect to such further actions which Ohio EPA may seek to require of the Respondent.

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.

59. Respondent shall preserve for the duration of these Orders and for a minimum of ten (10) years after termination of these Orders, all documents and other information within its possession or control, or within the possession or control of its contractors or agents, which in any way relate to the Work, notwithstanding any document retention policy to the contrary. Respondent may preserve such documents by microfiche, or other electronic or photographic device. At the conclusion of this document retention period, Respondent shall notify Ohio EPA at least sixty (60) days prior to the destruction of these documents or other information; and upon request, shall deliver such documents and other information to Ohio EPA.

XXIII. OTHER CONTRACTS

60. Ohio EPA shall not be considered a party to and shall not be held liable under any contract entered into by Respondent in carrying out the activities pursuant to these Orders.

XXIV. OTHER CLAIMS

61. Nothing in these Orders shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person, firm, partnership or corporation, not a Party to these Orders, for any liability arising from, or related to, the operation of the RVAAP or events or conditions at the Site.

XXV. OTHER APPLICABLE LAWS

62. All actions required to be taken pursuant to these Orders shall be undertaken in accordance with the requirements of all applicable local, state and federal laws and regulations. These Orders do not waive or compromise the applicability and enforcement of any other statutes or regulations applicable to Respondent.

XXVI. WAIVER

63. The Respondent agrees that these Orders are lawful and reasonable, that the times provided for compliance herein are reasonable and that the Respondent agrees to comply with these Orders. The Respondent, by acceptance of these Orders, agrees to comply with these Orders and acknowledges that the Respondent's failure to do so may result in revocation of these Orders, pursuant to Section XXIX. Revocation, and further legal action by Ohio EPA. The Respondent hereby waives the right to appeal the issuance, terms and conditions, and service of these Orders, and it hereby waives any

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.

XXX. TERMINATION

68. Respondent's obligations under these Orders shall terminate when Respondent certifies in writing and demonstrates to the satisfaction of Ohio EPA that Respondent has performed all obligations under these Orders, including the payment of Response Costs, and the Chief of Ohio EPA's Office of Federal Facilities Oversight acknowledges, in writing, the termination of these Orders. If Ohio EPA does not agree that all obligations have been performed, then Ohio EPA will notify Respondent of the obligations that have not been performed, in which case Respondent shall have an opportunity to address any such deficiencies and then seek termination as described above.

69. The certification shall contain the following attestation: "I certify that the information contained in or accompanying this certification is true, accurate and complete." This certification shall be submitted to Ohio EPA by Respondent and shall be signed by an authorized official of Respondent.

70. The termination of these Orders 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.

XXXI. EFFECTIVE DATE

71. The effective date of these Orders is the date these Orders are entered into the Journal of the Director of Ohio EPA.

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

RVAAP-01	Ramsdell Quarry Landfill
RVAAP-02	Erie Burning Grounds
RVAAP-03	Demolition Area #1
RVAAP-04	Open Detonation Area #2
RVAAP-05	Winklepeck Burning Grounds (including Deactivation Furnace)
RVAAP-06	C-Block Quarry
RVAAP-08	Load Line 1 and Settling Pond
RVAAP-09	Load Line 2 and Settling Pond
RVAAP-10	Load Line 3 and Settling Pond
RVAAP-11	Load Line 4 and Settling Pond
RVAAP-12	Load Line12 and Settling Pond
RVAAP-13	Building 1200 and Settling Pond
RVAAP-15	Load Line 6 Treatment Plant
RVAAP-16	Quarry Landfill /Former Fuze and Booster Burning Pits
RVAAP-18	Load Line 12 Treatment Plant
RVAAP-19	Landfill North of Winklepeck
RVAAP-26	Fuze and Booster Area Settling Tanks
RVAAP-28	Mustard Agent Burial Site
RVAAP-29	Upper and Lower Cobbs Pond
RVAAP-30	Load Line 7 Pink Water Treatment Plant
RVAAP-32	40- and 60- mm Firing Range
RVAAP-33	Firestone Test Facility
RVAAP-34	Sand Creek Disposal Road Landfill
RVAAP-35	Building 1037-Laundry Wastewater Sump
RVAAP-36	Pistol Range
RVAAP-37	Pesticide Building S-4452
RVAAP-38	NACA Test Area
RVAAP-39	Load Line 5 Fuze Line 1
RVAAP-40	Load Line 7 Booster Line 1
RVAAP-41	Load Line 8 Booster Line 2
RVAAP-42	Load Line 9 Detonator Line
RVAAP-43	Load Line 10 Percussion Element
RVAAP-44	Load Line 11 Artillery Primer
RVAAP-45	Wet Storage Area
RVAAP-46	Buildings F-15 and F-16
RVAAP-47	Building T-5301
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";

xi. Final (July, 1996), Phase I Remedial Investigation Site Safety and Health Plan, Addendum for High Priority Areas of Concern for the Ravenna Army Ammunition Plant, Ravenna, Ohio";

xii. (October-November 1996), "Sampling Plan, Relative Risk Site Evaluation for Ravenna Army Ammunition Plant, Project Number 37-EF-5360-97, Ravenna, Ohio;

xiii. (January 1998), "Sampling and Analysis Plan Addendum for the Phase II Remedial Investigation for Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant, Ravenna, Ohio;

xiv. (February 1998), "Remedial Investigation Report for the Phase I Remedial Investigation of High Priority Areas of Concern at the Ravenna Army Ammunition Plant, Ravenna, Ohio. Volume I Main Text;

xv. (February 1998), "Remedial Investigation Report for the Phase I Remedial Investigation of High Priority Areas of Concern at the Ravenna Army Ammunition Plant, Ravenna, Ohio. Volume II Appendices A-K;

xvi. (April 1998), "Safety and Health Plan Addendum for the Phase II Remedial Investigation of the Winklepeck Burning Grounds and Determination of Facility-Wide Background at the Ravenna Army Ammunition Plant, Ravenna, Ohio;

xvii. March 2000 - Installation Action Plan for the Ravenna Army Ammunition Plant

xviii. _____ 2001 - Installation Action Plan for the Ravenna Army Ammunition Plant

xix. February 2002 - Installation Action Plan for the Ravenna Army Ammunition Plant

xx. Final (March 2001) Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio

xxi. Final (March 2001) Facility-Wide Health and Safety Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio

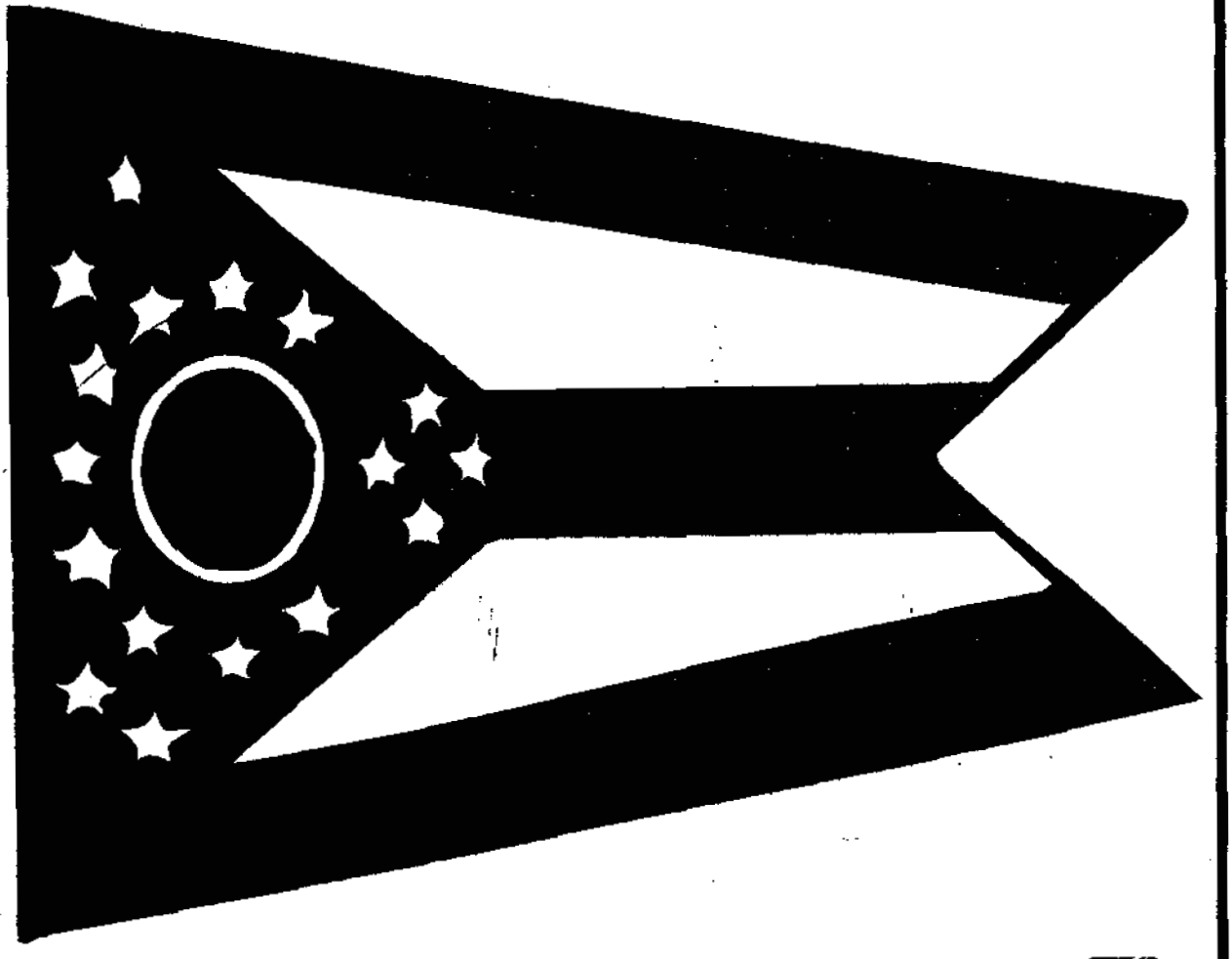
xxii. (May 1999) Hazardous and Medical Waste Study No. 37-EF-5360-99 Relative Risk Site Evaluation for Newly Added Sites at the Ravenna Army Ammunition Plant, Ravenna, Ohio, 19-23 October

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



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Statement of Purpose

The purpose of the Installation Action Plan (IAP) is to outline the total multi-year restoration program for an installation. The plan will define Installation Restoration Program (IRP) requirements and propose a comprehensive approach and associated costs to conduct future investigations and remedial actions at each Area of Concern (AOC) at the installation.

In an effort to coordinate planning information between the IRP manager, major army commands (MACOMs), installations, executing agencies, regulatory agencies, and the public, an IAP has been completed for the Ravenna Army Ammunition Plant (RVAAP). The IAP is used to track requirements, schedules and tentative budgets for all major Army installation restoration programs.

All site-specific funding and schedule information has been prepared according to projected overall Army funding levels and is therefore subject to change during the document's annual review. Under current project funding, all remedies will be in place at the RVAAP by the end of FY 2014.

The following people contributed this the IAP.

Glen Beckham	Army Corp of Engineers, Louisville
Dr. David J. Brancato	Army Corp of Engineers, Louisville
Bonnie Buthker	Ohio Environmental Protection Agency
Todd R. Fisher	Ohio Environmental Protection Agency
Tiffany Gates-Tull	Engineering & Environment for AEC
John Jent	Army Corp of Engineers, Louisville
Joe King	Army Environmental Center
Timothy Lamb	Army Corp of Engineers, Louisville
Eileen Mohr	Ohio Environmental Protection Agency
Mark Patterson	Ravenna Army Ammunition Plant
LTC Tom Tadsen	Ohio Army National Guard
JoAnn Watson	Army Environmental Center
Paul Zorko	Army Corp of Engineers, Louisville

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

Acronyms & Abbreviations

RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
REM	Removal
RI	Remedial Investigation
RIP	Remedy in Place
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
RTLS	Ravenna Training and Logistics Site
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Application International Corporation
SI	Site Inspection
SVOC	Semi-Volatile Organic Compounds
SWMU	Solid Waste Management Unit
TAPP	Technical Assistance for Public Participation
TNT	2,4,6-trinitrotoluene
TPH	Total Petroleum Hydrocarbons
USACE	United States Army Corps of Engineers
USACHPPM	United States Army Center for Health Promotion and Preventive Medicine
USAEC	United States Army Environmental Center
USAEHA	United States Army Environmental Hygiene Agency (changed to USACHPPM)
USATHMA	United States Army Toxic and Hazardous Materials Agency (replaced by AEC)
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VOC	Volatile Organic Compounds
WBG	Winklepeck Burning Ground

Approval

Ravenna Army Ammunition Plant
Installation Action Plan
FY04

MARK C. PATTERSON
Facility Manager
Ravenna AAP

KENNETH E. WIGGANS
Chief, Oversight North Branch
US Army Environmental Center

RANDALL J. CERAR
Chief, Cleanup Division
US Army Environmental Center

Summary

STATUS	RVAAP is not a NPL site. RVAAP had submitted a Part B permit application to U. S. and Ohio Environmental Protection Agencies. The application covered the installation's interim status RCRA sites. The permit application was withdrawn during the 3rd quarter of FY94. The installation is currently negotiating Director's Findings and Orders with the Ohio EPA to cover future hazardous waste activities needed for closure of RVAAP.
NUMBER OF SITES:	51 AEDB-R sites 29 Active ER,A Eligible Sites 4 Sites under PBC 18 Response Complete under ER,A 0 MMRP Sites
DIFFERENT SITE TYPES:	3 Burn Areas 1 Contaminated Soil Pile 1 Firing Range 3 Landfills 1 Pesticide Shop 6 Spill Site Area 6 Waste Treatment Plants 3 Other (RVAAP-17, 35, 38) 1 Explosive Ordnance Disposal Area 1 Unexploded Munitions/Ordnance 1 Contaminated Building 3 Disposal Pit/Dry Wells 2 Industrial Discharges 1 Pistol Range 4 Storage Areas 9 Surface Impoundment/Lagoons 2 Underground Storage Tanks 3 Above Ground Storage Tanks
CONTAMINANTS OF CONCERN:	Explosives, Heavy Metals, Propellants, Pesticides (PCBs), SVOCs, VOCs
MEDIA OF CONCERN:	Groundwater, Soil, Surface Water, Sediment
COMPLETED REM/IRA/RA:	RVAAP-47, Building T-5301 IRA RVAAP-03, Open Demo Area #1
CURRENT IRP PHASES (per funding):	RI/FS at 16 sites; RD at 2 sites; LTM at 1 sites PBC at 4 sites
PROJECTED IRP PHASES (per funding):	RI/FS at 21 sites; RD at 18 sites; RA at 19 sites RA(O) at 1 site; LTM at 23 sites; PBC at 4 sites
IDENTIFIED POSSIBLE 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
FUNDING:	PRIOR YEAR FUNDS $31,797,422.32 FUTURE REQUIREMENTS $36,718,000 TOTAL $68,515,422.32
DURATION:	YEAR OF IRP INCEPTION: 1989 PROJECTED COMPLETION DATE OF ALL RAs: 2014 YEAR OF IRP COMPLETION 2015+

Installation Information

SITE DESCRIPTION:

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.

