

FY2012

RADFORD ARMY AMMUNITION PLANT
Army Defense Environmental Restoration Program
Installation Action Plan

Printed 24 January 2013

Table of Contents

| | |
|---|----|
| Statement Of Purpose..... | 1 |
| Acronyms..... | 2 |
| Acronym Translation Table..... | 5 |
| Site Alias List..... | 6 |
| Installation Information..... | 7 |
| 5-Year / Periodic Review Summary..... | 8 |
| Land Use Control (LUC) Summary..... | 9 |
| Cleanup Program Summary..... | 14 |
| Installation Restoration Program..... | 15 |
| IRP Summary..... | 16 |
| IRP Contamination Assessment..... | 17 |
| IRP Previous Studies..... | 18 |
| Installation Restoration Program Site Descriptions..... | 23 |
| PBC @ Radford PBC site..... | 24 |
| RAAP-001 TNT WASTE ACID NEUTRALIZATION PITS(S51)..... | 25 |
| RAAP-005 WASTE PROPELLANT BURNING GROUND (S13)..... | 26 |
| RAAP-009 LANDFILL NITRO AREA (S40)..... | 27 |
| RAAP-011 RED WATER ASH BURIAL GROUND (S41)..... | 28 |
| RAAP-013 RED WATER ASH BURIAL #2 (S49)..... | 29 |
| RAAP-014 PROPELLANT BURNING ASH DISPOSAL (S54)..... | 30 |
| RAAP-018 OILY WATER BURIAL AREA (S48)..... | 31 |
| RAAP-023 SANITARY LANDFILL NO.2 (S43)..... | 32 |
| RAAP-024 LANDFILL NO.3 (S45)..... | 33 |
| RAAP-039 HAZARDOUS WASTE LANDFILL (HWMU16)..... | 34 |
| RAAP-042 SURFACE IMPOUNDMENT #5 (HWMU #5)..... | 35 |
| RAAP-043 SURFACE IMPOUNDMENT #7 (HWMU #7)..... | 36 |
| RAAP-044 NEW RIVER UNIT..... | 37 |
| Installation Restoration Program Site Closeout (No Further Action) Sites Summary..... | 39 |
| IRP Schedule..... | 43 |
| Installation Restoration Program Milestones..... | 43 |

Table of Contents

| | |
|---|-----------|
| IRP Schedule Chart..... | 46 |
| Military Munitions Response Program..... | 47 |
| MMRP Summary..... | 48 |
| MMRP Contamination Assessment..... | 49 |
| MMRP Previous Studies..... | 50 |
| Military Munitions Response Program Site Descriptions..... | 51 |
| RFAAP-001-R-01 ARMY RESERVE SMALL ARMS RANGE..... | 52 |
| Military Munitions Response Program Site Closeout (No Further Action) Sites Summary..... | 53 |
| MMRP Schedule..... | 54 |
| Military Munitions Response Program Milestones..... | 54 |
| MMRP Schedule Chart..... | 55 |
| Compliance Restoration..... | 56 |
| CR Summary..... | 57 |
| CR Contamination Assessment..... | 58 |
| CR Previous Studies..... | 59 |
| Compliance Restoration Site Descriptions..... | 60 |
| CC 001 Oleum Plant Acidic Wastewater Sump..... | 61 |
| CC 002 Garbage Incinerator (Bldg 7219)..... | 62 |
| CC-003 Asbestos Disposal Trenches 1 and 2..... | 63 |
| Compliance Restoration Site Closeout (No Further Action) Sites Summary..... | 64 |
| CR Schedule..... | 65 |
| Compliance Restoration Milestones..... | 65 |
| CR Schedule Chart..... | 66 |

Statement of Purpose

The purpose of the Installation Action Plan (IAP) is to outline the total multiyear cleanup program for an installation. The plan identifies environmental cleanup requirements at each site or area of concern (AOC), and proposes a comprehensive, installation-wide approach, along with the costs and schedules associated with conducting investigations and taking the necessary remedial actions (RA).

In an effort to coordinate planning information between the restoration manager, the US Army Environmental Command (USAEC), the Army Materiel Command (AMC), the Radford Army Ammunition Plant (RAAP), the executing agencies, regulatory agencies, and the public, an IAP was completed. The IAP is used to track requirements, schedules, and tentative budgets for all major Army installation cleanup programs.

All site-specific funding and schedule information has been prepared according to projected overall Army funding levels and is, therefore, subject to change.

Acronyms

| | |
|--------|---|
| ACM | Asbestos Containing Material |
| AEDB-R | Army Environmental Database-Restoration |
| AMC | US Army Materiel Command |
| AOC | Area of Concern |
| ASD | Alternate Source Determination |
| BDDT | Building Debris Disposal Trench |
| BLA | Bag Loading Area |
| CAP | Corrective Action Plan |
| CC | Compliance-related Cleanup |
| CMS | Corrective Measures Study |
| COC | Contaminants of Concern |
| CORA | Corrective Action Permit |
| CR | Compliance Restoration |
| cy | cubic yard |
| DD | Decision Document |
| DERP | Defense Environmental Restoration Program |
| DNT | Dinitrotoluene |
| ER,A | Environmental Restoration, Army |
| FLFA | Former Lead Furnace Area |
| FRA | Final Remedial Action |
| FS | Feasibility Study |
| FY | Fiscal Year |
| GIS | Geographic Information System |
| GPS | Groundwater Protection Standard |
| HBN | Health-Based Numbers |
| HHRA | Human Health Risk Assessment |
| HWMU | Hazardous Waste Management Unit |
| IAA | Igniter Assembly Area |
| IAP | Installation Action Plan |
| IAW | In Accordance With |
| ID | Identification |
| IDM | Investigative Derived Material |
| IM | Interim Measure |
| IMWP | Interim Measure Work Plan |
| IR | Installation Restoration |
| IRA | Interim Remedial Action |
| IRP | Installation Restoration Program |
| K | thousand |
| LTM | Long-Term Management |
| LUC | Land Use Control |
| MC | Munitions Constituents |
| MCL | Maximum Contaminant Level |
| MMA | Main Manufacturing Area |
| MMRP | Military Munitions Response Program |
| MNA | Monitored Natural Attenuation |

Acronyms

| | |
|-------------|---|
| MR | Munitions Response |
| MRSPP | Munitions Response Site Prioritization Protocol |
| N/A | Not Applicable |
| NBG | Northern Burning Ground |
| NFA | No Further Action |
| NPL | National Priorities List |
| NRU | New River Unit |
| ODUSD (I&E) | Office of the Deputy Under Secretary of Defense for Installations and Environment |
| PBA | Performance-Based Acquisition |
| PBC | Performance-Based Contract |
| PCB | Polychlorinated Biphenyl |
| PCE | Tetrachloroethylene |
| Pop. | Population |
| RA | Remedial Action |
| RA(C) | Remedial Action - Construction |
| RAAP | Radford Army Ammunition Plant |
| RAB | Restoration Advisory Board |
| RC | Response Complete |
| RCRA | Resource Conservation and Recovery Act |
| RD | Remedial Design |
| RFA | RCRA Facility Assessment |
| RFI | RCRA Facility Investigation |
| RI | Remedial Investigation |
| RIP | Remedy-in-Place |
| ROD | Record of Decision |
| RRSE | Relative Risk Site Evaluation |
| RY | Rail Yard |
| SI | Site Inspection |
| SLERA | Screening Level Ecological Risk Assessment |
| SSA | Site Screening Area |
| SSP | Site Screening Process |
| SVOC | Semi-Volatile Organic Compound |
| SWMU | Solid Waste Management Unit |
| TAPP | Technical Assistance for Public Participation |
| TBD | To Be Determined |
| TCE | Trichloroethylene |
| TCLP | Toxicity Characteristic Leachate Procedure |
| TNT | Trinitrotoluene |
| TRC | Technical Review Committee |
| USACE | US Army Corps of Engineers |
| USACHPPM | US Army Center for Health Promotion and Preventive Medicine |
| USAEC | US Army Environmental Command |
| USATHAMA | US Army Toxic and Hazardous Materials Agency |
| USEPA | US Environmental Protection Agency |
| VDEQ | Virginia Department of Environmental Quality |

Acronyms

VI Verification Investigation
VOC Volatile Organic Compound
WBG Western Burning Ground
WPA Work Plan Addendum

Acronym Translation Table

CERCLA

Preliminary Assessment(PA)
Site Inspection(SI)
Remedial Investigation/Feasibility Study(RI/FS)
Remedial Design(RD)
Remedial Action (Construction)(RA(C))
Remedial Action (Operation)(RA(O))
Long Term Management(LTM)
Interim Remedial Action(IRA)

RCRA

= RCRA Facility Assessment(RFA)
= Confirmation Sampling(CS)
= RCRA Facility Investigation/Corrective Measures Study(RFI/CMS)
= Design(DES)
= Corrective Measures Implementation (Construction)(CMI(C))
= Corrective Measures Implementation (Operation)(CMI(O))
= Long Term Management(LTM)
= Interim Measure(IM)

CERCLA

Preliminary Assessment(PA)
Remedial Investigation(RI)
Feasibility Study(FS)
Remedial Design(RD)
Remedial Action (Construction)(RA(C))
Remedial Action (Operation)(RA(O))
Long Term Management(LTM)
Interim Remedial Action(IRA)

RCRA Underground Storage Tank (UST) Site Phase Terms

= Initial Site Characterization(ISC)
= Investigation(INV)
= Corrective Action Plan(CAP)
= Design(DES)
= Implementation (Construction)(IMP(C))
= Implementation (Operations)(IMP(O))
= Long Term Management(LTM)
= Interim Remedial Action(IRA)

Site Alias List

AEDB-R Site ID to Alias List

| AEDB-R # | Alias |
|-----------------|--------------|
| CC 001 | SSA72 |
| CC 002 | SSA77 |
| CC-003 | SSA 30 79 |
| PBC @ Radford | PBC site |
| RAAP-001 | SWMU 51 |
| RAAP-005 | SWMU 13 |
| RAAP-009 | SWMU 40 |
| RAAP-011 | SWMU 41 |
| RAAP-013 | SWMU 49 |
| RAAP-014 | SWMU 54 |
| RAAP-018 | SWMU 48 |
| RAAP-023 | SWMU 43 |
| RAAP-024 | SWMU 45 |
| RAAP-039 | HWMU 16 |
| RAAP-042 | HWMU #5 |
| RAAP-043 | HWMU #7 |
| RAAP-044 | NRU |
| RFAAP-001-R-01 | |

Installation Information

Installation Locale

Installation Size (Acreage): 6900

City: Radford

County: Pulaski and Montgomery Counties

State: Virginia

Other Locale Information

The RAAP is located in the western part of Virginia, approximately 40 miles west of Roanoke. It consists of two locations in mountainous terrain: the main manufacturing area (MMA) and New River Unit (NRU). The NRU is located approximately six miles from the MMA, near Dublin, Virginia. The New River flows through the MMA. Land use surrounding the MMA and NRU is primarily agricultural with some residential and industrial use.