COMMAND ORGANIZATION:

INSTALLATION: Ravenna Army Ammunition Plant, Commander's Representative and National Guard Bureau
INSTALLATION MODIFIED CARETAKER CONTRACTOR: Toltest Inc.

IRP EXECUTING AGENCIES:

INVESTIGATION PHASE: U.S Army Corps of Engineers, Louisville District
ACTION PHASE: U.S Army Corps of Engineers, Louisville District

REGULATORY PARTICIPATION:

FEDERAL: U.S. Environmental Protection Agency, Region V
STATE: Ohio Environmental Protection Agency (Ohio EPA)

REGULATORY STATUS:

- RCRA Interim Part A Permit
- 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.

Installation Description

HISTORY

RVAAP is a government-owned, contractor-operated (GOCO) U.S. Army BRAC facility. In FY 1993, the mission of RVAAP was changed from inactive-maintained to modified caretaker status (limited mission). Toltest, Inc. is the current modified caretaker contractor. The current mission is storage of bulk explosives and propellants. The installation is contained within an 11 mile long, 3.5 mile wide tract and is bounded by State Route 5, the Michael J. Kirwan Reservoir, 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.

In August 1940, a tract of land covering 25,000 acres was purchased by the United States Government in the northeastern part of Ohio in Portage and Trumbull counties. Construction of the plant started in September 1940 with the Hunkin-Conkey Construction Company as the principal contractor, Wilbur Watson and Associates as the principal engineers, and the Atlas Powder Company as the operating contractor and consultant. The facility was completed and commenced operations during December 1941/January 1942, with the primary missions of depot storage and ammunition loading. To accomplish these two missions, the installation was divided into two separate units, the Portage Ordnance Depot and the Ravenna Ordnance Plant. The Portage Ordnance Depot's primary mission was depot storage of munitions and components, while the Ravenna Ordnance Plant's mission was ammunition loading. In August 1943, the installation was redesignated the Ravenna Ordnance Center, and again in November 1945 as the Ravenna Arsenal.

Facilities were operated by the Atlas Powder Company from September 1940 until the end of World War II. The operation of the plant was turned over to the Ordnance Department. From 1946 to 1949, the ammonium nitrate line was operated by the Silas Mason Company for the production of ammonium nitrate fertilizer.

The plant was placed in standby status in 1950 and operations were limited to renovation, demilitarization, and normal maintenance of equipment, along with storage of ammunition and components.

Beginning in April 1951, facility operations were contracted with Ravenna Arsenal, Inc., a subsidiary of the Firestone Tire and Rubber Company of Akron, Ohio.

The plant was reactivated during the Korean Conflict for the loading and packing of major caliber shells and components. In July 1954, the Plum Brook Ordnance Works of Sandusky, Ohio and the Keystone Ordnance Works of Meadville, Pennsylvania were made satellites to Ravenna. All production ended in August 1957, and in October 1957, the installation was again placed in a standby condition. The Plum Brook Plant ceased to be under the jurisdiction of Ravenna in March 1958. The Keystone Ordnance Works was transferred to the General Services Administration in July 1959.

Rehabilitation work started in October 1960 to establish facilities in the ammonium nitrate line for the processing and explosive melt-out of bombs. These operations commenced in January 1961, thereby establishing the first operation of this type in the ammunition industry. In July 1961, the plant was again deactivated and in November 1961, the installation was divided once again. The industrial portion was redesignated as the Ravenna Ordnance Plant and the entire facility was designated the Ravenna Army Ammunition Plant. The RVAAP was once again reactivated in May 1968 to load, assemble, and pack (LAP) munitions on three load lines and two component lines in support of the Southeast Asian Conflict . These facilities were subsequently deactivated in August 1972. A mission for the demilitarization of the M71A1 90MM projectile extended from June 1973 until March 1974.

In October 1982, the Physics International Company, a subsidiary of Rockcor, Inc., purchased Ravenna Arsenal, Inc. from the Firestone Company. In June 1985, Rockcor Inc. was purchased by the Olin Corporation.

Demilitarization of various munitions continued on a periodic basis through 1992. In FY 1993, the installation's status changed from inactive-maintained to modified caretaker. On October 1, 1998, R&R International, Inc. took over as the installation's contractor (R&R was later replaced by Toltest, Inc).

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.

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

The contamination at RVAAP originated from past industrial activities associated with the production and demilitarization of large caliber shells, gravity bombs, and parts for these munitions. RVAAP produced munitions during World War II and the Korean and Vietnam Wars. The industrial operations at RVAAP consisted of 12 production areas known as Load Lines. Load Lines 1 through 4 (melt-pour Lines) were the primary sources of secondary explosives contamination such as TNT, HMX and RDX, which were melted and poured into shell and bomb cavities. Load Line 1 and 12 were used for demilitarization of shells. Load Line 1 was used to produce and recondition tank mines. Workers would periodically use steam and hot water to hose down equipment and the floors and walls of buildings contaminated with explosive dust, spills, and vapors. The explosive-contaminated water from the cleaning, known as "pink water", then drained out doorways and through floor drains onto the soils surrounding the buildings or was discharged into open ditches or ponds after being filtered through saw dust to remove suspended explosives. Waste explosives from the melt pour Lines were routinely disposed of by open burning and detonation at other sites on the installation.

Load Lines 5 through 11 (fuze and booster) were used to manufacture fuzes, primers, and boosters while Load Line 12 housed the ammonium nitrate plant. Potential contaminants in Lines 5 through 11 include lead azide, mercury fulminate, lead styphnate, black powder, heavy metals, TNT, and Composition B. The amount of explosives used at the fuze and booster Lines was much less than that used at the melt-pour Lines because of the types of small munitions components being made there. Also, the operations did not create as much waste and were cleaner due to the special handling procedures needed when working with the highly shock and heat sensitive primary explosives. Load Line 12 produced ammonium nitrate for explosives, fertilizers and aluminum chloride. It also was periodically used for demilitarization projects involving the melt-out of TNT and other secondary explosives from the cavities of bombs and shells. As in the other melt pour Lines, these activities resulted in pink water being released to the soils, ditches, and ponds in and around the Line. Other types of contaminated sites associated with past industrial activities at RVAAP include landfills, testing facilities, dumps, burial sites, a pistol range, storage facilities, a scrap yard, and decontamination buildings. Although not present at every one of these sites, the contaminants of potential concerns include primary and secondary explosives, propellants, heavy metals, volatile and semivoltile organics, PCBs, and pesticides. Industrial activities ceased in 1992 when RVAAP was declared excess.

RVAAP started the IRP in 1989. Currently there are 32 active sites and 4 PBC sites in the program. The sites were given a RRSE rating of high, medium, or low based on the results of limited sampling in 1996 and 1998. Sampling has been done of the soil, sediment, surface, and groundwater at many of the high sites and a some of the medium sites as part of the remedial investigation process during the past 7 years.

Preliminary well sampling, conducted by Ohio EPA in 1997 and 1998, showed no off-post explosives contamination of residential wells.

A Phase I RI examined 11 high priority sites identified as RVAAP-04, 05, 08, 09, 10, 11, 12, 13, 18, 19, and 29. A final RI report was issued in 1997. The study concluded that Load Lines 1-4, and 12 appeared to be the most contaminated, contaminants were probably not migrating far from the sources in significant concentrations, and the RRSE score of three sites (RVAAP-13, 19, 29) should be lowered to medium. The report recommended further study in the form of a Phase II RI at these sites to determine the nature, extent and significance of contamination.

Investigation of Winklepeck Burning Grounds (WBG) is the furthest along of all the AOCs. The 200-acre site has high explosives and heavy metals soil contamination at many of the 70 burn pads. The concentrations are highest on the pads in the northeast and northwest. Soils at seven of the pads were identified as having significant risk for humans for at least one of the seven evaluated receptors. Significant soil contamination has been found to a depth of 6 feet at some of the most heavily used pads. Soils contamination between the pads was occasionally found. The study identified at least one animal species at every pad that would be potentially at risk. A field truthing ecological study of WBG was started in order to further evaluate the results of the screening risk assessment. It is nearing completion. Low levels of explosives were detected in the groundwater at two wells and the sediment at WBG. No COPCs were identified for human or ecological receptors exposed to

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 Perforance 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 newesy stategy to accelerate clean up programs nationwide. The project will result in an interim remedy. Additional investigations of the soils under the inaccessable 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.

Previous Studies

Title	Author	Date
Installation Assessment of Ravenna Army Ammunition Plant. Report No. 132	USATHMA	Nov-78
Ravenna Army Ammunition Plant RCRA Facility Assessment Draft RR/VSI Report	Jacobs Engineering Group, Inc.	Oct-89
Hazardous Waste Management Study No. 37-26-0442-84: Phase 2 of AMC Open Burning/Open Detonation Groundwater Evaluation	USAEHA OSC/Specpro	Oct-89
Facility-Wide Safety and Health Plan for the Ravenna Army Ammunition Plant	OSC/mkm	Feb-96
Preliminary Assessment for the Characterization of Areas of Contamination	OSC/mkm	Feb-96
Action Plan for the Ravenna Army Ammunition Plant	OSC/mkm	Mar-96
Facility-Wide Sampling and Analysis Plan for the Ravenna Army Ammunition Plant	OSC/Specpro	Apr-96
Phase 1 Remedial Investigation Sampling and Analysis Plan Addendum for High Priority Areas of Concern for the Ravenna Army Ammunition Plant	OSC/Specpro	Jul-96
Phase 1 Remedial Investigation Site Safety and Health Plan Addendum for High Priority Areas of Concern for the Ravenna Army Ammunition Plant	OSC/mkm	Jul-96
Investigation-Derived Waste Characterization and Disposal Plan for the Phase I RI of High Priority Areas of Concern at RVAAP	USACE OSC/mkm	Dec-96
Public Meeting Briefing - Phase I RI of High Priority AOCs at the RVAAP	USACE	Sep-97
Quality Control Plan for the phase II RI for Winklepeck Burning Grounds at RVAAP	USACE	Jan-98
Sampling and Analysis Plan Addendum for the Phase II Remedial Investigation for Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant		Jan-98
Remedial Investigation Report for the Phase I Remedial Investigation of High Priority Areas of Concern at the Ravenna Army Ammunition Plant. Volume I Main Text		Feb-98
Remedial Investigation Report for the Phase I Remedial Investigation of High Priority Areas of Concern at the Ravenna Army Ammunition Plant. Volume II Appendixes A-K		Feb-98
Geophysical Survey Results of Mustard Agent Burial Site at RVAAP, Edition 2	USACE	Mar-98
Safety and Health Plan Addendum for the Phase II Remedial Investigation of the Winklepeck Burning Grounds and Determination of Facility-Wide Background		Apr-98
Geophysical Survey Results of mustard Agent Burial Site 1 at RVAAP, Edition 1	USACE	Apr-98
SAP Addendum for the Phase II RI of the Winklepeck Burning Grounds and Determination of facility-Wide Background at the RVAAP	USACE	Apr-98
RCRA Closure Field Investigation Report for the Deactivation Furnace Area, Open Detonation Area, Building 1601, and Pesticides Building at RVAAP	USACE	Jun-98
SAP and SSHP Addendum for the Groundwater Investigation of the Former Ramsdell Quarry Landfill	USACE	Jun-98
Hazardous Medical Waste Study RRSE for Newly Added Sites at RVAAP	USACE	Oct-98
October 1998 Quarterly Monitoring Report, Ramsdell Quarry Groundwater Investigation	USACE	Oct-98
Initial Phase Report Groundwater Investigation Ramsdell Quarry at RVAAP	USACE	Jan-99
Initial Phase Report, Groundwater Investigation, Ramsdell Quarry Landfill	USACE	Jan-99
February 1999 Quarterly Monitoring Report, Ramsdell Quarry Groundwater Investigation	USACE	Feb-99
Quarterly Monitoring Report, Ramsdell Quarry Groundwater Investigation	USACE	Apr-99
Phase II RI Report for the Winklepeck Burning Grounds at RVAAP	USACE	Aug-99
Sampling and Analysis Plan Addendum No. 1 for the Phase II RI of Load Line	USACE	Aug-99
SAP Addendum No. 1 for the Phase II RI Load Line 1	USACE	Aug-99
Environmental Information Management Needs Assessment	USACE	Sep-99
SAP Addendum No. 1 for Phase 1 RI of Demo Area 1 at RVAAP	USACE	Oct-99
SSHP Addendum No. 1 for Phase I RI of Demo Area 1 at RVAAP	USACE	Oct-99
Draft- Vegetation Methods for Ground-Truthing of Ecological Risk at Winklepeck Burning Grounds at the RVAAP, Draft	USACE	Dec-99
Small Mammal Methods for Ground-Truthing of Ecological Risk at Winklepeck Burning Grounds at the RVAAP	USACE	Dec-99
Sampling and Analysis Plan for the Interim Removal Action, Decontamination and Demolition of Building T-5301(AOC 47)	OSC	Feb-00

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

Title	Author	Date
Technical Memorandum, Human Health and Ecological Risk Assessment Approarch for the Load Line 1 and Load Line 2 Phase II Remedial Investigations- Revised Final	SAIC	Aug-02
RVAAPs Facility Wide Human Health Risk Work Plan- Draft	CELRL	Sep-02
RVAAPs Facility Wide Ecological Risk Work Plan- Draft	CELRL	Oct-02
Report on the Biological Field Truthing Effort and Winklepeck Burning Grounds- Draft Final	SAIC	Nov-02
RVAAPs Facility Wide Surface Water Assessment Work Plan- Draft	CELRL	Dec-02
Conceptual Plan For a Facility-Wide Groundwater Monitoring Program Plan For the RVAAP		Aug-03
Final Sampling and Analysis Plan Addendum for the Remedial Investigation at Load Line #6		Sep-03
Final Sampling and Analysis Plan Addendum for the Remedial Investigation at Load Line #9		Sep-03
Final Safety and Health Plan for the Remedial Investigation of Load Lines #6, and #9		Sep-03
Samling & Analysis Plan Addenda for the Phase I/Phase II Remedial Investigation of the Fuse & Booster Quarry Landfill/Ponds at the RVAAP		Oct-03
Safety and Health Plan for the Phase I/Phase II Remedial Investigation of the Fuse & Booster Quarry Landfill/Ponds at the RVAAP		Oct-03
Final Work Plan for the Remedial Design/Removal Action at the Paris-Windham Road Dump		Nov-03
Final Work Plan for the Remedial Design/Removal Action at the Sand Creek Dump		Nov-03
Final Phase II Remedial Investigatin Report for the Winklepeck Burning Grounds at the RVAAP (with revised executive summary)	SAIC	Jun-03
Draft Final Phase II Remedial Investigation Report for Load Line 12 at the RVAAP	SAIC	Oct-03
Final Phase II Remedial Investigation Report for Load Line 1at the RVAAP	SAIC	Jun-03
Preliminary Draft Phase II Remedial Investigation Report for Load Line 2 at the RVAAP	SAIC	May-03
Preliminary Draft Phase II Remedial Investigation Report for Load Line 3 at the RVAAP	SAIC	May-03
Preliminary Draft Phase II Remedial Investigation Report for Load Line 4 at the RVAAP	SAIC	May-03
Preliminary Draft Supplemental Baseline Human Health Risk Assessment for Load Line 1 Alternative Receptors at the RVAAP	SAIC	May-03
Final Facility Wide Ecological Risk Work Plan	CELRL	Apr-03
Draft Facility Wide Human Health Risk Work Plan (Final Due Dec 03)	CELRL	Apr-03
Final Sampling and Analysis Plan Addendum No. 1 for the Phase II Remedial Investigation of the Erie Burning Grounds at the RVAAP	SAIC	Oct-03
Final Site Safety and Health Plan Addendum No. I for the Phase II Remedial Investigation of the Erie Burning Grounds at the RVAAP	SAIC	Oct-03
Final Sampling and Analysis Plan Addendum No. 1 for the Phase I Remedial Investigation of the Ramsdell Quarry Landfill at the RVAAP	SAIC	Oct-03
Final Site Safety and Health Plan Addendum No. I for the Phase I Remedial Investigation of the Ramsdell Quarry Landfill at the RVAAP	SAIC	Oct-03
Final RVAAP Facility Wide Surface Water Assessment Work Plan	CELRL	Jan-03
Ravenna Army Ammunition Plant Community Relations Plan	CELRL	Sep-03

ER,A ELIGIBLE ACTIVE DSERTS SITES

RVAAP-01
RAMSDELL QUARRY LANDFILL

SITE DESCRIPTION

The Ramsdell Quarry Landfill is an unlined, 10-acre landfill in the bottom of an abandoned quarry. Water is ponded in the northern end of the quarry. During the period 1946 to 1950, the site was used as a surface-burning site to thermally treat waste explosives and napalm bombs. No historical information has been located for the period of 1950-1976. Since 1976, the site has been used strictly as a non-hazardous solid waste landfill. A portion of the site was permitted as a sanitary landfill by the state of Ohio from 1978 until its closure in 1990. The landfill is regulated under RCRA while the remaining portion of the quarry is regulated under CERCLA.