Installation Mission

The primary mission of the RAAP is the manufacture of propellants. Since 1968 the RAAP has also produced trinitrotoluene (TNT) on an intermittent basis.

Lead Organization

Army Materiel Command (AMC)

Lead Executing Agencies for Installation

Radford AAP and United States Army Corps of Engineers (USACE), Baltimore District

Regulator Participation

| | |
|----------------|--|
| Federal | US Environmental Protection Agency (USEPA), Region III [Resource Conservation and Recovery Act (RCRA) and Office of Superfund] |
| State | Virginia Department of Environmental Quality (VDEQ), Federal Facilities Restoration Program |

National Priorities List (NPL) Status

RADFORD ARMY AMMUNITION PLANT is not on the NPL

Installation Restoration Advisory Board (RAB)/Technical Review Committee (TRC)/Technical Assistance for Public Participation (TAPP) Status

RAB established 199807

Installation Program Summaries

IRP

Primary Contaminants of Concern: Explosives, Metals, Perchlorate, Pesticides, Polychlorinated Biphenyls (PCB), Semi-volatiles (SVOC), Volatiles (VOC)

Affected Media of Concern: Groundwater, Other (Sludge), Sediment, Soil, Surface Water

MMRP

Primary Contaminants of Concern: Munitions constituents (MC)

Affected Media of Concern: Soil

CR

Primary Contaminants of Concern: Asbestos, Dioxins/Dibenzofurans, Metals

Affected Media of Concern: Soil

5-Year / Periodic Review Summary

No 5-Year / Periodic Reviews have been scheduled

Land Use Control (LUC) Summary

LUC Title: NRU IC for BLA, IAA, BDDT

Site(s): RAAP-044

ROD/DD Title: NRU Proposed Plan Final

Location of LUC

NRU BLA, IAA, BDDT

Land Use Restriction: Restrict land use - No residential use

Types of Engineering Controls: Fences, Guards, Signs

Types of Institutional Controls: Dig Permits, Restrictions on land use

Date in Place: 201109

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: N/A

LUC Enforcement: Annual Inspections, Other

Contaminants: PAH

Additional Information

N/A

LUC Title: SSAs 72, 77, 30 and 79 IC

Site(s): CC 001, CC 002, CC-003

ROD/DD Title: SSP Report SSAs 18, 72, 30, 79, 60, & 77

Location of LUC

SSAs 72, 77, 30 and 79

Land Use Restriction: Restrict land use - No residential use

Types of Engineering Controls: Fences, Guards, Signs

Types of Institutional Controls: Dig Permits, Restrictions on land use

Date in Place: 201101

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: N/A

LUC Enforcement: Annual Inspections, Other

Contaminants: METALS

Additional Information

N/A

LUC Title: SWMU 13 IC

Site(s): RAAP-005

ROD/DD Title: SWMU 13 RFI Report Final

Land Use Control (LUC) Summary

Location of LUC

SWMU 13, a narrow strip of land between the permitted unit and the river.

Land Use Restriction: Landfill restriction - Restrict access to the site

Types of Engineering Controls: Fences, Guards, Signs

Types of Institutional Controls: Dig Permits

Date in Place: 201103

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: N/A

LUC Enforcement: Annual Inspections, Other

Contaminants: METALS

Additional Information

N/A

LUC Title: SWMU 40 IC

Site(s): RAAP-009

ROD/DD Title: RAAP-09 (SWMU 40 & 71)

Location of LUC

SWMU 40

Land Use Restriction: Restrict land use - No residential use

Types of Engineering Controls: Fences, Guards, Signs

Types of Institutional Controls: Dig Permits, Restrictions on land use

Date in Place: 201103

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: 201103

LUC Enforcement: Annual Inspections, Other

Contaminants: METALS, ORGANICS, VOC

Additional Information

N/A

LUC Title: SWMU 41B IC

Site(s): RAAP-011

ROD/DD Title: SWMU 41 RFI Final

Location of LUC

SWMU 41B

Land Use Control (LUC) Summary

Land Use Restriction: Restrict land use - No residential use
Types of Engineering Controls: Fences, Guards, Signs
Types of Institutional Controls: Dig Permits, Restrictions on land use
Date in Place: 201104
Modification Date: N/A
Date Terminated: N/A
Inspecting Organization: Installation
Record of LUC: Master Plan or Equivalent
Documentation Date: N/A
LUC Enforcement: Annual Inspections, Other
Contaminants: METALS, VOC
Additional Information
N/A

LUC Title: SWMU 43 IC
Site(s): RAAP-023
ROD/DD Title: SWMU 43 RFI
Location of LUC
SWMU 43
Land Use Restriction: Restrict land use - No residential use
Types of Engineering Controls: Fences, Guards, Signs
Types of Institutional Controls: Dig Permits, Restrictions on land use
Date in Place: 201101
Modification Date: N/A
Date Terminated: N/A
Inspecting Organization: Installation
Record of LUC: Master Plan or Equivalent
Documentation Date: N/A
LUC Enforcement: Annual Inspections, Other
Contaminants: METALS, VOC
Additional Information
N/A

LUC Title: SWMU 45 IC
Site(s): RAAP-024
ROD/DD Title: SWMU 45 SSP Report Final
Location of LUC
SWMU 45
Land Use Restriction: Restrict land use - No residential use
Types of Engineering Controls: Fences, Guards, Signs
Types of Institutional Controls: Dig Permits, Restrictions on land use

Land Use Control (LUC) Summary

Date in Place: 201003

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: N/A

LUC Enforcement: Annual Inspections, Other

Contaminants: METALS

Additional Information

N/A

LUC Title: SWMU 49 IC

Site(s): RAAP-013

ROD/DD Title: SWMU 49 RFI Report Final

Location of LUC

SWMU 49

Land Use Restriction: Restrict land use - No residential use

Types of Engineering Controls: Fences, Guards, Signs

Types of Institutional Controls: Dig Permits, Restrictions on land use

Date in Place: 201103

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: N/A

LUC Enforcement: Annual Inspections, Other

Contaminants: VOC

Additional Information

N/A

LUC Title: SWMU 51 IC

Site(s): RAAP-001

ROD/DD Title: SWMU 51 (RAAP-001) RFI/CMS Report

Location of LUC

SWMU 51

Land Use Restriction: Restrict land use - No residential use

Types of Engineering Controls: Fences, Guards, Signs

Types of Institutional Controls: Dig Permits, Restrictions on land use

Date in Place: 201004

Modification Date: N/A

Date Terminated: N/A

Land Use Control (LUC) Summary

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: N/A

LUC Enforcement: Annual Inspections

Contaminants: DIOXINS/DIBENZOFURANS, METALS

Additional Information

N/A

Cleanup Program Summary

Installation Historic Activity

The Radford Army Ammunition Plant (RAAP) is located in the mountains of southwest Virginia in Pulaski and Montgomery Counties. It consists of two noncontiguous areas: the MMA and the NRU. The MMA is located approximately five miles northeast of the city of Radford, Virginia which is approximately 10 miles west of Blacksburg and 47 miles southwest of Roanoke. The NRU is located about six miles west of the MMA, near the town of Dublin.

The RAAP lies in one of a series of narrow valleys typical of the eastern range of the Appalachian Mountains. Oriented in a northeast-southwest direction, the valley is approximately 25 miles long, eight miles wide at the southeast end and narrowing to two miles at the northeast end. The RAAP lies along the New River in the relatively narrow northeastern corner of the valley. The New River divides the RAAP into two areas. The Horseshoe Area (which is part of the MMA) lies within a meander of the New River.

The RAAP began manufacturing propellants in 1941 and continues that work today. Since 1968, the RAAP has also produced TNT on an intermittent basis. The working population at the RAAP varies greatly with the mission requirements.

Installation Program Cleanup Progress

IRP

Prior Year Progress: An interim measure (IM) source removal effort was completed at SWMUs 40, 48, 57 and the Army Reserve Small Arms Range. Supported USEPA effort in the Statement of Basis for the reissuance of the plant's RCRA Corrective Action permit that will document final action at numerous IRP sites, many of which are NFA.

Future Plan of Action: Comply with the hazardous waste management unit (HWMU) 5 corrective action plan (CAP). Negotiate the following: RFI/CMS report at SWMU 48/49 and NRU final Decision Document. Continue with LTM at SWMUs 40 and 54. Follow-up on LUCs at SWMUs 40, 41, 43, 45, SSAs 72, 77, 30 and 79.

MMRP

Prior Year Progress: A performance-based acquisition (PBA) was awarded for this site to implement the RFI/corrective measures study (CMS) with options for cleanup. A combined interim measures (IM) and RFI work plan was approved and subsequently executed. IM effort was source removal and the RFI report is under review.

Future Plan of Action: Complete the RFI/CMS and award PBA options as necessary.

CR

Prior Year Progress: Obtained approval for the site screening process (SSP) report with NFA/LUC recommendation for compliance-related cleanup (CC) sites 001, 002, and 003.

Future Plan of Action: Implement any needed LUC per the SSP report when approved for CC sites 001, 002 and 003. Work with USEPA during the reissuance of the plant's RCRA Corrective Action Permit to ensure these requirements are incorporated.

RADFORD ARMY AMMUNITION PLANT
Army Defense Environmental Restoration Program
Installation Restoration Program

IRP Summary

Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count: 47/33

Installation Site Types with Future and/or Underway Phases

| | |
|---|---|
| 1 | Burn Area (RAAP-005) |
| 1 | Chemical Disposal (RAAP-039) |
| 9 | Landfill (PBC @ Radford, RAAP-001, RAAP-009, RAAP-011, RAAP-013, RAAP-014, RAAP-018, RAAP-023, RAAP-024) |
| 1 | Storage Area (RAAP-044) |
| 2 | Surface Impoundment/Lagoon (RAAP-042, RAAP-043) |

Most Widespread Contaminants of Concern

Explosives, Metals, Perchlorate, Pesticides, Polychlorinated Biphenyls (PCB), Semi-volatiles (SVOC), Volatiles (VOC)

Media of Concern

Groundwater, Other (Sludge), Sediment, Soil, Surface Water

Completed Remedial Actions (Interim Remedial Actions/ Final Remedial Actions (IRA/FRA))

| Site ID | Site Name | Action | Remedy | FY |
|----------|--|--------|------------------------|------|
| RAAP-041 | SURFACE IMPOUNDMENT #4 (HWMU #4) | FRA | REMOVAL | 1988 |
| RAAP-014 | PROPELLANT BURNING ASH DISPOSAL (S54) | IRA | REMOVAL | 2000 |
| RAAP-045 | FORMERCADMIUM PLATING FACILITY(BLDG 4343) | FRA | REMOVAL | 2007 |
| RAAP-001 | TNT WASTE ACID NEUTRALIZATION PITS(S51) | FRA | REMOVAL | 2009 |
| RAAP-001 | TNT WASTE ACID NEUTRALIZATION PITS(S51) | FRA | INSTITUTIONAL CONTROLS | 2009 |
| RAAP-016 | WASTEWATER PONDS FROM PROP INCINER(S39) | FRA | REMOVAL | 2009 |
| RAAP-040 | FORMER LEAD FURNACE AREA | FRA | WASTE REMOVAL - SOILS | 2009 |
| RAAP-024 | LANDFILL NO.3 (S45) | FRA | INSTITUTIONAL CONTROLS | 2010 |
| RAAP-009 | LANDFILL NITRO AREA (S40) | FRA | INSTITUTIONAL CONTROLS | 2011 |
| RAAP-022 | POND BY BLDGS 4931 & 4928 (S57) | FRA | WASTE REMOVAL - SOILS | 2011 |
| RAAP-044 | NEW RIVER UNIT | FRA | WASTE REMOVAL - SOILS | 2011 |
| RAAP-018 | OILY WATER BURIAL AREA (S48) | FRA | REMOVAL | 2012 |

Duration of IRP

Date of IRP Inception: 198409

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201212/201912

Date of IRP completion including Long Term Management (LTM): 204209

IRP Contamination Assessment

Contamination Assessment Overview

The initial requirements for the corrective action process were specified in a RCRA permit issued by the USEPA in 1989. In October 2000, the permit, which governs corrective action, was reissued. In October 1992, the first phase of investigations at the SWMUs was completed under the 1989 permit. In some cases SWMUs are grouped together based on similar histories or proximity. Various investigations and actions have been completed since the first phase and submitted to the USEPA and the Commonwealth of Virginia. They are currently reviewing the results of these investigations.

The October 2000 Corrective Action Permit is the USEPA Region III enforceable document to manage the RAAP Installation Restoration Program (IRP) and specific environmental restoration, Army (ER,A) eligible sites. The RAAP has separate permits issued by the Commonwealth of Virginia to manage operations pertaining to RCRA Subpart C, D and X. Similarly, the post-closure care permits are the enforceable documents issued by the Commonwealth of Virginia to manage the RAAP IRP and specific ER,A eligible sites.

The primary contaminants of concern at RAAP include metals and explosives. Groundwater within the RAAP boundaries appears to be affected. Groundwater is believed to eventually discharge to the New River. Current data does not suggest that off-post groundwater has been impacted. Regional efforts are underway to delineate the occurrence and flow of the groundwater. The efforts are complicated due to the presence of karst geology (highly fractured and channelized limestone). Due to the nature of this geology, source removal (clean closure) is the preferred alternative when an action may be required.

Cleanup Exit Strategy

The RAAP, in consultation with the USEPA and the VDEQ, will investigate sites to assess what action, if any, is required to achieve response complete (RC). The remaining sites will most likely fall into three broad categories: NFA, source removal, or waste-in-place with LTM.

IRP Previous Studies

| Year | Title | Author | Date |
|------|--|---------------------------------------|----------|
| 1992 | Verification Investigation Report | Dames and Moore | OCT-1992 |
| | RCRA Facility Investigation Report | Dames and Moore | OCT-1992 |
| 1994 | SWMU 69 Closure Report | Dames & Moore | AUG-1994 |
| 1995 | Final Community Relations Plan | Radford Army Ammunition Plant | SEP-1995 |
| 1996 | RCRA Facility Investigation for Solid Waste Management Units 17, 31, 48, 54 | Parsons Engineering and Science, Inc. | JAN-1996 |
| 1997 | New River and Tributaries Study, Radford Army Ammunition Plant | Parsons Engineering Science, Inc. | DEC-1997 |
| 1998 | Site Management Plan | ICF Kaiser Engineers, Inc. | MAY-1998 |
| | Closure Documentation for Solid Waste Management Unit 10, Biological Treatment Plant Equalization Basin | Radford Army Ammunition Plant | DEC-1998 |
| | Closure Report for the Eastern Lagoon of SWMU 8 | Radford Army Ammunition Plant | DEC-1998 |
| 1999 | RCRA Facility Investigation Report for SWMUs 31, 39, 48, 49, & 58 | ICF Kaiser | JAN-1999 |
| | Work Plan Addendum 8: RI/FS for the Northern and Western Burning Grounds (at the NRU) and RFI for Building 4343 | ICF Kaiser | JUN-1999 |
| | Work Plan Addendum 009: RFI Activities at Solid Waste Management Units 31, 48, and 49 and Horseshoe Area Groundwater Study | The IT Group | NOV-1999 |
| 2000 | Work Plan Addendum 010: Background Study | Radford Army Ammunition Plant | AUG-2000 |
| | Final Work Plan Addendum 11: Soil Sampling and Reporting SWMU 6 | Radford Army Ammunition Plant | NOV-2000 |
| 2001 | Final SWMU 6 Sampling Results Report | Radford Army Ammunition Plant | MAY-2001 |
| 2002 | Final Work Plan Addendum 009: SWMU 31 and Horseshoe Area Groundwater Study | Radford Army Ammunition Plant | SEP-2002 |
| | Final Work Plan Addendum 012: SWMUs 39, 48, 49, 50, 58, 59, AOC-FLFA, AOC-Building 4343, New River Unit | Radford Army Ammunition Plant | SEP-2002 |
| | Final Master Work Plan | Radford Army Ammunition Plant | SEP-2002 |
| | Final Work Plan Addendum 13 RFI at SWMU 54 | Radford Army Ammunition Plant | SEP-2002 |
| | Final Work Plan Addendum 14 RFI at SWMU 40/71 | Radford Army Ammunition Plant | SEP-2002 |

IRP Previous Studies

| Year | Title | Author | Date |
|------|--|-------------------------------|----------|
| 2002 | Final SWMU 6 Decision Document | Radford Army Ammunition Plant | OCT-2002 |
| 2003 | Final Work Plan Addendum 16, Site Screening Process for SWMUs 13, 37, 38, 46, 57, 68, 69, 75, 76, and AOCs A, F, Q | Radford Army Ammunition Plant | MAR-2003 |
| | Final Work Plan Addendum 17 SWMU 51 RCRA Facility Investigation | Radford Army Ammunition Plant | DEC-2003 |
| | Final Work Plan Addendum 18, RCRA Facility Investigation at SWMU 41 | Radford Army Ammunition Plant | DEC-2003 |
| | Final SWMU 58 RCRA Facility Investigation Report | Radford Army Ammunition Plant | DEC-2003 |
| 2004 | Final Soil Sampling Report, SWMU 8 and 36 | Radford Army Ammunition Plant | JAN-2004 |
| | Final Building 4343 RCRA Facility Investigation/Corrective Measures Study Report | Radford Army Ammunition Plant | FEB-2004 |
| | Final Work Plan Addendum 17 SWMU 51 RCRA Facility Investigation | Radford Army Ammunition Plant | FEB-2004 |
| | Final New River Unit Additional Characterization: Work Instructions | Radford Army Ammunition Plant | MAY-2004 |
| | Final SWMU 54 Additional Characterization: Work Instructions | Radford Army Ammunition Plant | JUL-2004 |
| | Final SWMU 58 Decision Document No Further Action | Radford AAP, Shaw | AUG-2004 |
| | Final SWMU 39 RCRA Facility Investigation/Corrective Measures Study Report | Radford Army Ammunition Plant | OCT-2004 |
| 2005 | Final SWMU 39 RCRA Facility Investigation/Corrective Measures Study Report | Radford Army Ammunition Plant | JUN-2005 |
| | Final No Further Action Decision Documents for SWMUs 8 and 36 | Radford Army Ammunition Plant | JUL-2005 |
| | Decision Document SWMU 8: Calcium Sulfate Treatment/Disposal Area No Further Action | Radford AAP, URS Corp | JUL-2005 |
| | Decision Document SWMU 36: Calcium Sulfate Drying Beds No Further Action | Radford AAP, URS Corp | JUL-2005 |
| 2006 | Final Sampling Plan Site Screening Process for SWMUs 13, 37, 38, 46, 57, 68, 69, and AOCs A, F, Q January 2006 | Radford AAP, URS Corp | JAN-2006 |
| | Final Sampling Plan (email) in re Site Screening Process for SWMUs 13, 37, 38, 46 57, 68, 69 and AOCs A, F, Q | Radford Army Ammunition Plant | JAN-2006 |
| | Radford AAP Installation Action Plan, 2006 | US Army | MAY-2006 |
| | Final Building 4343 Interim Measures Work Plan, October 2006 | Radford AAP, Shaw | OCT-2006 |
| 2007 | Final RFI Report SWMU 31 | Shaw Environmental | JAN-2007 |
| | Final Building 4343 Interim Measure Completion Report, Radford AAP | Radford AAP, Shaw | APR-2007 |
| | Radford Army Ammunition Plant, Site Screening Process Report for Solid Waste Management Units 13, | URS | MAY-2007 |

IRP Previous Studies

2007

| Title | Author | Date |
|--|--|----------|
| 37, 38, 46, 57, 68, 69 and Areas of Concern A, F, Q Final | | |
| Closure Evaluation for Hazardous Waste Management Unit 4 (HWMU #4)-Interim Status, Radford Army Ammunition Plant, EPA ID VA 1210020730 | ATK letter 07-815-129 dated 28 June 2007 | JUN-2007 |
| Final SWMU 31 RCRA Facility Investigation Report | Radford AAP, URS Corp | JUL-2007 |
| Final Master Work Plan Addendum 19: SWMU 48, SWMU 49, SWMU 50, SWMU 59, SWMU 41, Area O, FLFA, SWMU 43, Area P | Radford AAP, URS Corp | JUL-2007 |
| Decision Document SWMU 46: Propellant Burial Area No Further Action | Radford AAP, URS Corp | AUG-2007 |
| Decision Document SWMU 68: Chromic Acid Treatment Tanks No Further Action | Radford AAP, URS Corp | AUG-2007 |
| Decision Document SWMU 69: Pond by Chromic Acid Treatment Tanks No Further Action | Radford AAP, URS Corp | AUG-2007 |
| Decision Document SWMU 75: Used Oil Storage Tank (Inert Gas Plant) No Further Action | Radford AAP, URS Corp | AUG-2007 |
| Decision Document SWMU 76: Used Oil Tanks No Further Action | Radford AAP, URS Corp | AUG-2007 |
| Decision Document AOC F: Former Drum Storage Area No Further Action | Radford AAP, URS Corp | AUG-2007 |
| Final Work Plan Addendum 021 RCRA Facility Investigation for Solid Waste Management Unit 57 | Radford AAP, URS Corp | OCT-2007 |
| Final Work Plan Addendum 020 RCRA Facility Investigation for Solid Waste Management Units 35, 37, 38 and Area of Concern Q | Radford AAP, URS Corp | OCT-2007 |
| Final NRU Additional Characterization Sampling & Groundwater Investigation Data Report | Radford AAP, Shaw | OCT-2007 |
| Final Work Plan Addendum 022 Site Screening Process at Solid Waste Management Unit 45 | Radford AAP, URS Corp | DEC-2007 |