Because this unit is unlined, there is potential for releases from the landfill to surrounding soils and groundwater. Five groundwater monitoring wells were installed around the landfill perimeter in 1988. The wells are monitored on a regular basis as part of the landfill closure requirements. New wells were installed in 1998 to further investigate the nature and extent of groundwater contamination at the landfill. A report of findings was published in October 1998. Low levels of explosives and metals have been detected in groundwater.

Additional wells were installed and soil, sediment and surface water samples were taken in fall 2003 to further determine the nature and extent of the contamination of the CERCLA portion of the quarry. A preliminary draft report on the findings is expected by winter 2004.

PROPOSED PLAN

Finalize reports. LTM will follow.

Note: Facility-wide groundwater monitoring will be partially funded under this site.

STATUS

RRSE RATING:
High
CONTAMINANTS:
Explosives, Metals
MEDIA OF CONCERN:
Soil, Groundwater
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	156		420	
IRA				
RD				
RA				
RA(O)				
LTM				614
Total	1,190,000			

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.

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

PROPOSED PLAN

Groundwater, soil and sediment samples will be taken in fall 2003. This report is expected in summer 2004.

Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	16	122		
IRA				
RD				
RA				
RA(O)				
LTM		35	30	30
Total	233,000			

RVAAP-04
OPEN DEMOLITION AREA #2

SITE DESCRIPTION

This AOC was used since 1948 to detonate large caliber munitions and off-spec bulk explosives that could not be deactivated or demilitarized by any other means due to their condition. Detonation was performed in a backhoe-dug pit with a minimum depth of 4 ft. After detonation, metal parts were picked up and removed from the site. The CERCLA (IRP) portion of the site is ~25 acres in size. Contaminants of concern at this site are white phosphorus, explosives, and heavy metals. Sand Creek bisects the site.

A Phase I RI was completed for the site in February 1998. The RI found explosives, particularly TNT, and several inorganics including cadmium, lead and mercury in both the surface and subsurface soils. Concentrations of inorganic compounds in sediment appear to be within site-wide background values. Groundwater is being investigated under the Phase II RI.

There is a smaller 1.5 acre area regulated under RCRA on the north side of Sand Creek, which was regularly used until 1992 for demolition activities. This area is not eligible for ER,A funding. A USAEHA geotechnical study was conducted at this site in 1992, with minor amounts of contamination being detected in the soils. Four groundwater monitoring wells were installed at the AOC as part of the USAEHA study. The wells are currently sampled on a quarterly basis. Low levels of explosives have been periodically detected in RCRA wells. Non-IRP funding was used in 1999 and 2000 to remove UXO/OE to a depth of 4 ft in the area of the 1.5 acre RCRA unit.

IRP funds are being used to characterize and properly handle any contaminated soils within the eligible areas.

In summer 2002, the Phase II RI field work was completed to better delineate the north side and delineate the south side of the AOC.

Work at this site is likely to be eligible for the Military Munitions Response Program (MMRP).

Facility-wide surface water and sediment sampling is being funded under this site, to evaluate the overall biological integrity of surface water by watershed.

PROPOSED PLAN

Prepare a RI report (draft expected in spring 2004). A RD/RA, such as fencing, bank stabilization and soil removal, may be required. LTM will follow.

STATUS

RRSE RATING:
High
CONTAMINANTS:
Explosives, Metals
MEDIA OF CONCERN:
Soil, Groundwater, Surface Water, Sediment
COMPLETED IRP PHASE:
PA/SI, Phase I RI (1998)
CURRENT IRP PHASE:
RI/FS
FUTURE IRP PHASE:
RI/FS (DD), RD, RA, LTM

Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	145	100		
IRA				
RD		18		
RA			1025	40
RA(O)				
LTM				1659
Total	2,987,000			

Aerial Photo of the Demolition Area #2.

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.

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

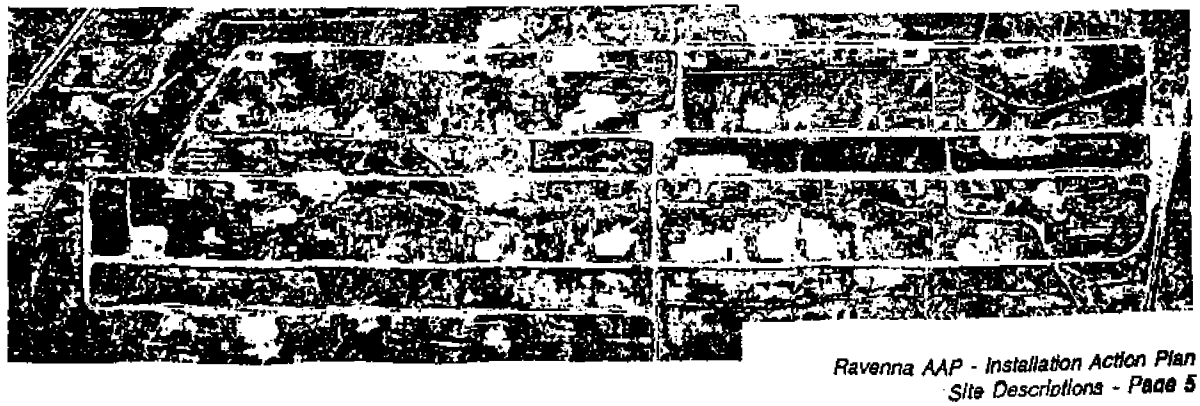
Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	40			
IRA				
RD	69			
RA		600	400	
RA(O)				
LTM			760	240
Total	2,109,000			

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.



RVAAP-06
C BLOCK QUARRY

SITE DESCRIPTION

This AOC is an abandoned borrow pit approximately 0.3 acres in size. The AOC was used as a disposal area for annealing process wastes (chromic acid) for a short time during the 1950s. Liquid wastes were apparently dumped on the ground in the pit bottom. The AOC is now heavily forested with trees of 1 ft diameter or larger. Waste constituents of concern include chromium, lead, and mercury.

A detailed sampling investigation of the soils from this unit in 1986 detected no metals above RCRA-regulated levels.

In the fall of 2001, additional samples were taken. Metals, including hexavalent chromium and organics were detected in soil above screening levels. The amount of contaminated soil is larger than previously expected. Groundwater has not been sampled.

STATUS

RRSE RATING:
Low
CONTAMINANTS:
Metals, Organics
MEDIA OF CONCERN:
Soil, Groundwater
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
None
FUTURE IRP PHASE:
RI/FS, RD, RA, LTM

PROPOSED PLAN

A RI/FS will be completed. Soil removal and LTM may be needed.

Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS				965
IRA				
RD				33
RA				1893
RA(O)				
LTM				454
Total	3,345,000			

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.

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

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 shown any significant contamination. The RI report was finalized in June 2003.

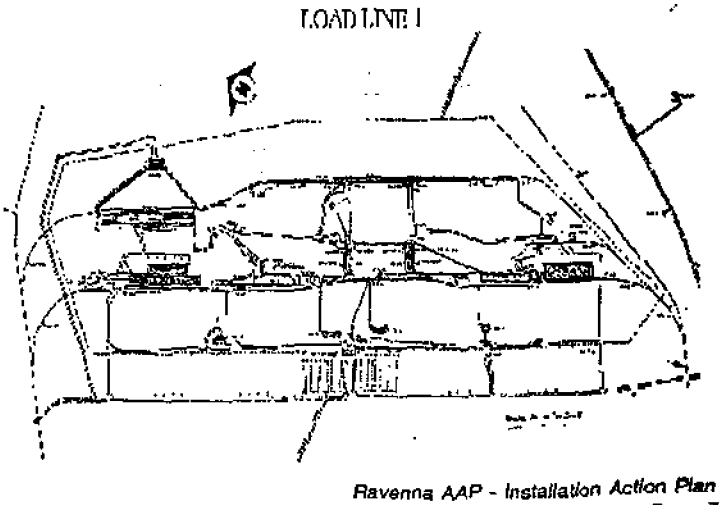
PROPOSED PLAN

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 inaccessable 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 1



RVAAP-09
LOAD LINE 2

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 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 triangular-shaped pond ~2 acres in size and 6 to 8 ft deep. Water from the impoundment was discharged to a surface stream that exited the installation. Contaminants of concern at this unit are explosive compounds and heavy metals (ex., lead, chromium, cadmium, and mercury). There is a high potential for releases from this unit to the soils, surface water/sediments 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 of the findings was submitted in May 2003 with regulatory review completed in June 2003.

STATUS

RRSE RATING:
High
CONTAMINANTS:
Explosives, Metals, SVOCs, VOCs
MEDIA OF CONCERN:
Soil, Groundwater, Surface Water, Sediment
COMPLETED IRP PHASE:
PA/SI, Phase I RI (1998)
CURRENT IRP PHASE:
PBC
FUTURE IRP PHASE:
PBC

Thermal decomposition of the building walls and foundations is being conducted (with non-ER,A funds).

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 inaccessable 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 regultory 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

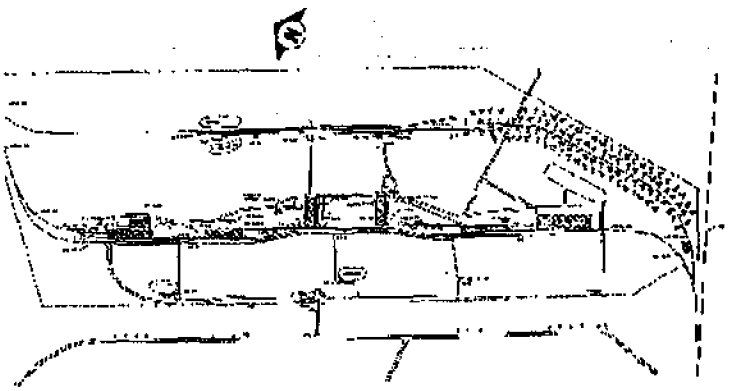
PROPOSED PLAN

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 inaccessable 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-11
LOAD LINE 4

SITE DESCRIPTION

From approximately 1943 to 1971, building wash-down water and waste water 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 triangular-shaped pond ~2 acres in size and 6 to 8 feet deep. Water from the impoundment was discharged to a surface stream that exited the installation. Contaminants of concern at this unit are explosive compounds and heavy metals (ex., lead, chromium, cadmium). 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:
Medium
CONTAMINANTS:
Explosives, Metals, SVOCs, VOCs
MEDIA OF CONCERN:
Soil, Groundwater, Surface Water, Sediment
COMPLETED IRP PHASE:
PA/SI, Phase I RI (1998)
CURRENT IRP PHASE:
PBC
FUTURE IRP PHASE:
PBC

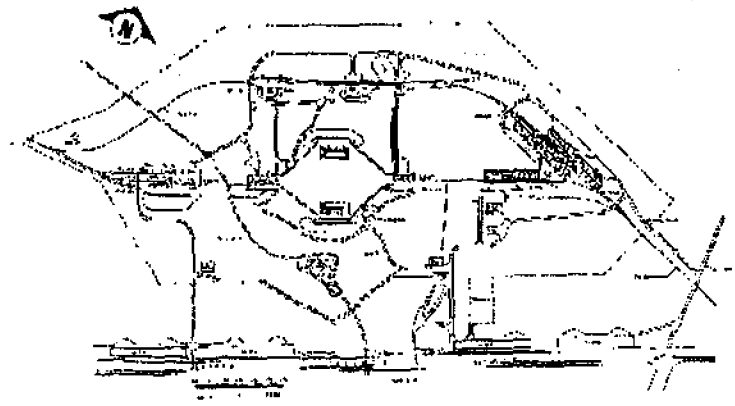
PROPOSED PLAN

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 inaccessable 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 4



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

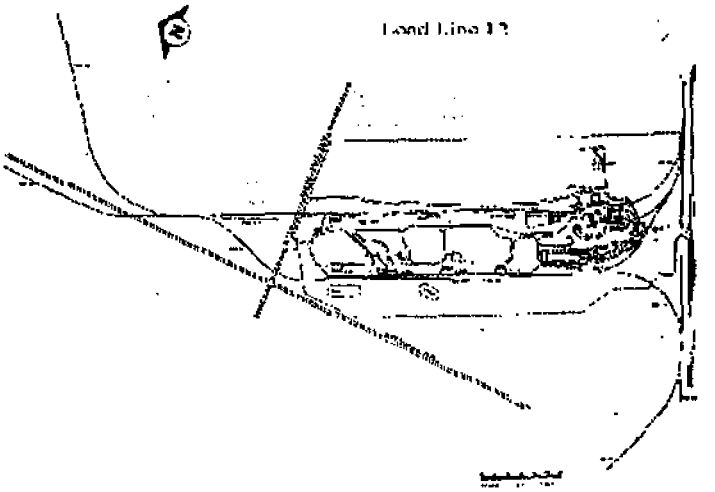
Finalize the RI report. A FS will be completed. Additional soil removal is likely to be required.

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				
Total	1,429,000			



RVAAP-13
BUILDING 1200 DILUTION/SETTLING POND

SITE DESCRIPTION

From approximately 1941 to 1971, ammunition was demilled at this building by steaming munitions rounds. The steam decontamination generated pink water, which drained to a man-made ditch. The ditch discharged into a 0.5-acre sedimentation pond, and the overflow from this pond discharged into Sand Creek. Contaminants of concern at this unit are explosive compounds and heavy metals (including lead, chromium, and mercury). There is a potential for releases from this unit to the soils, surface water/sediment and groundwater.

Limited explosives and metals contamination was detected in the ditch and settling ponds during the Phase I RI.

STATUS

RRSE RATING:
Low
CONTAMINANTS:
Explosives, Metals
MEDIA OF CONCERN:
Soil, Groundwater, Surface Water, Sediment
COMPLETED IRP PHASE:
PA/SI, Phase I RI (1998)
CURRENT IRP PHASE:
None
FUTURE IRP PHASE:
RI/FS, RD, RA, LTM

Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS				686
IRA				
RD				5
RA				213
RA(O)				
LTM				400
Total	1,304,000			

PROPOSED PLAN

A RI/FS will be completed. Soil removal is expected. LTM will follow.

RVAAP-16
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 wascompleted in November 2003.

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				
Total	2,163,000			

PROPOSED PLAN

RI work will be required. A RD/RA of sediment and/or debris removal may be needed.

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 in 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.

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			

PROPOSED PLAN

Groundwater samples will be collected to test for mustard breakdown products.

RVAAP-29
UPPER & LOWER COBB PONDS

SITE DESCRIPTION

The Upper and Lower Cobb Pond complex consists of two unlined ponds that received discharges from Load Lines 3 and 12 explosive waste water treatment systems from 1941 through 1971. Upper Cobb Pond is ~5 acres in size and Lower Cobb Pond is ~4 acres in size.

The Phase I RI found low levels of explosives in sediment; no contaminants were found in the surface water. The Phase II RI field work was completed in the summer 2001. Soil, sediment, surface water and groundwater were sampled. The Preliminary Draft Report is expected to be submitted in spring 2004.

This site is partially addressed under the Facility-Wide Surface Water sampling program.

STATUS

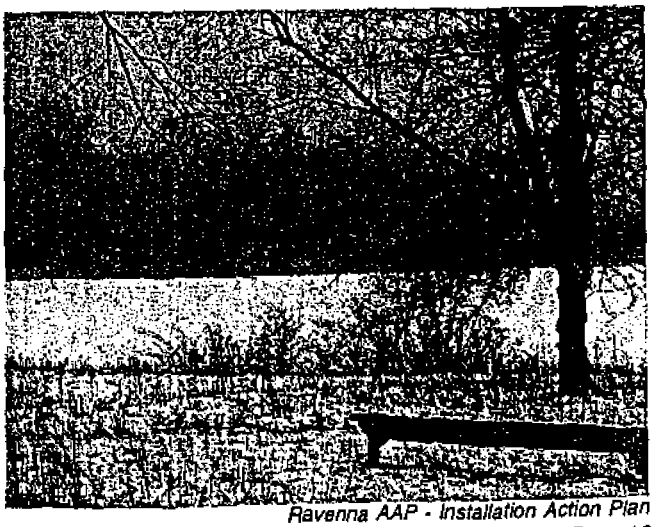
RRSE RATING:
Medium
CONTAMINANTS:
Explosives, Metals, Aluminum Chloride
MEDIA OF CONCERN:
Soil, Groundwater, Surface Water, Sediment
COMPLETED IRP PHASE:
PA/SI, Phase I RI (1998)
CURRENT IRP PHASE:
RI/FS
FUTURE IRP PHASE:
RI/FS, LTM

PROPOSED PLAN

Prepare and submit the RI report. No remedial action is expected. LTM may follow.

Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	49	204		
IRA				
RD				
RA				
RA(O)				
LTM			609	150
Total	1,012,000			



RVAAP-34
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)athracene (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				
Total	60,000			

RVAAP-36
PISTOL RANGE

SITE DESCRIPTION

This AOC was used by the installation security force for pistol qualification. Bullets were fired into the embankment. The unit size is 350 x 150 ft. No original file documentation exists for this site.

CHPPM samples detected lead in the soil at a maximum concentration of 4,309 ppm.

STATUS

RRSE RATING:
Medium
CONTAMINANTS:
Lead
MEDIA OF CONCERN:
Soil, Surface Water, Sediment
COMPLETED IRP PHASE:
PA/SI, RI/FS
CURRENT IRP PHASE:
RD
FUTURE IRP PHASE:
RA

PROPOSED PLAN

RD and RA will include the removal and sifting of the top foot of soil, followed by lime stabilization and return of the sifted soil. The site will be seeded and mulched.

Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS				
IRA				
RD	22			
RA		388		
RA(O)				
LTM				
Total	410,000			

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

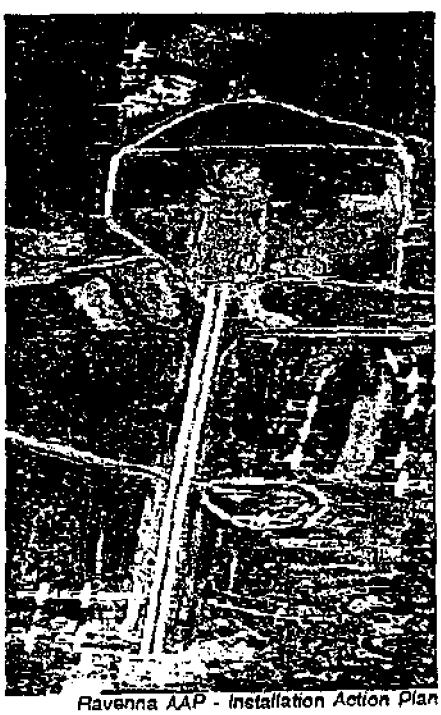
RRSE RATING:
Medium
CONTAMINANTS:
Metals, Inorganics, VOCs
MEDIA OF CONCERN:
Soil, Groundwater, Surface Water, Sediment
COMPLETED IRP PHASE:
PA/SI, Phase I RI
CURRENT IRP PHASE:
None
FUTURE IRP PHASE:
Phase II RI/FS, RD, RA, LTM

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				
Total	1,302,000			



RVAAP-39
LOAD LINE 5

SITE DESCRIPTION

This AOC was a load line that was operated from 1941 to 1945 to produce fuzes for artillery projectiles. Load line 5 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 those buildings that were used to load the black powder and mercury fulminate. 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. Surface soils were found to have a maximum lead concentration of 2,800 ppm. Explosives were not detected in any samples taken by USACHPPM.

Screening groundwater 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. Groundwater was collected from an approximate depth of 12 ft adjacent to the settling tank next to Building 1F-3.

STATUS

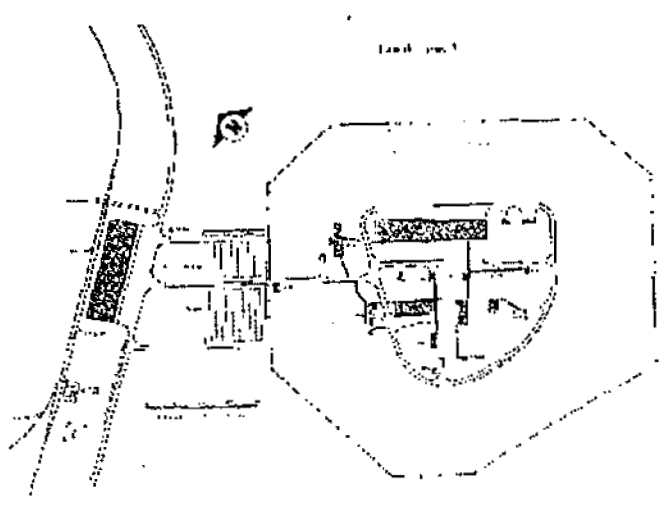
RRSE RATING:
Medium
CONTAMINANTS:
Explosives, Metals
MEDIA OF CONCERN:
Soil, Groundwater, Surface Water, Sediment
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
None
FUTURE IRP PHASE:
RI/FS, RD, RA, LTM

Constrained Cost to Complete				
	2004	2005	2006	2007+
RI/FS				1157
IRA				
RD				8
RA				258
RA(O)				
LTM				369
Total	1,792,000			

PROPOSED PLAN

A RI will be completed. Thermal treatment of buildings will be conducted. A RD/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.



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.

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

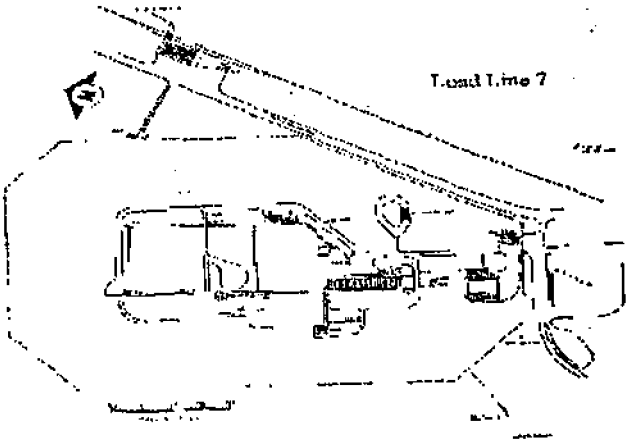
Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS				1157
IRA				
RD				218
RA				258
RA(O)				
LTM				369
Total	1,792,000			

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.



RVAAP-41
LOAD LINE 8

SITE DESCRIPTION

This AOC was used to assemble booster charges for artillery projectiles between 1941 and 1945. Load Line 8 was deactivated and the equipment was removed in 1945.

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 and one groundwater sample were collected from outside of the assembly buildings and analyzed for explosives and metals. The sampling locations were selected based on assembly use. Sample point selection emphasized production and explosives storage buildings. One sediment sample was collected from the small (approximately 10 feet in diameter) settling pond at the AOC and analyzed for the same compounds. No surface water was collected from the settling pond since this would be an intermittent source, and is not significant for the purpose of the RRSE. The subsurface soil used to estimate the groundwater pathway was collected approximately 60 feet north-northwest of Building 2B-1 (downgradient by surface topography). Lead was found in the surface soil at a maximum concentration of 1,000 ppm. No explosives were detected.

STATUS

RRSE RATING:
Medium

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

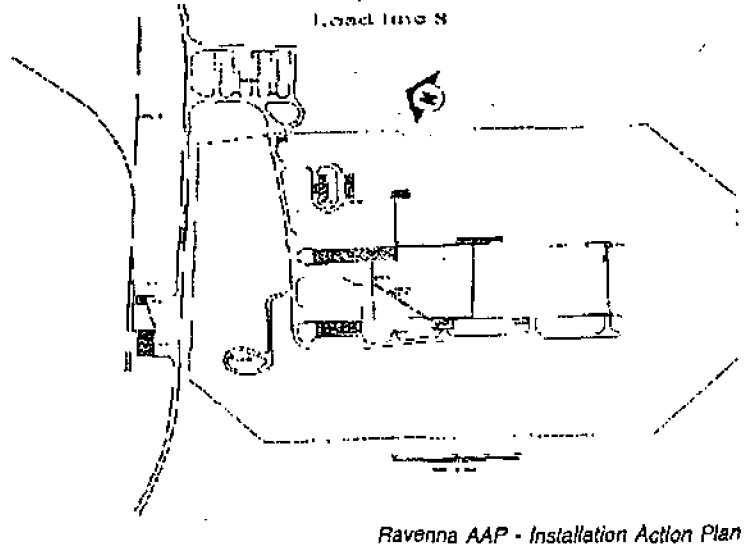
Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS			502	655
IRA				
RD				8
RA				258
RA(O)				
LTM				369
Total	1,792,000			

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.



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.

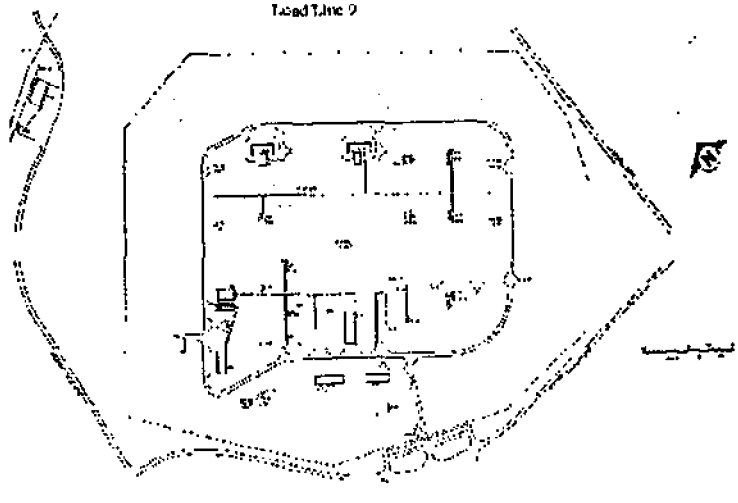
All foundations and footers (to 4 ft bgs) will be removed. Flushing and grouting or removal of the underground utilities will be done as needed. Any residual contamination will be removed. This will be accomplished with non-ER,A funds.

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
Total	764,000			



RVAAP-43
LOAD LINE 10

SITE DESCRIPTION

This AOC operated from 1941 to 1945 to produce percussion elements. Load Line 10 was placed on standby in 1945. From 1951 to 1957, LL-10 produced primers and percussion elements. From 1969 to 1971, LL-10 was used again to produce primers. It has been inactive since.

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, metals and cyanide. The sampling locations were selected based on the production use. Emphasis was placed on those buildings that were used to produce or store the explosives. LL10 is the only load line known to have lead thiocyanate, so cyanide was added to the list of analytes. 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 pathway were evident. Antimony (maximum 600 ppm) and lead (maximum 3,100 ppm) were detected in the surface soil at levels above the RRSE standard concentrations. Small amounts of explosives (2,4,6 TNT, 4am 2,6 DNT and 2am 4,6 DNT) were detected in the surface soil. 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 west site of Bldg PE-6.

STATUS

RRSE RATING:
Medium
CONTAMINANTS:
Explosives, Metals
MEDIA OF CONCERN:
Soil, Groundwater
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
None
FUTURE IRP PHASE:
RI/FS, RD, RA, LTM

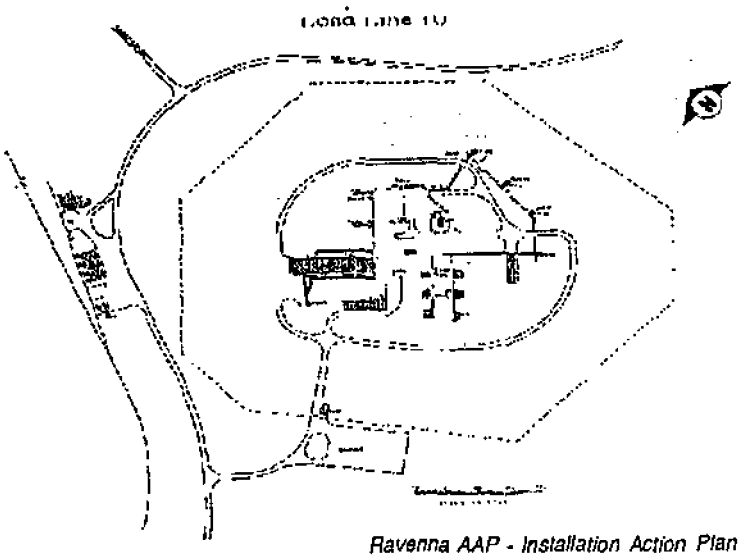
Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS				1229
IRA				
RD				8
RA				258
RA(O)				
LTM				297
Total	1,792,000			

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.