2008

| | | |
|--|-------------------------------|----------|
| Final Historical Records Review Radford Army Ammunition Plant, Virginia, Military Munitions Response Program | Radford AAP, URS Corp | JAN-2008 |
| Master Work Plan Addendum 025: TCE Plume at Bldgs 1549,1041, 1034 (RAAP-047) | ARCADIS | MAY-2008 |
| Draft RFI Work Plan RAAP-031: Area of Concern A - Nitrocellulose Rainwater Ditch | ARCADIS | JUN-2008 |
| Draft Remedial Investigation Work Plan New River Unit (RFAAP-044) | ARCADIS | JUN-2008 |
| Work Plan Addendum 023: RFI at SWMU 13, Radford Army Ammunition Plant, Virginia | URS | JUL-2008 |
| SWMU 51 RCRA Facility Investigation/Corrective Measures Study Radford Army Ammunition Plant, Radford, VA | Shaw | JUL-2008 |
| Final SWMU 39 Interim Measures Work Plan, Radford Army Ammunition Plant, Virginia | Shaw | JUL-2008 |
| Draft SWMU 51 Interim Measures Work Plan, Radford Army Ammunition Plant, Radford, VA | Shaw | JUL-2008 |
| Semiannual Groundwater Monitoring Report, HWMUs 5, 7, 10 & 16, Second Quarter, 2008 | Radford Army Ammunition Plant | AUG-2008 |
| Final Master Work Plan Addendum 024: MMRP Site Screening Process | URS | SEP-2008 |

IRP Previous Studies

| 2008 | Title | Author | Date |
|------|--|---------|----------|
| | Final SWMU 54 RCRA Facility Investigation/ Corrective Measures Study Radford Army Ammunition Plant, Radford, VA Volumes I and II | URS | SEP-2008 |
| | Draft Former Lead Furnace Area Interim Measures Work Plan | Shaw | NOV-2008 |
| | Final Former Lead Furnace Area RCRA Facility Investigation/Corrective Measures Study Report | Shaw | NOV-2008 |
| | Draft Work Plan Addendum 29 Supplemental Work Plan RAAP-031: Area of Concern A-Nitrocellulose Rainwater Ditch | ARCADIS | DEC-2008 |
| 2009 | | | |
| | Draft SWMUs 48 and 49 RCRA Facility Investigation/Corrective Measures Study Report | Shaw | FEB-2009 |
| | Final Corrective Action Plan for Hazardous Waste Management Unit 5 (RAAP-042) | ARCADIS | APR-2009 |
| | Final Solid Waste Management Units 40 (RAAP-009) and 71 (RAAP-002) RCRA Facility Investigation/Corrective Measures Study Report Volumes I and II | URS | APR-2009 |
| | Final Site Screening Process Report Radford Army Ammunition Plant, Virginia, Military Munitions Response Program | URS | MAY-2009 |
| | Draft Supplemental Remedial Work Plan New River Unit-RFAAP-NRU | ARCADIS | JUN-2009 |
| | Final RFI Report RAAP-031: Area of Concern A-Nitrocellulose Rainwater Ditch | ARCADIS | JUL-2009 |
| | Final Engineering Evaluation/Cost Analysis Northern Burning Ground, New River Unit | ARCADIS | JUL-2009 |
| | Final Solid Waste Management Unit 57 (RAAP-022) RCRA Facility Investigation/Corrective Measures Study Report | URS | SEP-2009 |
| | Final RCRA Facility Investigation Report RAAP-047 Buildings 1549, 1041 and 1034 | ARCADIS | SEP-2009 |
| | Final SWMUs 50 and 59 RCRA Facility Investigation Report | Shaw | SEP-2009 |
| | Final RFI Addendum SWMU 31 (RAAP-026): Coal Ash Settling Lagoons | ARCADIS | OCT-2009 |
| | Draft SWMU 41 RCRA Facility Investigation Report | Shaw | NOV-2009 |
| | Draft SWMU 43 RCRA Facility Investigation Report | Shaw | NOV-2009 |
| | Final Removal Action Work Plan for the Northern Burning Ground New River Unit (RAAP-044) | ARCADIS | DEC-2009 |
| 2010 | | | |
| | Final SWMU 54 Interim Measures Work Plan | Shaw | JAN-2010 |
| | Final Solid Waste Management Unit 45 (RAAP-024) Site Screening Process Report | URS | JAN-2010 |
| | Draft Army Reserve Small Arms Range (RFAAP-001-R-01) | Shaw | FEB-2010 |
| | Final Interim Measures Completion Reports: SWMU 51, SWMU 39, and FLFA | Shaw | FEB-2010 |
| | Final Remedial Investigation Report New River Unit (RAAP-044) BDDT, BLA, IAA, RY, WBG and Groundwater Volumes I and II | ARCADIS | JUN-2010 |

IRP Previous Studies

| 2010 | Title | Author | Date |
|------|--|------------|----------|
| | Final Study Area at Solid Waste Management Unit 13 RCRA Facility Investigation Report | URS | JUL-2010 |
| | Final Solid Waste Management Units 35, 37, 38, and Area of Concern Q (RAAP-10) RCRA Facility Investigation Report | URS | SEP-2010 |
| | Final Feasibility Study Report New River Unit (RAAP-044) Bag Loading Area, Igniter Assembly Area, and Western Burning Ground | ARCADIS | SEP-2010 |
| | Final Area P RCRA Facility Investigation Report | Shaw | SEP-2010 |
| | Final Proposed Plan for New River Unit (RAP-044) | ARCADIS | SEP-2010 |
| | Final Response Action Completion and Closure Report for the Northern Burning Ground New River Unit (RAAP-044) | ARCADIS | OCT-2010 |
| | Draft Final SWMU 57 Interim Measures Work Plan | UXB/Kemron | NOV-2010 |
| | Final Remedial Action Workplan for BLA, IAA, & BDDT New River Unit (RAAP-044) | ARCADIS | NOV-2010 |
| | Final Site Screening Process Report for Site Screening Areas 18, 72, 30, 79, 60 and 77 | URS | DEC-2010 |
| | Draft Final SWMU 40 Interim Measures Work Plan | UXB/Kemron | DEC-2010 |
| 2011 | Final SWMU 43 RCRA Facility Investigation Report | Shaw | JAN-2011 |
| | Final SWMU 41 RCRA Facility Investigation Report | Shaw | FEB-2011 |
| | Final Army Reserve Small Arms Range RCRA Facility Investigation and Interim Measures Work Plan | Shaw | MAR-2011 |
| | Final SWMU 54 MNA Interim Measures Work Plan | Shaw | APR-2011 |
| | Final Remedial Action Work Plan for the Western Burning Ground | ARCADIS | APR-2011 |
| | Draft SWMU 54 Interim Measures Completion Report | Shaw | APR-2011 |
| | Draft NRU Monitoring Well Abandonment Plan | ARCADIS | APR-2011 |
| | Draft SWMU 48 Interim Measures Work Plan | Shaw | JUN-2011 |
| | Draft SWMU 57 Interim Measures Completion Report | UXB/Kemorn | JUN-2011 |
| | Final SWMU 40 Landfill Nitro Area Interim Measures Work Plan | UXB/Kemorn | AUG-2011 |

RADFORD ARMY AMMUNITION PLANT
Installation Restoration Program
Site Descriptions

Site ID: PBC @ Radford
Site Name: PBC site
Alias: PBC site

STATUS

Regulatory Driver: RCRA

RRSE: LOW

Contaminants of Concern: Explosives, Metals, Semi-volatiles (SVOC), Volatiles (VOC)

Media of Concern: Groundwater, Soil

| Phases | Start | End |
|-------------|-------------|--------|
| RFA..... | 199909..... | 200101 |
| DES..... | 200609..... | 201212 |
| CMI(C)..... | 200609..... | 201212 |
| CMI(O)..... | 201009..... | 201212 |

RIP Date: 201212

RC Date: 201912

SITE DESCRIPTION

This site tracks the costs from two performance-based contracts (PBCs), one that was awarded in 2006 and one that was awarded in 2008.

The PBC that was awarded in September 2006 includes the following sites: RAAP-001, 011, 013, 016, 018, 023, 025, 028, 037, 038, and 040. Options remain for RAAP-011, 013, and 018.

All other options of this PBC have been awarded. Please refer to individual sites for descriptions and for post-PBC cost information.

The second PBC, awarded in February 2008, includes: RAAP-026, 031, 042, 044, and 047. All options for RAAP-026 and RAAP-042 have been awarded. Unfunded options remain for the other sites. Please refer to individual sites for descriptions and post-PBC cost information.

CLEANUP/EXIT STRATEGY

Please refer to the individual cleanup strategies for each site.

Site ID: RAAP-001

Site Name: TNT WASTE ACID NEUTRALIZATION PITS(S51)

Alias: SWMU 51

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Explosives

Media of Concern: Soil

| Phases | Start | End |
|--------------|-------------|--------|
| RFA..... | 198410..... | 198412 |
| CS..... | 198410..... | 198412 |
| RFI/CMS..... | 200207..... | 200801 |
| DES..... | 200709..... | 200802 |
| CMI(C)..... | 200709..... | 200909 |
| LTM..... | 201106..... | 204206 |

RIP Date: N/A

RC Date: 200909

SITE DESCRIPTION

SWMU 51 is located on a plateau in the southeastern section of the horseshoe area and consists of one unlined trench, approximately 20 feet wide by 200 feet long. From 1968 through 1972, an estimated 10 tons of red water ash was reportedly disposed of in the trench. The trench also was used in the 1970s for disposal of TNT neutralization sludge from the treatment of red water. The pits were backfilled and revegetated.

A 1992 RFI by Dames & Moore evaluated groundwater and soil samples and a CMS was recommended. The soil and groundwater concentrations of contaminants of concern (COCs) exceeded health-based numbers (HBNs) in the 1989 RCRA corrective action permit (CORA) and could indicate risk under an industrial worker scenario.

In FY04 the soil samples for the site-screening process, a quantitative human health risk assessment (HHRA), and a screening-level ecological risk assessment (SLERA) were collected.

Groundwater and soil samples were collected and analyzed for semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs) and explosives to support a quantitative HHRA. Due to the nature of the karst geology, source removal is recommended. LTM will be performed for five years. SWMUs 28 and 52 are in the same vicinity. During the May 2006 IAP workshop, Department of the Army representatives understood that this site would not be remedy-in-place (RIP)/RC by FY07. In September 2006, a PBC was awarded with a RIP of September 2009. In 2007 additional samples were collected in accordance with work plan addendum (WPA) 019 that was approved by the stakeholders. In 2008 an RFI/CMS report was prepared and approved by the stakeholders that contained a recommendation for source removal (clean closure) as groundwater was not affected. A follow-on interim measure work plan (IMWP) was prepared and similarly approved to implement this recommendation. The IM effort was completed in 2009. Closeout documentation was submitted in accordance with (IAW) the CORA. On April 1, 2010 the regulators approved the closeout report and its recommendation of NFA with Land use control to prevent excavation below 15 feet.

CLEANUP/EXIT STRATEGY

The LTM phase is open to handle LUC.

The Installation Commanders (ICs) are to maintain the site in its current industrial/commercial as a closed SWMU and to prevent residential use (i.e. exposure below 15 feet).

Site ID: RAAP-005

Site Name: WASTE PROPELLANT BURNING GROUND (S13)

Alias: SWMU 13

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Metals

Media of Concern: Soil

| Phases | Start | End |
|---------------|--------------|------------|
| RFA..... | 198410..... | 198412 |
| CS..... | 198410..... | 198412 |
| RFI/CMS..... | 200505..... | 201008 |
| CMI(C)..... | 201008..... | 201008 |
| LTM..... | 201106..... | 204206 |

RIP Date: N/A

RC Date: 201008

SITE DESCRIPTION

SWMU 13 constitutes about 20 acres in the southeast section of the horseshoe area on the northern bank of the New River within the 100 year floodplain. Since manufacturing operations began at RAAP in 1941, the SWMU has been used to burn waste explosives, propellants, and laboratory wastes (propellant and explosive residues, samples and analytical residues). Until 1985 burning was conducted on the soil. Since then burning has been performed in pans.

A 1992 RFI by Dames & Moore evaluated groundwater quality and potential soil contamination for explosives, VOCs, SVOCs, and heavy metals. The concentrations of COCs exceeded HBNs in the 1989 CORA and could indicate risk under an industrial worker scenario.

In FY04, a site-screening sampling was performed. The site-screening effort identified off-site migration associated with activities before 1986. A final SSP report was submitted in May 2007; it contained a recommendation for further investigation that was subsequently approved on June 7, 2007 by the USEPA and on April 13, 2007 by the VDEQ on an earlier draft. In FY05, in anticipation of those approvals, an RFI/CMS was procured. Also in FY05, a permit was issued by the VDEQ governing burning operations at the open burning ground. A groundwater and soil monitoring program is part of the permit.

In 2008, the WPA 023 RFI work plan for sampling the area from the fence to the river (i.e. outside of the active unit) was prepared and approved by the stakeholders. In November 2008 sampling was performed IAW WPA 023. In July 2009 the draft RFI report was submitted. Review comments were addressed. The final RFI addressed the area outside of the permitted unit from the fence to the river [about 30 to 50 feet] which is mostly a steep slope. The final RFI recommended no further action beyond implementing a land use control to prevent digging in this area. On August 26, 2010 the USEPA and the VDEQ approved the final RFI report.

CLEANUP/EXIT STRATEGY

Per the final RFI report, NFA beyond LUC was approved by the regulatory agencies. The LUC is to prevent digging at the site which is a narrow strip of land between the permitted unit and the river.

The LTM phase is open to handle LUC.

Site ID: RAAP-009
Site Name: LANDFILL NITRO AREA (S40)
Alias: SWMU 40

STATUS

Regulatory Driver: RCRA
RRSE: HIGH
 Contaminants of Concern: Metals
 Media of Concern: Soil, Surface Water

| Phases | Start | End |
|------------------|-------------|--------|
| RFA..... | 198410..... | 198412 |
| CS..... | 198410..... | 198412 |
| RFI/CMS..... | 200105..... | 200909 |
| DES..... | 201007..... | 201106 |
| CMI(C)..... | 201007..... | 201106 |
| LTM..... | 201106..... | 204206 |
| RIP Date: | N/A | |
| RC Date: | 201106 | |

SITE DESCRIPTION

In the 1970s and early-1980s, SWMU 40, which is approximately 1.5 acres, was reportedly used as a sanitary landfill to dispose of uncontaminated paper, municipal refuse, cement, and rubber tires. Whether hazardous wastes or wastes containing hazardous constituents were ever disposed of in the landfill is not known. Between 1991 and 1992, a fenced enclosure for asbestos storage was constructed over the northeast corner of this SWMU. The unit was strictly an area fill and was covered with soil and grass.

A 1992, a RCRA verification investigation (VI) by Dames & Moore attempted to install four monitoring wells which could not be sampled because the four borings were dry. In 1993 and 1994, a dye-trace study was conducted by Engineering-Science in the adjacent area to identify groundwater flow paths in the south-central section of the MMA; however, this site is not believed to affect groundwater. This site and SWMU 71 (RAAP-02) are combined for the RFI. In FY01 a contract to perform a RFI/CMS was procured and in FY03 field investigations were completed. Soil samples were collected to confirm previous investigative results and to provide additional data to support a quantitative HHRA and SLERA. A portion [20 cubic yards (cy)] of the investigative derived material (IDM) was determined to be hazardous waste (lead) and was stabilized and disposed of in a permitted treatment storage and disposal facility.

In FY04, the RFI was submitted to the VDEQ and the USEPA for review. In FY05 there were several comment review cycles. Stakeholders agreed that additional sampling was needed to address soil and groundwater data gaps, and in FY06 additional sampling was procured. In 2008 a new RFI/CMS report was submitted. Regulatory comments were addressed and a final RFI/CMS report was submitted in April 2009. It was approved June 30, 2009. In early 2010, a PBC was awarded to implement the CMS recommendation. In December 2010 a work plan was submitted and was approved Aug. 26, 2011 by the USEPA and the VDEQ. RFAAP subsequently repaired the cap, installed an additionally groundwater monitoring well and began LTM in accordance with the work plan.

CLEANUP/EXIT STRATEGY

In 2010 a PBA contract was awarded to implement the RFI/CMS remedy. LUC and LTM are anticipated.

The LTM phase is also to handle LUC.

The LUC is to maintain the site in its current industrial/commercial as a closed SWMU and to prevent residential use.

Site ID: RAAP-011

Site Name: RED WATER ASH BURIAL GROUND (S41)

Alias: SWMU 41

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Explosives, Metals, Semi-volatiles (SVOC)

Media of Concern: Groundwater, Soil, Surface Water

| Phases | Start | End |
|--------------|-------------|--------|
| RFA..... | 198410..... | 198412 |
| CS..... | 198410..... | 198412 |
| RFI/CMS..... | 200207..... | 201109 |
| CMI(C)..... | 201103..... | 201109 |
| LTM..... | 201109..... | 204209 |

RIP Date: N/A

RC Date: 201109

SITE DESCRIPTION

SWMU 41 is located in the MMA and consists of two noncontiguous disposal areas for red water ash. The northern area (41A) consisted of an unlined lagoon approximately 50 feet by 70 feet, which was backfilled. The southern area (41B) consisted of a clay-lined disposal area approximately 100 feet by 150 feet. Prior to construction of the red water treatment plant, red water was concentrated by evaporation and burned in four rotary kilns located in the TNT manufacturing area. From 1967 to 1971 the ash produced from these kilns was disposed of in SWMU 41B.

A 1992 RCRA VI by Dames & Moore included the collection and analysis of groundwater samples near the landfill, ash and soil samples from the lagoon north of the landfill, and a surface water sample from Stroubles Creek.

Data from the VI indicate explosives and metals in the soil and SVOCs and metals in the groundwater above 1989 RCRA CORA permit HBNS. The soil samples for the SSP, a quantitative HHRA and a SLERA, were collected in FY04.

In September 2006 a PBC was awarded with a RIP date of September 2009. In 2007, additional samples were collected in accordance with WPA 019 that was approved by the stakeholders. In December 2009, a draft RFI report was submitted. In the process of addressing regulatory comments a well was installed and sampled at 41A in October 2010. Data from the effort supports NFA at 41A. Land use control was recommended for 41B. A revised RFI was submitted in February 2011 and approved March 23, 2011 by the USEPA and the VDEQ.

CLEANUP/EXIT STRATEGY

Per the RFI report and new 41A groundwater data, NFA was obtained for SWMU 41A and LUC at SWMU 41B.

The LUC is to maintain SWMU 41B in its current commercial/industrial state as a closed SWMU and to prevent residential use. LTM is open to address the LUC at SWMU 41B.

The site is included in the PBC that was awarded in 2006.

Site ID: RAAP-013
Site Name: RED WATER ASH BURIAL #2 (S49)
Alias: SWMU 49

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Explosives, Metals, Semi-volatiles (SVOC), Volatiles (VOC)

Media of Concern: Groundwater, Soil

| Phases | Start | End |
|--------------|-------------|--------|
| RFA..... | 198410..... | 198412 |
| CS..... | 198410..... | 198412 |
| RFI/CMS..... | 199712..... | 201212 |
| LTM..... | 201212..... | 202109 |

RIP Date: N/A

RC Date: 201212

SITE DESCRIPTION

SWMU 49 is approximately 75 feet by 50 feet and is located in the horseshoe area, contiguous with SWMUs 48, 50, and 59. The four SWMUs were classified together during the 1980s because a distinction could not be made between the areas by visual observation. SWMU 48 was later divided into an upper and a lower disposal area, and SWMU 49 was determined to be part of the SWMU 48 lower disposal unit. SWMU 49 reportedly received 10 tons of red water ash during its active life.

A 1992 RCRA VI by Dames & Moore and a 1996 RFI by Parsons Engineering-Science were conducted to determine the impacts to groundwater quality and soil. A 1999 draft RFI by ICF Kaiser included the verification of previous RFI results. Metals, VOCs, and SVOCs were detected above 1989 RCRA CORA permit HBNs.

The RFI sampling was completed in FY02. In September 2006, a PBC was awarded with a RIP of September 2009 at SWMUs 49, 48, 50, and 59, which are close to each other. In 2007, additional samples were collected in accordance with WPA 019 that was approved by the stakeholders. In February 2009 a draft RFI/CMS report was submitted. Regulatory review comments are being addressed via an Interim Measures (IM) (source removal) at SWMU 48 and subsequent submittal of a revised RFI/CMS report. To that end a SWMU 48 IM Work plan was approved by USEPA and the VDEQ on July 20, 2011 with subsequent execution from July 2011 through February 2012. RFI/CMS report is under revision for internal review. Due to the contiguous nature of SWMU 49 (RAAP-013) and SWMU 48 (RAAP-018), SWMU 49 is tracking costs for both of these sites.

CLEANUP/EXIT STRATEGY

An RFI/CMS effort is underway to address site-specific groundwater.