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 permannetly 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.

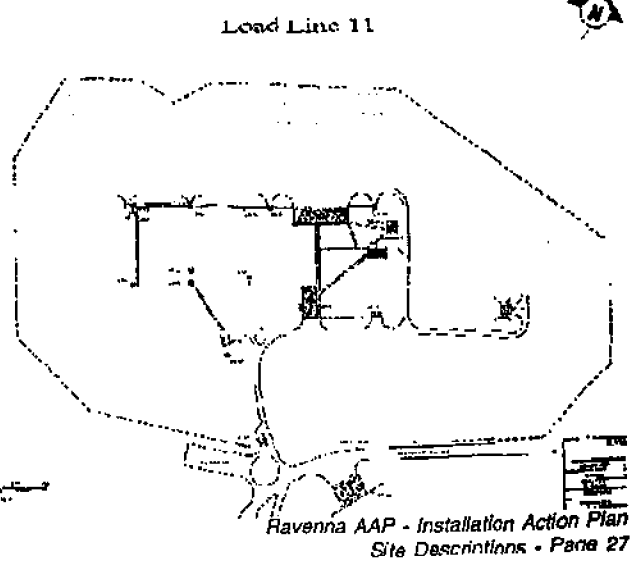
All foundations and footers (to 4 ft bgs) will be removed. Flushing and grouting or removal of the underground utilities will be done as needed. Any residual contamination will be removed. This will be accomplished with non-ER,A funds.

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
Total	589,000			



RVAAP-45
WET STORAGE AREA

SITE DESCRIPTION

This AOC was used from 1941 to 1945 to store (in igloos) lead azide, mercury fulminate and tetryl. The product was stored in water-filled drums. There is no documentation concerning any spills in the area. The surface soil pathway is considered complete.

Five surface soil samples were collected from the AOC and analyzed for explosives and metals. One sample was collected outside the door, just off of the edge of the concrete pad from each of the five buildings used for storage, or from the soil immediately below a discharge from a floor drain. The most significant contaminant concentrations were from lead (3,100ppm), mercury (49ppm) and cadmium (41ppm).

The buildings were thermally treated in spring 2003.

STATUS

RRSE RATING:
Low
CONTAMINANTS:
Metals, Lead Azide, Mercury Fulmate, Tetryl
MEDIA OF CONCERN:
Soil
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
None
FUTURE IRP PHASE:
RI/FS, LTM

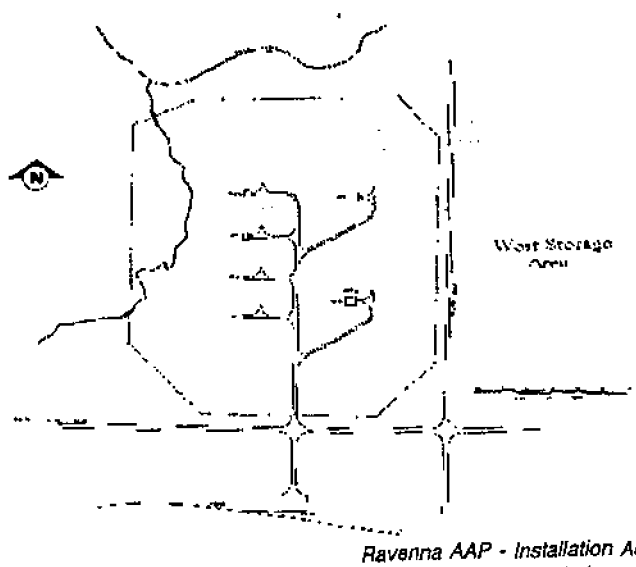
PROPOSED PLAN

The demolition of the structures is expected to be completed by Dec 2003.

Complete a RI. Only limited action is expected once a full and representative sampling program is completed.

Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS				359
IRA				
RD				
RA				
RA(O)				
LTM				120
Total	479,000			



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				
Total	867,000			

RVAAP-48
ANCHOR TEST AREA

SITE DESCRIPTION

Limited information is known about this research and development area. It is believed that the site was used for testing of explosively driven soil anchoring devices. The dates of use for this AOC are unknown. It currently consists of several dirt mounds with a nearby sand pit (~6 x 30ft). There is some metal debris in the area.

The surface soil and groundwater pathways are considered complete. Five soil samples and one Geoprobe groundwater sample were collected from around the dirt mound and in the sand pit. These were analyzed for metals and explosives as part of the USACHPPM study. Arsenic was detected in the groundwater at a maximum concentration of 14.4 ppb; arsenic was also detected in the soil.

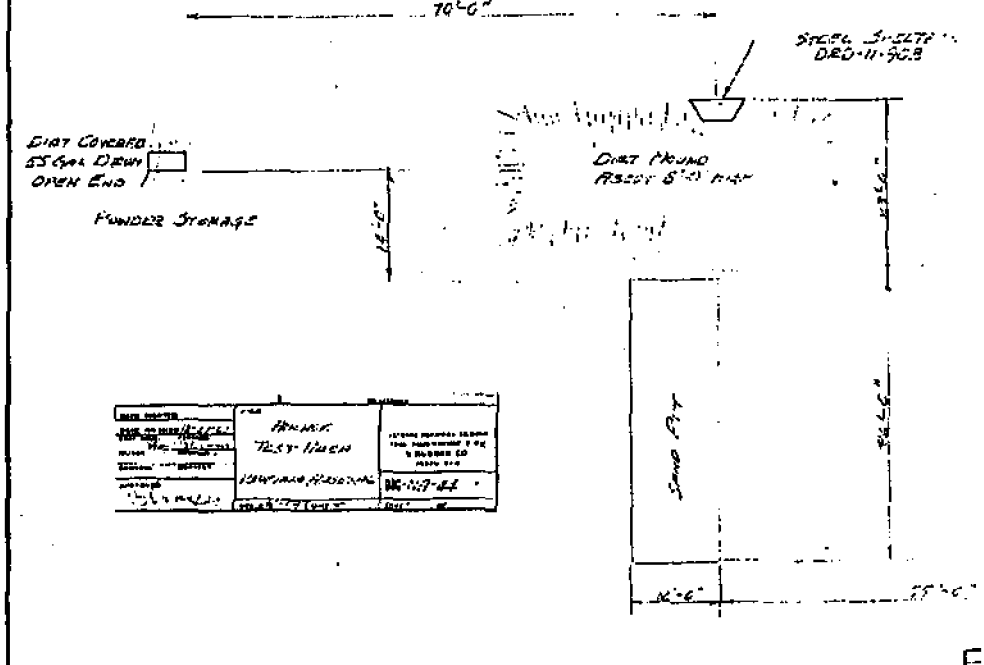
STATUS

RRSE RATING:
Medium
CONTAMINANTS:
Explosives, Metals
MEDIA OF CONCERN:
Soil, Groundwater, Sediment
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
None
FUTURE IRP PHASE:
RI/FS, LTM

PROPOSED PLAN

Limited soil sampling is planned. No remediation is expected. LTM may follow.

Constrained Cost to Complete				
	2004	2005	2006	2007+
RI/FS				284
IRA				
RD				
RA				
RA(O)				
LTM				1137
Total	1,421,000			



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.

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

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.

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-50
ATLAS SCRAP YARD

SITE DESCRIPTION

This AOC is the site of an old construction camp (approximately 150 acres) built to house workers during the construction of the plant. Facilities were demolished following World War II. Since that time, the area has been used as a scrap yard for miscellaneous materials. UXO is present at the southwest corner of the site.

Preliminary samples detected low levels of PAHs in soil and metals in one screening groundwater sample.

Non-IRP sorting and removal of OE and OE scrap at the site has been partially completed. Soil samples showed levels of benzo(a)pyrene (maximum 22 ppm), and dibenzo(a,h)anthracene (maximum 7.3 ppm) above the human RRSE standard concentrations.

STATUS

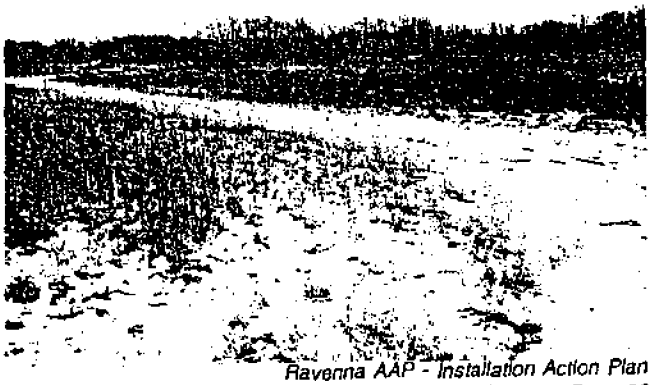
RRSE RATING:
Medium
CONTAMINANTS:
Explosives, Metals, SVOCs, VOCs, PCBs, Herbicides
MEDIA OF CONCERN:
Soil, Groundwater, Surface Water, Sediment
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
None
FUTURE IRP PHASE:
RI/FS, RD, RA, LTM

PROPOSED PLAN

A RI/FS will be completed. A RD/RA of debris and soil removal may be required.

Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS				642
IRA				
RD				80
RA				1156
RA(O)				
LTM				360
Total	2,238,000			



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.

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

PROPOSED PLAN

A removal report will be prepared in winter 2003-4.

Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS				
IRA				
RD				
RA				
RA(O)				
LTM	40	14		
Total	54,000			

RESPONSE COMPLETE SITES

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-14
LOAD LINE 6 EVAPORATION UNIT

SITE DESCRIPTION

This site is not eligible for ER,A funds

From 1981 through 1987, tenant operations at this load line generated building wash down and wastewater, which was discharged into an 18 x 14 x 4 foot concrete tank. This unit was closed under a NPDES closure in 1989. The closure required removal of all contaminated soils associated with the unit. Soil sampling conducted after removal of soils confirmed clean closure of this unit.

This site is RC because it is not eligible for IRP funding.

STATUS

RRSE RATING:
NE
CONTAMINANTS:
Explosives, PCB
MEDIA OF CONCERN:
Soil
COMPLETED IRP PHASE:
PA/SI, RA-RCRA Closure
CURRENT IRP PHASE:
RC - 1989

RVAAP-15
LOAD LINE 6 TREATMENT PLANT

SITE DESCRIPTION

This was an active unit in operation since 1987 by Physics International, which closed in 1993. The unit consists of dual activated carbon units for filtration of pink water generated from load line operations. The wastewater treatment system discharged under an NPDES-permitted discharge to the RVAAP sanitary sewer system. Contaminants of concern at this unit are explosive compounds. There is a low potential for releases from this unit.

This site is RC under the IRP because it's not eligible for IRP funding.

STATUS

RRSE RATING:
Low
CONTAMINANTS:
Explosives
MEDIA OF CONCERN:
Soil
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
RC - 2000

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

RVAAP-20
SAND CREEK SEWAGE TREATMENT PLANT

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. This plant is no longer needed by the installation under modified caretaker status, and was closed in FY 1993 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:
Explosives, PCB
MEDIA OF CONCERN:
Soil, Groundwater
COMPLETED IRP PHASE:
PA
CURRENT IRP PHASE:
RC - 1989

RVAAP-21
DEPOT SEWAGE TREATMENT PLANT

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. This plant is no longer needed by the installation under modified caretaker status and was closed in FY 1993 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, Groundwater
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
RC - 1989

RVAAP-22
GEORGE ROAD SEWAGE TREATMENT PLANT

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

RVAAP-23
UNIT TRAINING EQUIPMENT SITE UST

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-24
WASTE OIL TANK

SITE DESCRIPTION

This site is not eligible for ER,A funds.

This unit is an above-ground storage tank, without secondary containment, for waste oil from the vehicle maintenance operations of an RVAAP tenant organization located in the Depot Area, Bldg. U4, of RVAAP. The tank was used from 1983 to 1993. The contents were emptied and the tank has remained inactive. Contaminants of concern include petroleum and metals. There is a potential for release of contaminants to the surrounding soils and groundwater from this unit.

This site in RC because it is not eligible for IRP funding.

STATUS

RRSE RATING:
Low
CONTAMINANTS:
Waste Oil
MEDIA OF CONCERN:
Soil, Groundwater
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
RC - 1989

RVAAP-25
BLDG. 1034 MOTOR POOL AST

SITE DESCRIPTION

This site is not eligible for ER,A funds.

This unit is an inactive above-ground storage tank used to store waste oil from RVAAP vehicle maintenance operations. Use of the tank began in 1974 and was emptied of all contents in FY93 and remains inactive. Contaminants of concern include petroleum and metals. There is a low potential for release of contaminants to the surrounding soils and groundwater from this unit.

This site in RC because it is not eligible for IRP funding.

STATUS

RRSE RATING:
Low
CONTAMINANTS:
Waste Oil
MEDIA OF CONCERN:
Soil, Groundwater
COMPLETED IRP PHASE:
PA/SI
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-30
LL7 TREATMENT PLANT

SITE DESCRIPTION

This AOC is an inactive dual activated carbon pink waste water treatment unit that was used by Physics International from 1989 through 1992. The discharge from the unit was regulated under the NPDES permit system. Contaminants of concern associated with this unit include explosive compounds.

This site is RC because it is not eligible for IRP funding.

STATUS

RRSE RATING:
Low
CONTAMINANTS:
Explosives
MEDIA OF CONCERN:
Soil
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
RC - 2000

RVAAP-31
ORE PILE RETENTION POND

SITE DESCRIPTION

This unit consists of a small pond constructed to prevent potentially contaminated surface runoff from strategic manganese and chromium ore piles from entering a receiving stream. The pond was constructed in the mid-1950s. There is a potential for release of contaminants from this unit to the surrounding soils, groundwater and surface water/sediment.

This site is RC because it is not eligible for IRP funding.

STATUS

RRSE RATING:
Low
CONTAMINANTS:
Maganese, Chromium
MEDIA OF CONCERN:
Soil, Groundwater, Surface Water
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
RC - 2000

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 originial 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

RVAAP-47
BLDG. T-5301

SITE DESCRIPTION

This building was used to clean and decontaminate explosives and propellants from small, miscellaneous production equipment. Quantities and dates of testing are unknown, but should correspond to the dates of production (intermittent from World War II to Vietnam).

The PA/SI was completed in 1998. The surface soil and sediment pathways are considered complete. The surface water pathway is not considered complete because the ditch no longer has water in it. Two surface soil samples were collected outside of the roll-up door adjacent to the concrete floor and one sediment sample was collected from the drainage ditch outside that drains to Sand Creek. All of the samples were analyzed for metals and explosives. A IRA was completed in FY2000. No industrially related contaminants were found in the soil during the confirmation sampling. Lead was detected in the sediment of Sand Creek at levels slightly above the facility background level.