Due to the contiguous nature of RAAP-013 (SWMU 49), RAAP-018 (SWMU 48), RAAP-025 (SWMU 50), and RAAP-028 (SWMU 59), local groundwater issues may be best addressed under a monitored natural attenuation (MNA)/LTM plan for RAAP-013 (SWMU 49) and source removal at RAAP-018 (SWMU 48), as these two sites are thought to be the likely source areas.

NFA or possibly a LUC is anticipated for soil at RAAP-13 (SWMU 49) and source removal with NFA is anticipated at RAAP-018 (SWMU 48). MNA/LTM is anticipated for groundwater at and in the vicinity of RAAP-013 (SWMU 49) and RAAP-018 (SWMU 48).

The LUC is to maintain SWMU 49 in its current industrial/commercial as a closed SWMU and to prevent residential use.

The site is included in the PBC that was awarded in 2006.

Site ID: RAAP-014

Site Name: PROPELLANT BURNING ASH DISPOSAL (S54)

Alias: SWMU 54

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Explosives, Metals, Perchlorate, Polychlorinated Biphenyls (PCB), Volatiles (VOC)

Media of Concern: Groundwater, Sediment, Soil, Surface Water

| Phases | Start | End |
|--------------|-------------|--------|
| RFA..... | 198410..... | 198412 |
| CS..... | 198410..... | 198412 |
| RFI/CMS..... | 199601..... | 200810 |
| DES..... | 200907..... | 201109 |
| IRA..... | 199808..... | 200001 |
| CMI(C)..... | 201009..... | 201109 |
| LTM..... | 201109..... | 204209 |

RIP Date: N/A

RC Date: 201109

SITE DESCRIPTION

SWMU 54 is an inactive disposal area situated on approximately five acres within the easternmost section of the horseshoe area. This SWMU was used during the 1970s to dispose of the propellant burning ground (SWMU 13) ash.

A 1992 RCRA VI by Dames & Moore, a 1996 RFI by Parsons Engineering-Science, and a 1997 Supplemental RFI by ICF Kaiser were conducted. Soil and groundwater samples were taken in these efforts. Soil data indicates the presence of metals and VOCs and explosives exceeding the 1989 RCRA CORA permit HBNS.

A 1999 interim removal action was performed by Parallax to remove hot spots associated with lead.

A contract to perform an RFI/CMS was procured in FY01. Clean closeout will mitigate long-term monitoring and long-term operation liability. From FY03 through FY06 RFI sampling was conducted. More sampling is needed per the March 29, 2006 to March 30, 2006 meeting of RAAP, the USAEC, the USACE, the US Army Center for Health Promotion and Preventive Medicine (USACHPPM), the VDEQ and the USEPA. In FY06 additional sampling was procured and the field effort was completed in fall 2007. In 2008 an RFI/CMS report was prepared and approved by the stakeholders that contained a recommendation for source removal (clean closure) to prevent further leaching to groundwater and allow for continued attenuation. In 2010 the source removal effort was physically complete. In 2011 the source closeout report and MNA work plan were submitted. On April 11, 2011 the MNA work plan was approved by the USEPA and the VDEQ. On July 11, 2011 the source closeout report, aka Interim Measures Completion Report, was approved by USEPA and the VDEQ.

CLEANUP/EXIT STRATEGY

The RFI/CMS report was approved by the regulatory agencies contained a recommendation for source removal (clean closure) to prevent further leaching to groundwater and allow for MNA with LTM. In 2009, a PBA contract was awarded to implement this remedy.

Site ID: RAAP-018
Site Name: OILY WATER BURIAL AREA (S48)
Alias: SWMU 48

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Explosives, Metals

Media of Concern: Groundwater, Soil

| Phases | Start | End |
|--------------|-------------|--------|
| RFA..... | 198409..... | 198410 |
| CS..... | 198410..... | 198412 |
| RFI/CMS..... | 199712..... | 201103 |
| CMI(C)..... | 201103..... | 201201 |
| LTM..... | 201201..... | 204206 |

RIP Date: N/A

RC Date: 201201

SITE DESCRIPTION

This unit is contiguous to SWMU 49 (red water ash disposal area), SWMU 50 (calcium sulfate disposal area), and SWMU 59 (bottom ash pile). An estimated 200,000 gallons or more of oil-contaminated wastewater were disposed of in unlined trenches at this unit prior to the off-plant recycling of used oil.

A 1992 RCRA VI by Dames & Moore and a 1996 RFI by Parsons Engineering-Science were conducted to evaluate potential groundwater contamination. Four monitoring wells were installed and sampled. Soil data from the VI indicated the presence of metals and explosives above 1989 RCRA CORA permit HBNS. Groundwater data from the VI indicated the presence of chlorinated solvents and metals above 1989 RCRA CORA permit HBNS.

In 1999 a draft RFI was submitted by ICF Kaiser. Soil data from the RFI indicated the presence of metals above 1989 RCRA CORA permit HBNS. In FY02 the RFI sampling was completed. In September 2006, a PBC was awarded with a RIP of September 2009 at SWMUs 49, 48, 50, and 59, which are in proximity to each other. In 2007, additional samples were collected in accordance with WPA 019 that was approved by the stakeholders. In February 2009 a draft RFI/CMS report was submitted. Regulatory review comments are being addressed via an Interim Measures (IM)(source removal) at SWMU 48 and subsequent submittal of a revised RFI/CMS report. To that end a SWMU 48 IM Workplan was approved by USEPA and the VDEQ on July 20, 2011 with subsequent execution from July 2011 through February 2012. RFI/CMS report is under revision for internal review.

CLEANUP/EXIT STRATEGY

An RFI/CMS effort is underway to address site-specific groundwater.

Due to the contiguous nature of RAAP-013 (SWMU 49), RAAP-018 (SWMU 48), RAAP-025 (SWMU 50), and RAAP-028 (SWMU 59), local groundwater issues may best be addressed under an MNA/LTM plan for RAAP-013 (SWMU 49) and source removal at RAAP-018 (SWMU 48), as these two sites are thought to be the likely source areas.

NFA or possibly an LUC is anticipated for soil at RAAP-13 (SWMU 49) and source removal with NFA is anticipated at RAAP-018 (SWMU 48). MNA/LTM is anticipated for groundwater at and in the vicinity of RAAP-013 (SWMU 49) and RAAP-018 (SWMU 48).

The LUC is to maintain SWMU 49 in its current industrial/commercial as a closed SWMU and to prevent residential use.

The site is included in the PBC that was awarded in 2006.

Site ID: RAAP-023
Site Name: SANITARY LANDFILL NO.2 (S43)
Alias: SWMU 43

STATUS

Regulatory Driver: RCRA
RRSE: LOW
 Contaminants of Concern: Metals, Volatiles (VOC)
 Media of Concern: Groundwater, Sediment, Surface Water

| Phases | Start | End |
|--------------|-------------|--------|
| RFA..... | 198409..... | 198410 |
| CS..... | 198410..... | 198412 |
| RFI/CMS..... | 200610..... | 201101 |
| CMI(C)..... | 201101..... | 201101 |
| LTM..... | 201106..... | 204206 |

RIP Date: N/A
RC Date: 201101

SITE DESCRIPTION

SWMU 43 is a closed, unlined sanitary landfill of approximately two acres, located immediately adjacent to the New River in the northeast section of the RAAP MMA. It operated from 1958 to 1969. The exact boundaries of the unit have not been determined because of the unavailability of a site plan or documents. The site was regraded in accordance with a VI recommendation. A 1992 RCRA VI by Dames & Moore installed six groundwater monitoring wells. Groundwater and surface water data indicates the presence of metals and VOCs which did not exceed 1989 RCRA CORA permit HBNs.

In September 2006, a PBC was awarded to produce an RFI/CMS by September 2009. In January 2011 a final RFI report was submitted that recommended no further action beyond land use control. The regulators approved this report on Jan. 28, 2011.

CLEANUP/EXIT STRATEGY

Per the final RFI report NFA beyond LUC was approved by the regulatory agencies. The LTM phase is open to handle LUC.

The LUC is to maintain the site in its current industrial/commercial as a closed SWMU and to prevent residential use.

The site is included in the PBC that was awarded in 2006.

Site ID: RAAP-024
Site Name: LANDFILL NO.3 (S45)
Alias: SWMU 45

STATUS

Regulatory Driver: RCRA
RRSE: HIGH
 Contaminants of Concern: Metals, Volatiles (VOC)
 Media of Concern: Groundwater, Soil

| Phases | Start | End |
|--------------|-------------|--------|
| RFA..... | 198410..... | 198412 |
| CS..... | 198410..... | 198412 |
| RFI/CMS..... | 200503..... | 201003 |
| CMI(C)..... | 201003..... | 201003 |
| LTM..... | 201106..... | 204206 |

RIP Date: N/A
RC Date: 201003

SITE DESCRIPTION

SWMU 45 is an inactive sanitary landfill of approximately five acres, located in the north-central section of the MMA. It operated between 1957 and 1961. The unit was never operated as a permitted landfill. Paper and municipal refuse were the only materials reportedly disposed of in SWMU 45. Evidence of burning has been observed in the area.

A 1992 RCRA VI by Dames & Moore included monitoring well installation, a geophysical survey, and a baseline human health risk assessment.

An SSP was procured in FY05. In late FY06, stakeholders agreed to the procurement of a geophysical delineation and groundwater assessment.

In 2007 additional samples were collected in accordance with WPA 022 that was approved by the stakeholders. In 2009 a draft SSP report which recommended NFA was submitted and regulatory comments were addressed. In January 2010 the final SSP report was submitted which NFA beyond land use control (LUC). LUC would be to maintain the site in its current commercial/industrial state as a closed SWMU and to prevent residential use. This report was approved by the USEPA and the VDEQ on March 29, 2010.

CLEANUP/EXIT STRATEGY

The LTM phase is open to handle LUC.

The LUC is to maintain the site in its current industrial/commercial as a closed SWMU and to prevent residential use.

Site ID: RAAP-039

Site Name: HAZARDOUS WASTE LANDFILL (HWMU16)

Alias: HWMU 16

STATUS

Regulatory Driver: RCRA
RRSE: HIGH
 Contaminants of Concern: Explosives, Volatiles (VOC)
 Media of Concern: Groundwater

| Phases | Start | End |
|------------------------|--------------|------------|
| RFA..... | 198410..... | 198412 |
| CS..... | 198410..... | 198412 |
| RFI/CMS..... | 200010..... | 200210 |
| LTM..... | 200210..... | 204203 |
| RIP Date: N/A | | |
| RC Date: 200210 | | |

SITE DESCRIPTION

HWMU 16 covers about two acres and is located in the horseshoe area of the plant between RAAP-007 (SWMU 28, Permit 401) and RAAP-029 (SWMU 52, Permit 401). The site is a landfill, closed in the early-1980s, which was used for lab chemicals and incinerator residue and as a burning ground.

Groundwater data indicates the presence of elevated concentrations of explosives and chlorinated solvents. There are indications that the groundwater contamination at HWMU 16 is migrating to the areas of SWMU 28 and 52.

In October 2002, a post-closure care permit requiring LTM was issued by the VDEQ.

On May 29, 2007, for LTM reduction, the RAAP submitted a Class 1 minor modification request to the VDEQ which was approved on June 14, 2007.

CLEANUP/EXIT STRATEGY

LTM is planned for 30 years as the post-closure requirement is for 30 years or site close-out. Wells will be sampled as required in the post closure permit. The costs for data management information system upgrades and modifications to the RCRA CORA permit to close-out sites are also included under this site.

Site ID: RAAP-042

Site Name: SURFACE IMPOUNDMENT #5 (HWMU #5)

Alias: HWMU #5

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Metals

Media of Concern: Groundwater, Soil

| Phases | Start | End |
|---------------|--------------|------------|
| RFA..... | 198410..... | 198412 |
| CS..... | 198410..... | 198412 |
| RFI/CMS..... | 200010..... | 200210 |
| LTM..... | 200210..... | 204203 |

RIP Date: N/A

RC Date: 200210

SITE DESCRIPTION

HWMU 5 is located in the middle of the MMA. It was a surface impoundment used for acidic wastewaters. Sludge was removed, but contaminated soil below the sludge layer was left in place. The lagoon was filled and capped. The presence of residual waste precludes clean closure.

Groundwater monitoring has been performed for the past 15 years. Dinitrotoluene (DNT) and trichloroethylene (TCE) were recently detected. TCE exceeded groundwater protection standards (GPSs). In FY04 an alternate source determination (ASD) report for TCE was resubmitted to the VDEQ.

In fall 2002 an investigative effort was completed for HWMUs 5 and 7. The subsequent Draft Field Investigation Report and Risk Assessment for HWMUs 5 and 7 (DAA 2003) was submitted to the VDEQ. This report is intended to facilitate elimination of LTM. In October 2002 a post-closure care permit requiring LTM was issued by the VDEQ.

In 2007 RAAP submitted several documents to the VDEQ to reduce or eliminate LTM. One of the documents was an ASD for TCE, later formalized in a multi-site permit modification request. The VDEQ review comments indicated that the ASD could not be approved with the current data because the TCE source was not identified. Soil data does not show TCE within and below HWMU 5, so there is merit in pursuing an ASD. A new site, RAAP-047, was created to address TCE issues in the vicinity and to prepare and resubmit the HWMU 5 ASD. In February 2008 a PBC was awarded to achieve an HWMU 5 ASD by March 2009.

Two sampling events occurred during May and July 2008 in accordance with WPA 025 that were approved by the stakeholders. Over summer 2008 several stakeholder discussions of the preliminary data and assessments occurred. Their conclusion was that an ASD could not be approved for TCE at HWMU 5. Therefore, the process to modify the post closure care permit for HWMU 5 was begun to incorporate a CAP. In December 2008 a draft CAP was prepared and put in public notice that proposed MNA/LTM as the cleanup remedy; however, the data and assessments indicated that NFA was appropriate for RAAP-047. On Nov. 5, 2009 the VDEQ approved the HMWU 5 CAP for MNA/LTM.

CLEANUP/EXIT STRATEGY

On Nov. 5, 2009, the VDEQ approved the HMWU 5 CAP for MNA/LTM.

LTM is planned for 30 years as the post-closure requirement is for 30 years or until clean closure has been demonstrated through the CAP and the post-closure care permit.

The site is included in the PBC that was awarded in 2008.

Site ID: RAAP-043

Site Name: SURFACE IMPOUNDMENT #7 (HWMU #7)

Alias: HWMU #7

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Metals

Media of Concern: Groundwater, Soil

| Phases | Start | End |
|---------------|--------------|------------|
| RFA..... | 198410..... | 198412 |
| CS..... | 198410..... | 198412 |
| RFI/CMS..... | 200010..... | 200210 |
| LTM..... | 200210..... | 204203 |

RIP Date: N/A

RC Date: 200210

SITE DESCRIPTION

HWMU 7 is located in the western section of the MMA along the New River. It was a surface impoundment used for acidic wastewaters. In 2001 the VDEQ issued a post-closure permit which requires LTM.

In the fall of 2002, an investigative effort was completed for HWMUs 5 and 7. The subsequent Draft Field Investigation Report and Risk Assessment for HWMUs 5 and 7 (DAA 2003) was submitted to the VDEQ. This report is intended to facilitate elimination of LTM. In October 2002 a post-closure care permit requiring LTM was issued by the VDEQ.

The following RAAP document submissions are provided as LTM reduction status:

- Jan. 9, 2007: ASD,
- Feb.9, 2007: Amended closure plan,
- May 29, 2007: Class 1 minor modification request, and
- Aug. 9, 2007: Class 3 permit modification request.

On June 14, 2007, the VDEQ approved the ASD and Class 1 modification. The VDEQ action is pending on the Class 3 modification because it combines actions on several sites. On September 27, the VDEQ approved the Class 3 Permit Modification and on January 5, 2012 the VDEQ approved the ASD for cobalt. Together these actions may allow RFAAP to close site upon submittal and approval of a closure report. On February 9, 2012 RFAAP submitted the closure report IAW the approved closure plan and requested clean closure of soil and groundwater. Regulatory review and action is pending.

CLEANUP/EXIT STRATEGY

LTM is planned for 30 years as the post closure requirement is for 30 years or until clean closure has been demonstrated the post-closure care permit process.

Wells will be sampled as required in the permit. A closure report will need to be submitted as the VDEQ has approved the amended closure plan. When, and if, the VDEQ approves the amended closure report and the Class 3 modification, the post-closure care/LTM can be eliminated.

Site ID: RAAP-044
Site Name: NEW RIVER UNIT
Alias: NRU

STATUS

Regulatory Driver: CERCLA

RRSE: HIGH

Contaminants of Concern: Metals, Polychlorinated Biphenyls (PCB)

Media of Concern: Groundwater, Sediment, Soil, Surface Water

| Phases | Start | End |
|------------|-------------|--------|
| PA..... | 199705..... | 199708 |
| SI..... | 199712..... | 199806 |
| RI/FS..... | 199806..... | 201009 |
| RD..... | 201009..... | 201009 |
| RA(C)..... | 201009..... | 201109 |
| LTM..... | 201109..... | 204209 |

RIP Date: N/A

RC Date: 201109

SITE DESCRIPTION

The NRU is located approximately six miles west of the RAAP MMA and consists of approximately 2,813 acres. Between 1940 and 1945 the NRU was used to load propellants and igniter charges and to manufacture igniter charge bags. Between 1943 and 1945 operations were expanded to include an additional bag-loading line, rolled powder operations, flash-reducer loading lines, and black powder drying facilities. Production ended after World War II, and the plant was officially designated as part of the RAAP installation. Since 1947, approximately 1,000 acres in the western section of the plant have been sold or transferred for other uses.

There is conductive flooring in several buildings. The material is made of barium, copper, asbestos, and lead. It is exposed to the elements and is leaching to surrounding soil.

An RI sampling effort included the collection of surface soil, sludge, and water samples. Metals have been detected in excess of the 1989 RCRA CORA permit HBNs; however, this site is not subject to any RCRA CORA permit. Six areas within the NRU are being investigated:

- the bag loading area (BLA),
- the igniter assembly area (IAA),
- the northern burning ground (NBG),
- the western burning ground (WBG),
- the rail yard (RY), and
- the building debris disposal trench (BDDT).

In FY02 the RI fieldwork was completed. In FY04 effort from the work instructions was performed.

In an e-mail dated Feb. 16, 2007, the USAEC confirmed that the BLA and IAA are eligible for ER,A funding.

In FY06, the USAEC decided to implement a PBC at the NRU. In February 2008, a PBC was awarded to achieve RC by August 2010.

In 2008 draft WPA 027 was submitted to the VDEQ. The VDEQ is the sole regulatory review agency and provided comments but formal approval has not occurred. In any case, sampling was performed in accordance with WPA 027 during summer 2008. In 2009 an engineering evaluation / cost analysis (EE/CA) removal action was completed at the NBG. In November 2009 a draft RI/FS document was submitted for the remaining five areas and groundwater. On July 30, 2010 the final RI report was approved. On Oct. 22, 2010 the final FS Report was approved. A public comment period on the proposed plan was held from Sept. 26 through Oct. 26, 2010. A public meeting was held on Oct. 19, 2010. Public comments are to be addressed during the preparation of the final decision document. The proposed plan was approved Dec. 13, 2010. In November 2010 a final remedial action work plan was submitted and remedial action started at that time and completed in May 2011. The VDEQ approved the IAA and BLA work plan on Dec. 9, 2011 and the WBG workplan on April 27, 2011. LUC is being implemented at the IAA, BLA and BDDT areas.

Site ID: RAAP-044
Site Name: NEW RIVER UNIT
Alias: NRU

CLEANUP/EXIT STRATEGY

The RA will follow the approved RI and FS reports for the RY, BLA, IAA, WBG and BDDT. RY is NFA. Excavation, transportation and disposal of contaminated soil and conductive flooring will occur at the BLA and IAA. Focused sediment removal and disposal will occur at the WBG pond.

In 2009 an EE/CA removal action was completed at the NBG, NFA was achieved.

LTM phase is open to handle LUC.

The LUC (IAA, BLA, BDDT) is to maintain the site in its current industrial/commercial as a closed site and to prevent residential use.

The site is included in the PBC that was awarded in 2008.