Ohio EPA has issued a letter stating no further action (under ER,A) is needed at this site provided the elevated lead found in the sediment is addressed during the facility-wide surface water investigation.

STATUS

RRSE RATING:
High
CONTAMINANTS:
Explosives, Metals
MEDIA OF CONCERN:
Soil, Sediment
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
RC - 2001

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 Demolitiona 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 Assements 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

Schedule

PROJECTED MILESTONES

2014
All Remedies In Place (RIP)

2015+
Long-term Monitoring Complete

NO FURTHER ACTION SITES

The following sites currently require no further action under the ER,A program.

RVAAP-03	OPEN DEMOLITION AREA #1	2003
RVAAP-26	FUZE BOOSTER AREA SETTLING TANKS	2000
RVAAP-27	BUILDING 854, PCB STORAGE	1989
RVAAP-47	BUILDING T-5301	2001

The following sites are not eligible for ER,A funds and will be addressed under other programs.

RVAAP-07	BLDG 1601 HAZ WASTE STORAGE	1989
RVAAP-14	LOAD LINE 6 EVAPORATION UNIT	1989
RVAAP-15	LOAD LINE 6 TREATMENT PLANT	2000
RVAAP-17	DEACTIVATION FURNACE	1989
RVAAP-18	LOAD LINE 12 WWT PLANT	1997
RVAAP-20	SAND CREEK STP	1989
RVAAP-21	DEPOT STP	1989
RVAAP-22	GEORGE RD STP	1989
RVAAP-23	UNIT TRAINING EQUIPMENT SITE UST	1989
RVAAP-24	WASTE OIL TANK	1989
RVAAP-25	BUILDING 1034 MOTOR POOL AST	1989
RVAAP-30	LL7 TREATMENT PLANT	2000
RVAAP-31	ORE PILE RETENTION POND	2000
RVAAP-35	1037 BLDG - LAUNDRY WASTEWATER SUMP	2000
RVAAP-37	PESTICIDE BUILDING S-4452	1996

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							

DSERTS #	SITE NAME	PHASE	FY03	FY04	FY05	FY06	FY07	FY08	FY09+
		LTM							
RVAAP-41	Load Line 8 Fuze and Booster (M)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-42	Load Line 9 Fuze and Booster (M)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-43	Load Line 10 Percussion Element (M)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-48	Anchor Test Area (M)	RI/FS							
		LTM							
RVAAP-50	Atlas Scrap Yard (M)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-06	C Block Quarry (L)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-13	Bldg. 1200 (L)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-19	Landfill North of Winklepeck Burning Ground (L)	RI/FS							
		RD							
		RA©							
		RA(O)							
		LTM							
RVAAP-28	Mustard Agent Burial Site (L)	RI/FS							
RVAAP-40	Load Line 7 Fuze and Booster (L)	RI/FS							
		RD							
		RA							
		LTM							
RVAAP-45	Wet Storage Area (L)	RI/FS							
		IRA							

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

FY 1994	Scoping	$9,371.88	$9,371.88
FY 1995	Group A Site/ RI	$225,207.33	
	Group A	$1,007,114.03	$1,232,321.36
FY 1996	Phase I RFI	$15,000	
	Winklepeck Burning Grounds	$21,460.64	
	Demo Area 2	$2,259.78	
	Load Line #1 Dil/ Set Ponds	$23,722.57	
	Load Line #12 Dil/Set	$19,620.97	
	Landfill/ Winklepeck	$2,101.08	
	Load Line #12 Pink Waste	$2,279.6	
	Load Line #3 Dil/Set	$20,502.48	
	Load Line #4 Dil/Set	$2,287.58	
	Upper & Lower Cobb Pond	$2,279.6	
	Load Line #2 Dil/Set	$21,994.65	
	RI/FS Group A Sites	$200,319.16	$333,828.11
FY 1997	RAB Support	$21,590.43	
	Mustard Agent Burial Site	$23,664.74	
	Winklepeck Burning Ground	$1,230,226.72	
	Firestone Test Fac., SI	$50,000	$1,325,481.89
FY 1998	RAB Support	$23,320.96	
	Burning Grounds	$10,000	
	GIS Database Dev P.O.	$28,991.12	$62,312.08
FY 1999	Winklepeck Burning Ground	$75,000	
	NACA Test RI/FS	$12,000	
	Load Line #1 RI/FS	$65,000	
	Erie Burning Ground RI/FS	$761,389	
	Demo Area #1	$42,931	
	NACA Test Area	$43,069	
	RAB Support	$20,000	
	Winklepeck Data Project Order	$20,000	
	Winklepeck Wells Project Order	$20,000	
	NACA Test Area	$386,788	
	Load Line #1 Phase II RI	$25,000	$1,471,177
FY 2000	Erie Burning Grounds RI	$39,200	
	Open Demolition Area #1 IRA	$401,100	
	Open Demolition Area #1 RI	$350,500	
	Open Demolition Area #2 RI	$45,500	
	Winklepeck Burning Grounds RI/FS	$1,432,900	
	Load Line I RI	$230,000	
	Load Line 12 RI	$1,239,800	
	Load Line 12 IRA	$408,700	
	NACA Test Area RI/FS	$138,800	
	Load Line 11 RI	$525,000	
	Load Line 11 RI	$975,000	

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	
	Central Burn Pits RI/FS	$630,000	
	Dump Along Paris-Windham Road RD	$10,000	$4,850,400
FY 2002	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	
	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
FY03	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-01	Ramsdell Quarry Landfill (H)	RI/FS	156	420						576		install 6 wells, 4 sampling events, 15 soil, detailed data analysis, Risk Assessment
		LTM			434	30	30	30	90	614	1,190	12 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report (40K/yr is combination of S&R and QA/QC)
RVAAP-02	Erie Burning Grounds (H)	RI/FS	16	122						138		additional sampling 15 soil, 12SW/sediment, 8 wells, RI report, HH & Eco Risk Characterization, UXO support needed
		LTM		35	30	30				95	233	~8 wells, semi-annual, Final Report
RVAAP-04	Demolition Area #2 (H)	RI/FS	145	100						245		Finalize RI report
		RD		18						18		design of RA
		RA			1,025	40				1,065		soil removal 500cy Haz, 1,600cy removal for bank stabilization ~75ft, closure report
		LTM				699	40	40	880	1,659	2,987	LTM-16 wells, 3 SWs, 6 times/year for 2 yrs, then 8 wells, semi-annual for 8 years, Closure report
RVAAP-05	Winklepeck Burning Grounds (H)	RI/FS	40							40		Ongoing FS, finalize reports, S&R
		RD	69							69		design of RA
		RA		1,000						1,000		Assuming soil removal to 4 ft bgs at ~8 pads (~12,000cy), Screen for explosives, compost & stabil (UXO avoidance)
		LTM			760	40	40	40	120	1,000	2,109	~17 wells, quarterly for 2 yrs, semi for 1 yrs, annual for 2 yrs, closure reports
RVAAP-08	Load Line 1 (H)	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	418	13 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-	Load Line 2 (H)											PBC
RVAAP-	Load Line 3 (H)											PBC
RVAAP-12	Load Line 12 (H)											PBC
RVAAP-16	Fuze and Booster Quarry Landfill/ Pond (H)	RI/FS	487	540	120					1,147		RI/FS including 12 wells, sediment, surface, and soil samples, (UXO complication), Eco data gaps 60K, Facility Wide GW set up in FY05 500K
		RD				15				15		design of RA
		RA					400	166		566		Sediment (1,600cy) & debris removal from ponds, lagoon
		LTM						335	100	435	2,163	12 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report

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	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	20	20	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	192	20	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	30	30	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-36	Pistol Range (M)	RD	22							22	410	design of RA
		RA		388						388		remove top ~foot of soil (~450cy), screen, fix, backfill, reveg etc.

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-38	NACA Test Area (M)	RI/FS	145	332						477		RI/FS including 12 wells, Risk HH & eco, Eco data gaps 60K
		RD		24						24		design of RA
		RA			237					237		soil bio remediation 2 acres
		LTM			414	30	30	30	60	564	1,302	12 wells, starting at quarterly, closure report
RVAAP-39	Load Line 5 Fuze and Booster (M)	RI/FS				997	40	120		1,157		RI/FS including GW, Eco data gaps 60K
		RD							8	8		design of RA
		RA							258	258		soil/sump removal 20cy
		LTM							369	369	1,792	6 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-41	Load Line 8 Fuze and Booster (M)	RI/FS				997	40	120		1,157		RI/FS including GW, Eco data gaps 60K
		RD							8	8		design of RA
		RA							258	258		soil/sump removal 20cy
		LTM							369	369	1,792	6 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-42	Load Line 9 Fuze and Booster (M)	RI/FS	118	83						201		RI/FS including GW, Eco data gaps 60K
		RD			8					8		design of RA
		RA				258				258		soil/sump removal 20cy
		LTM					197	20	80	297	764	6 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-43	Load Line 10 Percussion Element (M)	RI/FS				1,069	40	120		1,229		RI/FS including GW, Eco data gaps 60K
		RD							8	8		design of RA
		RA							258	258		soil/sump removal 20cy
		LTM							297	297	1,792	6 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-48	Anchor Test Area (M)	RI/FS						200	84	284		Phase II RI
		LTM							1,137	1,137	1,421	4 wells, semi-annual
RVAAP-50	Atlas Scrap Yard (M)	RI/FS						492	150	642		UXO support - 100 soil locations, ~6-8 wells, ~8 sediment, 2 surface water, Risk, eco, Eco data gaps 60K
		RD							80	80		design of RA
		RA							1,156	1,156		debis and soil removal
		LTM							360	360	2,238	8 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-06	C Block Quarry (L)	RI/FS							965	965		RI/FS, DD
		RD							33	33		design of RA
		RA							1,893	1,893		Soil removal ~5,000cy
		LTM							454	454	3,345	4 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report

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		complete a RI/FS
		RD							5	5		design of RA
		RA							213	213		200cy soil removal
		LTM							400	400	1,304	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		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	1,916	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		RI/FS including GW, Eco data gaps 60K
		RD							8	8		design of RA
		RA							258	258		soil/sump removal 20cy
		LTM							369	369	1,792	6 wells quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual closure reports
RVAAP-45	Wet Storage Area (L)	RI/FS							359	359		complete RI, site closure
		RA							120	120	479	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
RVAAP-01	Ramsdell Quarry Landfill (H)	RI/FS	156		420					576		install 6 wells, 4 sampling events,15 soil, detailed data analysis, Risk Assessment
		LTM				434	30	30	120	614	1,190	12 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report (40K/yr is combination of S&R and QA/QC)
RVAAP-02	Erie Burning Grounds (H)	RI/FS	16	122						138		additional sampling 15 soil, 12SW/sediment, 8 wells, RI report, HH & Eco Risk Characterization, UXO support needed
		LTM		35	30	30				95	233	~8 wells, semi-annual, Final Report
RVAAP-04	Demolition Area #2 (H)	RI/FS	145	100						245		Finalize RI report
		RD		18						18		design of RA
		RA			1,025	40				1,065		soil removal 500cy Haz, 1,600cy removal for bank stabilization ~75ft, closure report
		LTM				699	40	40	880	1,659	2,987	LTM-16 wells, 3 SWs, 6 times/year for 2 yrs, then 8 wells, semi-annual for 8 years, Closure report
RVAAP-05	Winklepeck Burning Grounds (H)	RI/FS	40							40		Ongoing FS, finalize reports, S&R
		RD	69							69		design of RA
		RA		600	400					1,000		Assuming soil removal to 4 ft bgs at ~8 pads (~12,000cy), Screen for explosives, compost & stabil (UXO avoidance)
		LTM			760	40	40	40	120	1,000	2,109	~17 wells, quarterly for 2 yrs, semi for 1 yrs, annual for 2 yrs, closure reports
RVAAP-08	Load Line 1 (H)	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	418	13 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-	Load Line 2 (H)											PBC
RVAAP-	Load Line 3 (H)											PBC
RVAAP-12	Load Line 12 (H)											PBC
RVAAP-16	Fuze and Booster Quarry Landfill/ Pond (H)	RI/FS	487	540	120					1,147		RI/FS including 12 wells, sediment, surface, and soil samples (UXO complication), Eco data gaps 60K, Facility Wide GW set up in FY05 500K
		RD				15				15		design of RA
		RA					400	166		566		Sediment (1,600cy) & debris removal from ponds, lagoon

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		finalize IRA and RI report
		LTM			449	20	20	20	40	549	589	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		sampling 2 areas
		RD				34				34		design of RA
		RA					420	54		474	867	sediment removal 200cy for explosives & metals, closure docs
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	1,926	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		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	418	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		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	1,012	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		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	1,849	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 #	SITE TITLE (RRSE)	PHASE	FY04	FY05	FY06	FY07	FY08	FY09	FY10+	PHASE TOTAL	SITE TOTAL	DESCRIPTION OF WORK
36		RA		388						388	410	remove top ~foot of soil (~450cy), screen, fix, backfill, reveg
RVAAP-38	NACA Test Area (M)	RI/FS		128	17	332				477		RI/FS including 12 wells, Risk HH & eco, Eco data gaps 60K
		RD				24				24		design of RA
		RA					237			237		soil bio remediation 2 acres
		LTM						414	150	564	1,302	12 wells, starting at quarterly, closure report
RVAAP-39	Load Line 5 Fuze and Booster (M)	RI/FS				997	40	120		1,157		RI/FS including GW, Eco data gaps 60K
		RD							8	8		design of RA
		RA							258	258		soil/sump removal 20cy
		LTM							369	369	1,792	6 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-41	Load Line 8 Fuze and Booster (M)	RI/FS			502	495	40	120		1,157		RI/FS including GW, Eco data gaps 60K
		RD							8	8		design of RA
		RA							258	258		soil/sump removal 20cy
		LTM							369	369	1,792	6 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-42	Load Line 9 Fuze and Booster (M)	RI/FS	118	83						201		RI/FS including GW, Eco data gaps 60K
		RD			8					8		design of RA
		RA				258				258		soil/sump removal 20cy
		LTM					197	20	80	297	764	6 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-43	Load Line 10 Percussion Element (M)	RI/FS				499	610	120		1,229		RI/FS including GW, Eco data gaps 60K
		RD							8	8		design of RA
		RA							258	258		soil/sump removal 20cy
		LTM							297	297	1,792	6 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-48	Anchor Test Area (M)	RI/FS						200	84	284		Phase II RI
		LTM							1,137	1,137	1,421	4 wells, semi-annual
RVAAP-50	Atlas Scrap Yard (M)	RI/FS						492	150	642		UXO support - 100 soil locations, ~6-8 wells, ~8 sediment, 2 surface water, Risk, eco, Eco data gaps 60K
		RD							80	80		design of RA
		RA							1,156	1,156		debis and soil removal
		LTM							360	360	2,238	8 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-	C Block Quarry (L)	RI/FS							965	965		RI/FS, DD

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
06		RD							33	33		design of RA
		RA							1,893	1,893		Soil removal ~5,000cy
		LTM							454	454	3,345	4 wells, quarterly for 2 yrs, 1 yr semi-annual, 2 yrs annual, closure report
RVAAP-13	Bldg. 1200 (L)	RI/FS							686	686		complete a RI/FS
		RD							5	5		design of RA
		RA							213	213		200cy soil removal
		LTM							400	400	1,304	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		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	1,916	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		RI/FS including GW, Eco data gaps 60K
		RD							8	8		design of RA
		RA							258	258		soil/sump removal 20cy
		LTM							369	369	1,792	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		complete RI, site closure
		RA							120	120	479	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.												

COMMUNITY INVOLVEMENT

The RVAAP Restoration Advisory Board (RAB) was established in 1996 and has 25 members consisting of 23 community members and 2 non-community members. The community members include a township appointee from each of the surrounding 6 townships, one representative appointed by the Trumbull County Commissioners, a representative appointed by the Portage County Commissioners, and 15 members chosen from the general public. One of the community members is elected as a community co-chair by majority vote. The two non-community members include a representative of the Ohio EPA and an Army installation co-chair appointed by the installation. A RAB operating procedure was adopted by all members on February 19, 1997. A copy can be found in the RVAAP technical library, as well as two public repositories.

The RVAAP RAB generally meets every two to three months depending on the need for relevant issues to be addressed. All meetings are open to the public and are rotated among public places within the townships around the installation. Current topics are addressed at the meetings and a speaker is generally featured. There have been presentations by the Ohio Department of Health addressing health issues related to the cleanup; by the contractors that are performing remediation work; by WES on the explosive uptake by vegitation; Corps of Engineers describing newly identified contaminated sites; and the Army Center for Health Promotion and Preventative Medicine to explain the rating of AOCs for funding and the process of performing ecological and human health risk assessments. The minutes of all RAB meetings are recorded. All meetings are announced in the local media. A tour for RAB members and the media has been conducted each summer to view AOCs where work is underway. The latest tour was held on July 27, 2002. Regular RAB meetings were held during the past year covering such topics as Guaranteed Fixed Price Remediation (now called PBC) at LLs 1-4, progress of the remedial investigations at Open Demo Area #2 and Fuze and Booster Quarry Ponds/Landfill and thermal decontamination at excess production buildings. A summer tour was not held in 2003 due to the lack of interest.

All IRP records are made available to the RAB members and any other interested parties through the two local libraries. A web site where all IRP and other RVAAP documents will be available is currently under development. RVAAP publishes the semiannual Community Access Newsletters to keep the public up to date on all IRP and other environmental work at RVAAP. The RAB received $25,000 for technical assistance for public participation (TAPP) (technical review) in April 1999. They recently received a second TAPP grant of $25,000. This funding was used to review the Ecological Field Truthing report for Winklepeck Burning Grounds. The review of the report by the TAPP provider and the RAB were favorable.

In 2003, a Community Relation Plan was written to facilitate communication, identify issues of concern and serve as a guide for public involement goals and objectives. The plan outlines the many ways that Ravanna AAP involves the community in the restoration activities, including through the RAB, site tours and issuance of fact sheets and newletters.

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

DEPARTMENT OF DEFENSE AND STATE MEMORANDUM OF AGREEMENT (DSMOA)

In order to expedite the cleanup of hazardous waste sites on Department of Defense (DoD) installations within the State of Ohio and ensure compliance with the applicable State law and regulations of the State, DoD and the Ohio Environmental Protection Agnecy (OEPA) on behalf of the State of Ohio enter into this Agreement.

Except as otherwise specified, the terms in this document are unique to this document only.

SECTION I
REIMBURSEMENT OF STATE COSTS

A. COVERAGE

1. This Agreement covers reimbursement of the costs associated with providing State services to Department of Defense installations for activities funded under the Environmental Restoration, Defense (ER,D) appropriation. Installations covered by this Agreement are those owned by the Federal government on the effective date of the Agreement including installations with sites on the National Priorities List (NPL) and installations with sites not on the NPL. The installations covered by this Agreement are listed in Attachment A. This Agreement does not cover the costs of services rendered prior to October 17, 1986; services at properties not owned by the Federal government; and activities funded from sources other than ER,D appropriation.

2. Unless a site-specific agreement provides otherwise, this Agreement is the mechanism for payment of the costs incurred by the State in providing the services listed in Paragraph B of this section in relation to ER,D funded activities at the installations covered by this Agreement. Full payment of State costs pursuant to this Agreement constitutes final settlement of any claims the State of Ohio may have for performance of services outlined in Section I(B) with respect to ER,D funded work carried out after October 17, 1986, at all of the installations covered by this Agreement, except for those State costs covered by a site-specific agreement.

3. DoD agrees to seek sufficient funding through the DoD budgetary process in accordance with Section II and to pay the State of Ohio for the services specified in paragraph B for all ER,D funded activities at installations covered by this Agreement, subject to the conditions and limitations set forth in this section.

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

involved, the date the costs were incurred, and show that the costs were entirely attributable to activities at an installation covered by this Agreement.

2. Payment of eligible State costs for services provided after the effective date of this Agreement must comply with all applicable Federal procurement and auditing requirements.

D. MAXIMUM REIMBURSEMENT

Reimbursement for services provided under paragraph B for all installations included in Attachment A shall not exceed one (1) percent of the estimated total costs for all of the work that has been funded by ER,D since October 17, 1986, and that will in the future be funded by ER,D or a minimum of $50,000, per year, whichever is greater. Estimates of cleanup costs developed under this Agreement are provided solely for the purpose of calculating the amount of funding the State is eligible to receive.

E. ANNUAL BUDGET LIMITS

The State may ordinarily request that up to a maximum of twenty-five (25) percent of the total State services funds for all installations listed in Attachment A be provided in accordance with Section II during any fiscal year. DoD may approve an annual budget limit that exceeds twenty-five (25) percent of the total State services funds if the State demonstrates the need for a higher percentage based on the scope of the work projected during the fiscal year. At least ten (10) percent of a State's services funding request will be provided in accordance with Section II of this agreement during a fiscal year if the State requests an allocation of ten (10) percent or more for services under this Agreement. The State may carry over unused funds into subsequent years. If the cost of State services during a fiscal year exceeds the annual budget limit, the State may expend its own funds to pay the cost of those services. To the extent allowable under Federal procedures for cooperative agreements, the State may then seek reimbursement of these costs in a subsequent year through a cooperative agreement as long as the total amount of the payments to the State does not exceed the one (1) percent ceiling, or the annual budget limit for that fiscal year. A payment schedule for reimbursement of past costs will be devised by the State of Ohio and the DoD.

F. ADJUSTMENT OF COST ESTIMATES

The State or DoD may request a review of total estimated ER,D funded project costs covered by this Agreement once during the terms of a cooperative agreement. The total project costs shall be revised to reflect the new estimates. The ceiling of one (1)

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.

I. EMERGENCIES

In an emergency situation involving a threat to public health or the environment, the State must, unless the nature of the emergency does not permit notification, notify the DoD Component prior to taking removal action in order to be reimbursed for its reasonable costs. Reimbursement of the State for its work will be handled directly between the DoD component and the State, and outside of this Agreement. Disagreements that arise under this paragraph are subject to the Dispute Resolution process in Section IV.

SECTION II
FUNDING AND THE PRIORITY SYSTEM

A. The Office of the Deputy Assistant Secretary of Defense (Environment), as the designee of the Office of the Secretary of Defense responsible for carrying out the Defense Environmental Restoration Program, and the DoD components shall seek sufficient funding through the DoD budgetary process to carry out their obligations for response actions at DoD installations within the State. Funds authorized and appropriated annually by Congress under the ER,D appropriation in the DoD Appropriations Act shall be the source of funds for all work contemplated by this Agreement.

B. Should the ER,D appropriation be inadequate in any year to meet the total DoD requirements for cleanup of hazardous or toxic contaminants, DoD shall establish priorities among sites in a manner which maximizes the protection of human health and the environment. In the prioritization process, DoD shall employ a model which has been and will be further developed with the assistance of the States and the EPA. Future enhancements or refinements to the model shall occur in consultation with the States and the EPA. DoD shall also involve the States and the EPA in its use of this prioritization model through review of technical site data. The DoD components shall receive and give full consideration to information provided by the States regarding factors to be considered in decisionmaking in the annual prioritization process for allocating resources available for cleanups. The State accepts that a DoD prioritization system developed and operated as described in this subparagraph is needed and provides a reasonable basis for allocating funds among sites in the interest of a national worst first cleanup program. To that extent, the State will make every effort to abide by the priorities developed thereunder.

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.

2. Should 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 be unable to agree within ten (10) working days, the matter shall be elevated to the head of the lead State agency and a counterpart member of the lead Service involved who shall be a general/flag officer or a member of the senior executive service.

3. Should the head of the lead State agency and the counterpart DoD representative fail to resolve the dispute within twenty (20) working days the matter shall be referred to the Governor and the Service Secretary concerned for resolution.

B. It is the intention of the parties that all disputes shall be resolved in this manner. Alternative dispute resolution methods may be used. In the event that the Governor and the Service Secretary are unable to resolve a dispute, the State retains any enforcement authority it may have under State and Federal law.

SECTION V
REOPENER

The terms of this Agreement may be modified at any time by mutual Agreement of the parties. If a party requests the Agreement to be reopened but the other party does not concur, the matter will be referred to an individual designated in writing by the signatories to this agreement. In the event they fail to agree within ten (10) working days the matter will be referred to the signatories of this agreement or their successors in office. If no resolution is reached within twenty (20) days, the Agreement shall not be reopened.

SECTION VI
TERMINATION

This Agreement may be terminated by either party at the expiration of any cooperative agreement entered into pursuant to this Agreement if the party seeking termination has notified the other party in writing at least ninety (90) days prior to the expiration of the cooperative agreement. After receiving a notice of termination, a party may invoke the dispute resolution process in Section IV. Each signatory of the agreement may involve other officials to whom they report in the process of resolution. The parties by mutual agreement may also refer the matter to the Governor of the State of Ohio and his(her) counterpart within the Department of Defense. Alternative

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. Meehan, Jr.
Principal Director,
ODASD (Environment)

DATE: SEP 10 1992

ATTACHMENT A TO DSMOA

DOD INSTALLATIONS COVERED BY THIS AGREEMENT

State of Ohio

Army

1. Ravenna Army Ammunition Plant

Navy

None

Air Force

1. Wright-Patterson AFB
2. Air Force Plant #85
3. Springfield MPT (Beckley)
4. Rickenbacker AGB
5. Newark AFS
6. Toledo
7. Mansfield Lanham

Defense Logistics Agency

1. Defense Electronics Supply Center (DESC)
2. Defense Construction Supply Center (DCSC)

INSTALLATIONS MAY BE ADDED TO THIS LIST PERIODICALLY AS NECESSARY IN ACCORDANCE WITH SECTION V, REOPENER

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

that the State plans to provide for each installation covered in the DSMOA for the specific award period of the CA.

- CAs will be awarded for a term of two (2) years, based on an annual estimate of requirements. Applications will be accepted after signature of the DSMOA by both parties; DoD processing time for applications is expected to be two months.

- The DASD(E) will accept the application, review it, and make a decision as to the award. This CA agreement, when signed by both the DASD(E) and the Head of the Agency signing on behalf of the State, comprises the contractual relationship between the DoD and the State.

- States may request funds in accordance with the methods outlined in OMB Circular A-102 and 32 CFR 278. These documents provide for the following methods of payment: (1) Advances (Letter of Credit), (2) Reimbursement, and (3) Working Capital Advances. A State may request a payment method in its cooperative agreement application.

• Allowable costs will be determined in accordance with OMB Circular A-87, Cost Principles for State and Local Governments. Specific services to be provided by the States will be as described in the DSMOA.

• Auditing of States programs will be accomplished in accordance with OMB Circular A-128, Audits of State and Local Governments.

The following is additional information regarding the general procedures that DoD plans to use in implementing DSMOAs and CA's with the States:

1. DoD DASD(E) will invite States to sign DSMOAs and submit applications for CAs.

2. DASD(E) will send a memorandum (Attachment C) to the DoD Components (Army, Navy, Air Force, DLA, and other DoD agencies) asking them to cooperate with the States and compile necessary data. The States and Installations will communicate directly on response activities anticipated to take place over the next two years and on the total DERA cost estimate.

3. DoD Components will use their Chain-Of-Command to develop and pass on data to DASD(E): Component Headquarters will give the message to their Major Commands (e.g., Army Materiel Command), and the Major Commands will forward the message to their Installations (e.g., Sacramento Army Ammunition Depot).

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.

o

THE OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301-8000

PRODUCTION AND
LOGISTICS

ATTACHMENT C

JUL 18 1989

E

MEMORANDUM FOR DEPUTY ASSISTANT SECRETARY OF THE ARMY,
ENVIRONMENT, SAFETY AND OCCUPATIONAL
HEALTH, OASA (I&L)
DEPUTY DIRECTOR FOR ENVIRONMENT, OASN (S&L)
DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE,
(E,S&OH), SAF/RQ
DIRECTOR, DEFENSE LOGISTICS AGENCY (DLA-W)

SUBJECT: DoD Components' Cooperation with the States for Cooperative Agreements on Site Cleanups

I am sending letters to the directors of State environmenta agencies inviting them to enter into DoD and State Memoranda of Agreements (DSMOAs). There has been a recent strong State expression of interest in them. I request that you inform the appropriate people in your Component that they should be ready b mid-July to respond to requests from the States for information necessary for the States to prepare applications for cooperative agreements (CAs) in accordance with Attachment B of the model DSMOA language.

Once a State and I have signed a DSMOA or started the process towards signature, the lead State agency can be expected to contact persons or offices designated by the Components as being "lead" for the Installation Restoration Program (IRP) for the installations listed in Attachment A of the DSMOA. States will need to determine what DERA-funded activities the installations have planned for the period of the proposed CAs (FY90/91). Each State will use this information to help prepare its application for a cooperative agreement and its request for funds. The designated installation representative should also give information to the State regarding probable DERA-funded activities through the life of the program, including total estimated cost. This will help the State plan its activities under the lifetime cap. The cost information should be acceptable to you before it is provided to the States.

This information is generally available from your program planning activities, FY90/91 DERA budget development data, and anticipated RI/FS results. States should also have much of this information if they are receiving notice of program activities and participating in such areas as: review of program planning and IRP documents, meetings of technical review committees,

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 summa of planned activities for the next two years (FY90/91) that the installation IRP representatives give to the States. Please tr 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 wi need to be updated every two years. During the CA period, if there is a significant change in response activities or estimat costs, the Component should notify the State as soon as possibl I will be providing you additional guidance on this matter in t 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 mak 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, i the key to cost-effective and timely execution of the Defense Environmental Restoration Program.

Thank you for your continuing efforts in making the progra a success. If you have questions or comments, Sam Napolitano remains my point of contact for DSMOAs, and Lt Col 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

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, DC 20301-8000

PRODUCTION AND LOGISTICS

SEP 10 1992

ATTACHMENT D

Ms. Jennifer Tiell
Acting Deputy Director
Ohio Environmental Protection Agency
1800 Water Mark Drive
Columbus, OH 43266-0149

Dear Ms. Tiell:

This letter clarifies the concerns and issues raised between my staff and yours regarding the Defense and State Memorandum of Agreement (DSMOA). It also supplements the DSMOA as Attachment D.

1. All services performed by the State of Ohio under the DSMOA will conform to all State applicable or relevant and appropriate State requirements related to response actions at DoD installations. DoD acknowledges that this regulatory oversight by the State is necessary to ensure compliance with State laws.

2. It is DoD's intention to involve the State in public education and public participation activities that are essential to cleanup at the installation. The State will be given an active role in the development and preparation of those activities. DoD acknowledges that Ohio may be required to meet State public involvement requirements at DoD facilities.

3. Past costs included in the one (1) percent cap of reimbursement costs under a DSMOA include those State costs within the definition of services listed in Section I.B. of the DSMOA which have been incurred both after the enactment of the Superfund Amendments and Reauthorization Act (SARA), October 17, 1986, and prior to the execution date of the DSMOA. The State's accounting practices and procedures used to document costs since October 17, 1986 will be accepted by DoD provided that the costs have been documented using accounting procedures and practices that reasonably identify the nature of the costs involved, the date the costs were incurred, and show that the costs were entirely attributable to activities at an installation covered by this Agreement.

4. The one percent cap applies to all costs for State reimbursement for technical services provided for Defense Environmental Restoration Account (DERA) funded activities from October 17, 1986, to the end of DERA expenditures. The DSMOA covers all State services listed in Section I.B. for all installations that are currently owned or Formerly Used Defense Sites (FUDS) that fulfill specific criteria that are listed in

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

may have to require that DoD undertake response actions, regardless of the ranking of a particular site and regardless of the funding source for the response action, nor does the DSMOA constitute an acceptance by the Office of the Secretary of Defense for the validity of such claims not covered by this Agreement. The State agrees to first exhaust all administrative courses of action pursuant to this or other installation agreements that reference the DSMOA before pursuing judicial remedy due to a lack of DERA funding.

6. Section I.A. of the DSMOA specifies that the Agreement covers reimbursement of costs including..." installations with sites on the National Priorities List (NPL) and installations with sites not on the NPL". The State of Ohio reserves any rights it may have to seek enforcement of State statutes at any installation - either NPL or non-NPL listed. The DSMOA does not 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 agreement or in the DSMOA prior to seeking judicial remedy.

7. With respect to the Consent Agreement dated February 17, 1988 between Ohio and DoD and the IAG for Wright-Patterson AFB between Ohio, U.S. EPA and DoD, DoD acknowledges that it does not anticipate this DSMOA will affect Ohio's relationship with either U.S. EPA or DoD under either of the two (2) mentioned agreements.

I hope this addresses your concerns. If you need further assistance in preparing the Cooperative Agreement, please contact Ms. Deborah Swichkow of my staff at 703-697-0821. I look forward to working with the State of Ohio.

Sincerely,

Patrick J. Meehan, Jr.
Principal Director, ODASD (Environment)

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 Paragraph1.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

Inspect, test and maintain the equipment required by this rule, as necessary to assure its proper operation in time of emergency.

x. Access to Communications or Alarm System, OAC 3745-54-34

xi. Required Aisle Space, OAC 3745-54-35

Maintain aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation in an emergency.

xii. Arrangements with Local Authorities, OAC 3745-54-37

(a) Make a diligent effort to:

(i) familiarize all emergency response agencies which are likely to respond in an emergency with the location and layout of the facility, properties of hazardous waste managed at the facility and associated hazards, places where facility personnel will normally be working, entrances to and roads inside the facility, and possible evacuation routes.

(ii) inform such agencies of safety equipment, supplies, proper emergency safety procedures that are applicable to the facility; and

(iii) familiarize the local police and fire departments, hospitals and any other local emergency service, with the properties of hazardous waste managed at the facility and the types of injuries or illness which could result from fires, explosions, or releases at the facility.

(b) If a State or local agency declines to enter into the arrangements set forth in OAC Rule 3745-54-37(A), document the refusal in the operating record as required by OAC Rule 3745-54-37(B).

xiii. Implementation of Contingency Plan, OAC 3745-54-51 & 3745-54-56

Immediately carry out the provisions of the approved contingency plan and follow the emergency procedures described in OAC Rule 3745-54-56, whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which threatens or could threaten human health or the environment.

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.

(b) Submit a copy of the approved contingency plan, to all local police departments, fire departments, hospitals, and local emergency response teams that may be called upon to provide emergency services, and notify such agencies and the local authorities, in writing, within ten (10) days of the effective date of any amendments of, revisions to, or modifications to the contingency plan.

(c) Submit a copy of the approved contingency plan to Ohio EPA's Division of Emergency and Remedial Response.

xviii. Emergency Coordinator, OAC 3745-54-55

xix. Emergency Procedures, OAC 3745-54-56 & 3745-51-01

xx. Availability, Retention and Disposition of Records, OAC 3745-54-74

xxi. Operating Record, OAC 3745-54-73

xxii. Contingency Plan Records, OAC 3745-54-73 & OAC 3745-54-56 (J)

Note in the operating record the time, date, and details of any incident that requires the implementation of the contingency plan, and within fifteen (15) days of any such incident, submit to the Director a written report of the incident containing the elements set forth in OAC Rule 3745-54-56(J).

xxiii. Manifest System, OAC 3745-54-70, 3745-54-71, 3745-54-72 & 3745-54-76

(a) In the management of waste at the facility, comply with the provisions of OAC Chapter 3745-52 and OAC Rules 3745-54-71, 3745-54-72 and 3745-54-76 with regard to the manifest system.

(b) Manifest discrepancy report. If a significant discrepancy in a manifest is discovered, attempt to reconcile the discrepancy. If not resolved with fifteen (15) days after receiving the waste, submit a report, including a copy of the manifest, to the Director in accordance with OAC Rule 3745-54-72.

(c) Unmanifested waste report. This report must be submitted to the Director within fifteen (15) days of receipt of unmanifested waste, which waste is not excluded from the manifest requirements by OAC Rule 3745-51-05, and include the information required under OAC Rule 3745-54-76.

xxiv. Annual Reports and Additional Reports, OAC 3745-54-75, 3745-54-77

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

ACRONYMS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	Chemical of Potential Concern
DQOs	Data Quality Objectives
FWGWMP	Facility-Wide Groundwater Monitoring Program
FSAP	Facility-Wide Sampling and Analysis Plan
HQ	Hazard Quotient
LTM	Long Term Monitoring
OD#2	Open Demolition #2 Area
Ohio EPA	Ohio Environmental Protection Agency
OVA	Organic Vapor Analyzer
PCB	Polychlorinated Biphenyl
PID	Photoionization Detector
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RQL	Ramsdell Quarry Landfill
RVAAP	Ravenna Army Ammunition Plant
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
USACE	U.S. Army Corps of Engineers
VOC	Volatile Organic Compound

TABLE OF CONTENTS

FIGURES

1.0 INTRODUCTION

This conceptual plan for a Facility-Wide Groundwater Monitoring Program plan (FWGWMP) for the Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio, has been prepared by SpecPro, Inc., under contract DAAA09-01-G-0009, Delivery Order #0012, with the U.S. Army Joint Munitions Command. The conceptual plan for the FWGWMP was developed in accordance with the U.S. Army Corps of Engineers (USACE) and Ohio Environmental Protection Agency (Ohio EPA) guidance documents, to meet the requirements for the investigation of known or suspected contaminated Areas of Concern (AOC) regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), and other federal or state regulations that govern environmental restoration activities at RVAAP.

The conceptual plan is intended to serve as a simplified description and schematic that outlines the components and standards of performance for a facility-wide groundwater monitoring program at RVAAP. The standards of performance are necessary to ensure consistency and defensibility of the large amounts of groundwater data expected to be gathered at RVAAP, regardless of Area of Concern (AOC), funding source, U.S. Army project manager, or contracted firm performing the work. The requirements for consistency include not only detailed procedures for sample collection and handling, but also for documentation, data validation, and quality assurance (QA)/quality control (QC).

1.1 PURPOSE OF THE FWGWMP

The overall purpose of developing and implementing a FWGWMP for RVAAP is to determine if AOC-related contaminants pose a risk to groundwater use either on the RVAAP facility or off-post. The following data quality objectives (DQOs) for the FWGWMP were developed jointly by the Ohio EPA, USACE, RVAAP, and SpecPro.

- Assess the hydrogeological conditions and groundwater quality in shallow and deep groundwater beneath the AOC using selected previously-installed and newly-installed AOC monitoring wells of known integrity suited to this purpose. Groups of monitoring wells based on hydrogeology and AOC's will be considered.
- Provide a comparative assessment of hydrogeologic characteristics and groundwater quality in both unconsolidated and bedrock monitoring wells to evaluate potential hydraulic connection between the water-bearing units.
- Conduct monitoring of the facility-wide groundwater monitoring well network (hereafter, network) to provide characterization of groundwater chemical quality and examine potential migration of contamination. Monitoring may be performed on a quarterly, semi-

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:

- Refine and revise the preliminary RVAAP conceptual plan as described in Section 3.2.1 of the FSAP with regard to groundwater occurrence and characteristics.
- Identify representative wells to monitor facility boundary and AOC-specific groundwater exit pathways.

3.2 Selection of Wells for Inclusion in the FWGWMP

The FWGWMP conceptual plan will serve as the basis for making decisions about selection of previously- and newly-installed AOC wells for inclusion in the network. Specific wells included in the network will be within the work plan of the FWGWMP and as agreed upon by Army and Ohio EPA. Up to 20% of the total number of groundwater wells at the time of the monitoring period under consideration will be included in the FWGWMP during any given monitoring period (see figure 3.1).

Existing Wells

Existing wells will be defined either as RCRA/Solid Waste wells or CERCLA wells. In accordance with the RVAAP Final Findings and Orders (hereafter; Orders)(date __TBD__), all wells installed as part of the RCRA/Solid Waste programs (Ramsdell Quarry Landfill {RQL} and Demolition Area #2 {OD#2}) will continue to be monitored. The data collected to date at the existing CERCLA wells will be used to evaluate inclusion in the FWGWMP.

Future Wells

Future wells installed as part of individual AOC investigations conducted under the ongoing CERCLA process at RVAAP will be evaluated for incorporation into the FWGWMP upon completion of at least three quarterly groundwater sampling events to be conducted as part of the Remedial Investigation (RI) phase at each AOC. The frequency of the sampling events may be other than quarterly if agreed upon by the Army and Ohio EPA.

Background Wells

Background wells will be evaluated for incorporation into the FWGWMP upon completion of two sampling events at a frequency agreed upon by Army and Ohio EPA.

3.3 Sampling and Analysis of Selected Monitoring Wells

All groundwater sampling and analyses, and groundwater well drilling, installation, construction, and abandonment procedures will be consistent with

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 grouridwater 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,

modeling, risk estimates, etc. The data needed to provide decision inputs may vary across RVAAP depending on the waste type, AOC setting, and other AOC-specific factors. Identification of specific inputs to the decision-making process will be further defined on AOC-specific and facility-wide basis as part of the FWGWMP.

3.5 Decision Error

Remedial action decisions may eventually need to be made for the groundwater exiting the RVAAP based on the results of the data assessment performed under the FWGWMP. Controlling the potential for making a wrong decision begins in the DQO process. Those errors include types of errors that may be introduced during sample collection or data assessment. A full discussion on how to limit these decision errors is provided in Section 3.2.8 of the FSAP.

4.0 REVIEW, REVISION, AND REPORTING PROVISIONS

4.1 Sampling Event Reports

Verified analytical results in accordance with Section 9.2 of the FSAP for each sampling event conducted as part of the FWGWMP will be obtained within forty-five (45) days of completion of the sampling event. Within thirty (30) days of receipt of the verified data a report documenting the event will be submitted to Ohio EPA. The sampling event report will include each of the following.

- A summary table of the groundwater data.
- Hard copy and 5dbf format electronic copy of the complete data set.
- Laboratory data sheets.
- QA/QC information – at a minimum, data regarding matrix spikes, matrix spike duplicates, laboratory control samples, field and laboratory blanks, chain of custody and sample receipt forms and duplicate samples will be submitted.
- Documentation of any contamination detected in any of the wells.
- Groundwater flow maps using the elevation data obtained during the sampling event.
- Results of any statistical analyses, if performed, in accordance with "Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities (U.S. EPA, 1992), "Standard Guide for Developing Appropriate Statistical Approaches for Ground Water Detection Monitoring Programs, (ASTM designation D 6312-98), or other mutually agreed upon guidance documents.

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.

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

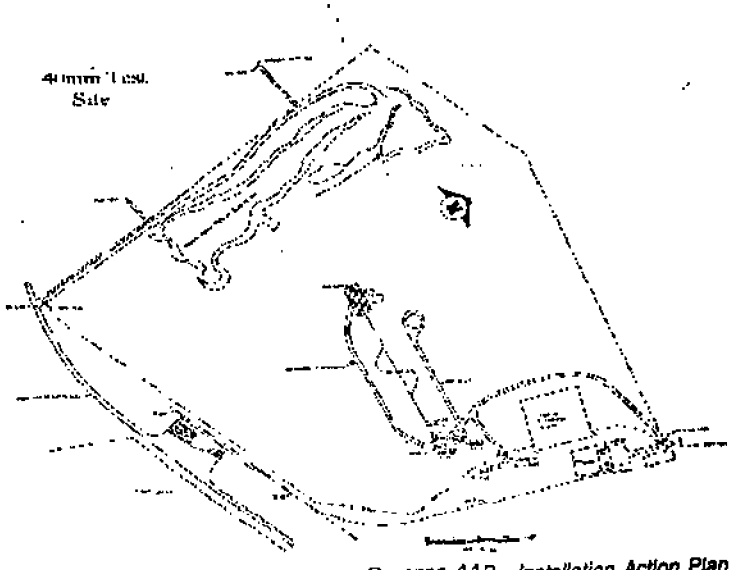
RRSE RATING:
Medium
CONTAMINANTS:
Metals
MEDIA OF CONCERN:
Soil
COMPLETED IRP PHASE:
PA/SI
CURRENT IRP PHASE:
RI/FS
FUTURE IRP PHASE:
RI/FS

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				
Total	334,000			



RVAAP-33
LOAD LINE 6

SITE DESCRIPTION

This unit, also known as the Firestone Test Facility, was reported by former workers at RVAAP to have been a security classified experimental test facility for munitions. Shaped charges were constructed and tested for the Department of Defense. The site consists of a pond (underwater test chamber) and several buildings (~45 acres). The dates of operation are not known. No original file documentation exists for this site. The contaminants of potential concern are lead azide, TNT, RDX, other explosives and metals.

Soil samples collected by CHPPM in 1996, detected antimony, copper and lead above the RRSE screening concentrations. The buildings were thermally treated and the remaining structures removed in 2003. THe Phase I RI field work was completed in November 2003.

STATUS

RRSE RATING:
Medium
CONTAMINANTS:
Lead Azide, 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

PROPOSED PLAN

A RI will be completed. A RD/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.

Constrained Cost to Complete

	2004	2005	2006	2007+
RI/FS	136	40	40	100
IRA				
RD				17
RA				747
RA(O)				
LTM				769
Total	1,849,000