Site Closeout (No Further Action) Summary

| Site ID | Site Name | NFA Date | Documentation |
|----------|---|----------|--|
| RAAP-002 | FLASH BURN PARTS AREA (S71) | 200909 | The RFI was completed and no further action is required. The final RFI report was approved June 30, 2009 |
| RAAP-003 | POND BY CR ACID TREATMENT TANKS(S69) | 200710 | A final Site Screening Process (SSP) report was submitted in May 2007 that contained a recommendation for no further action, which was subsequently approved by USEPA June 7, 2007 and VDEQ April 13, 2007. A subsequent NFA Decision Document was approved by USEPA September 21, 2007 and VDEQ October 1, 2007 |
| RAAP-004 | INERT LANDFILL NO3 (S74) | 200009 | Active Landfill - not eligible for ER,A |
| RAAP-006 | FORMER DRUM STORAGE AREA 9387-2(F) | 200009 | A final SSP report was submitted in May 2007 that contained a recommendation for no further action that was subsequently approved by USEPA June 7, 2007 and VDEQ April 13, 2007 on an earlier draft. In accordance with the RCRA CORA Permit, a decision document for no further action was submitted in August 2007 and was approved by USEPA Sept. 21, 2007 and VDEQ Oct. 1, 2007. |
| RAAP-007 | CLOSED SANITARY LANDFILL (S28) | 200009 | Handled under post closure care permit for RAAP-039, HWMU 16 |
| RAAP-008 | CASO4 TREATMENT/DISPOSAL AREA (S27) | 200009 | Site is active (VDEQ permit 353) - Not eligible for ER,A funding |
| RAAP-010 | CASO4 TRMT/DISP (8,9,35,36,37,38,Q) | 201011 | The RFI was completed and no further action is required. The final RFI report was approved Nov. 4, 2010 |
| RAAP-012 | ACID WASTEWATER LAGOON(S6) | 200209 | The Decision Document was approved by USEPA on Oct. 9, 2002 and by VDEQ on Oct. 24, 2002 |
| RAAP-015 | FLY ASH LANDFILL #1 (S26) | 200009 | Completed post-closure care under VDEQ permit 399. Not eligible for ER,A funding |
| RAAP-016 | WASTEWATER PONDS FROM PROP INCINER(S39) | 200909 | Interim Measures Completion Reports: SWMU 51, SWMU 39 and FLFA, Final Document February 2010, approved by USEPA April 1, 2010 |
| RAAP-017 | ACTIVATED CARBON DISPOSAL AREA(S53) | 200009 | See RAAP-007, S28. Not eligible for ER,A funding |
| RAAP-019 | INERT LANDFILL NO.1 (S32) | 200009 | Site closed under VDEQ permit 400. Not eligible for ER,A funding |
| RAAP-020 | FLY ASH LANDFILL #2 (S29) | 200009 | Site is active - VDEQ permit 353. Not eligible for ER,A funding |
| RAAP-021 | PROPELLANT BURIAL (S46) | 200710 | A final SSP report was submitted in May 2007 that contained a recommendation for no further action, which was subsequently approved by USEPA June 7, 2007 and VDEQ April 13, 2007. A subsequent NFA Decision Document was approved by USEPA Sept. 21, 2007 and VDEQ Oct. 1, 2007 |

Site Closeout (No Further Action) Summary

| Site ID | Site Name | NFA Date | Documentation |
|----------|--|----------|--|
| RAAP-022 | POND BY BLDGS 4931 & 4928 (S57) | 201109 | Final RFI/CMS was submitted in 2009 & was approved by USEPA & VDEQ on Sept. 21, 2009. In November 2010 the interim measures work plan (IMWP) was prepared & submitted IAW the RFI/CMS. This draft work plan was approved by USEPA & DEQ via email dated January 6, 2011. The Draft Final IM Completion Report was submitted in June 2011 & was approved by EPA & VDEQ on Aug. 26, 2011. As the action achieved unrestricted use no further action is needed. |
| RAAP-025 | CASO4 TREATMENT/DISPOSAL AREA (S50) | 200909 | In 2009 a final RFI was submitted which recommended NFA and approved Oct 23, 2009. |
| RAAP-026 | COAL ASH SETTLING LAGOONS (S31) | 200909 | In 2009 a final draft RFI report was submitted which recommended NFA and was approved Dec. 14, 2009. |
| RAAP-027 | RUBBLE PILE(S58) | 200412 | VDEQ approved the RFI Report on Aug. 5, 2003 and USEPA approved it on May 24, 2004. A Decision Document was submitted to USEPA and VDEQ on Sept. 10, 2004. USEPA approved DD on 16 Dec. 2004. |
| RAAP-028 | BOTTOM ASH PILE(S59) | 200909 | In 2009 a final RFI was submitted which recommended NFA and approved Oct 23, 2009. |
| RAAP-029 | CLOSED SANITARY LANDFILL (S52) | 200009 | Handled under post closure care permit for RAAP-039, HWMU 16 |
| RAAP-030 | AIR CURTAIN DESTRUCTOR & OPEN BURN (S17) | 200009 | VDEQ approve closure action for the Air Curtain Destructor on 12 Aug 2005. The Open Burn Pit is still active. Not eligible for ER,A funding |
| RAAP-031 | AREA A NITROCELLULOSE RAINWTR DITCH | 200909 | In 2009 a final draft RFI report was submitted which recommended NFA and was approved Oct. 23, 2009. |
| RAAP-032 | MOBILE USED OIL TANKS (S61,75,76) | 200305 | SWMU 61 not eligible for ER,A funding, as it no longer exists (trailer-mounted tank). SWMU 75: VDEQ letter of Oct. 3, 1995 and USEPA approval of Work Plan Addendum 16 on Sept. 8, 2003; SWMU 76: VDEQ letter of Aug. 28, 1992 and USEPA approval of Work Plan Addendum 16 on Sept. 8, 2003. In accordance with the RCRA CORA Permit, a decision document for no further action was submitted in August 2007 for SWMUs 75 & 76 and was approved by USEPA Sept. 21, 2007 and VDEQ Oct. 1, 2007. |
| RAAP-033 | CHROMIC ACID TREATMENT TANKS (S68) | 200710 | A final Site Screening Process (SSP)report was submitted in May 2007 that contained a recommendation for no |

Site Closeout (No Further Action) Summary

| Site ID | Site Name | NFA Date | Documentation |
|----------|---|----------|--|
| | | | further action, which was subsequently approved by USEPA June 7, 2007 and VDEQ April 13, 2007. A subsequent NFA Decision Document was approved by USEPA Sept. 21, 2007 and VDEQ Oct. 1, 2007 |
| RAAP-035 | SEWAGE LINES | 200205 | Sewer system work plan, electronic data disk, line inspection and manhole reports 35 video tapes, etc. were submitted to USEPA and VDEQ on 23 Jan 2003. Not eligible for ER,A funding |
| RAAP-036 | BIOPLANT BASIN (S10) | 199812 | Clean-closed for soils and groundwater is monitored according to post-closure permit for HWMUs 5, 7, 10, and 16. Not eligible for ER,A funding |
| RAAP-037 | BATTERY STORAGE AREA (P) | 201011 | In 2010 a final RFI Report was submitted which recommended NFA. It was approved Nov. 4, 2010. |
| RAAP-038 | UNDERGROUND FUEL OIL SPILL (O) | 200904 | In 2008 a draft RFI/CMS report was submitted. Based on that report, the stakeholders agreed that this site should be closed out under the VDEQ Oil Program. On March 3, 2009 VDEQ approved NFA for this site. On April 29, 2009 USEPA stated that NFA would be issued under the RCRA CORA permit. |
| RAAP-040 | FORMER LEAD FURNACE AREA | 200909 | Interim Measures Completion Reports: SWMU 51, SWMU 39 and FLFA, Final Document February 2010, approved by USEPA April 1, 2010 |
| RAAP-041 | SURFACE IMPOUNDMENT #4 (HWMU #4) | 200809 | On June 28, 2007, RAAP submitted a closure evaluation and requested clean closure for groundwater such that the post closure care period could be terminated. On Aug. 16, 2007, the VDEQ concurred that clean closure for groundwater had been achieved and advised RAAP to discontinue remaining post closure activities. |
| RAAP-045 | FORMERCADMIUM PLATING FACILITY(BLDG 4343) | 200709 | Final RFI/CMS was submitted in FY04 and was approved by USEPA on Aug. 16, 2004 and by VDEQ (draft) on Aug. 28, 2003. In FY06, the interim measures work plan was prepared in accordance with the RFI/CMS and was approved by the USEPA Sept. 20, 2006 and VDEQ Sept. 11, 2006. Final Interim Measures Completion Report was submitted in Apr 2007 and was approved by the USEPA Jun 8, 2007 and by the VDEQ Mar 30, 2007 on an earlier draft. As the action achieved unrestricted use no further action is needed. |
| RAAP-047 | TCE Plume at BLDGS 1549,1041&1034 | 200909 | In 2009 a final RFI Report was submitted which recommended NFA. It was |

Site Closeout (No Further Action) Summary

| Site ID | Site Name | NFA Date | Documentation |
|-----------|-----------------------|----------|---|
| | | | approved Oct. 23, 2009. |
| RFAAP-046 | MMA GROUNDWATER STUDY | 200703 | Cleanup strategy changed from site-wide to site-specific. |

IRP Schedule

Date of IRP Inception: 198409

Past Phase Completion Milestones

1985

CS (RAAP-001 - TNT WASTE ACID NEUTRALIZATION PITS(S51), RAAP-002 - FLASH BURN PARTS AREA (S71), RAAP-003 - POND BY CR ACID TREATMENT TANKS(S69), RAAP-004 - INERT LANDFILL NO3 (S74), RAAP-005 - WASTE PROPELLANT BURNING GROUND (S13), RAAP-006 - FORMER DRUM STORAGE AREA 9387-2(F), RAAP-007 - CLOSED SANITARY LANDFILL (S28), RAAP-008 - CASO4 TREATMENT/DISPOSAL AREA (S27), RAAP-009 - LANDFILL NITRO AREA (S40), RAAP-010 - CASO4 TRMT/DISP (8,9,35,36,37,38,Q), RAAP-011 - RED WATER ASH BURIAL GROUND (S41), RAAP-012 - ACID WASTEWATER LAGOON(S6), RAAP-013 - RED WATER ASH BURIAL #2 (S49), RAAP-014 - PROPELLANT BURNING ASH DISPOSAL (S54), RAAP-015 - FLY ASH LANDFILL #1 (S26), RAAP-016 - WASTEWATER PONDS FROM PROP INCINER(S39), RAAP-017 - ACTIVATED CARBON DISPOSAL AREA(S53), RAAP-018 - OILY WATER BURIAL AREA (S48), RAAP-019 - INERT LANDFILL NO.1 (S32), RAAP-020 - FLY ASH LANDFILL #2 (S29), RAAP-021 - PROPELLANT BURIAL (S46), RAAP-022 - POND BY BLDGS 4931 & 4928 (S57), RAAP-023 - SANITARY LANDFILL NO.2 (S43), RAAP-024 - LANDFILL NO.3 (S45), RAAP-025 - CASO4 TREATMENT/DISPOSAL AREA (S50), RAAP-026 - COAL ASH SETTLING LAGOONS (S31), RAAP-027 - RUBBLE PILE(S58), RAAP-028 - BOTTOM ASH PILE(S59), RAAP-029 - CLOSED SANITARY LANDFILL (S52), RAAP-030 - AIR CURTAIN DESTRUCTOR & OPEN BURN (S17), RAAP-031 - AREA A NITROCELLULOSE RAINWTR DITCH, RAAP-033 - CHROMIC ACID TREATMENT TANKS (S68), RAAP-035 - SEWAGE LINES, RAAP-036 - BIOPANT BASIN (S10), RAAP-037 - BATTERY STORAGE AREA (P), RAAP-038 - UNDERGROUND FUEL OIL SPILL (O), RAAP-039 - HAZARDOUS WASTE LANDFILL (HWMU16), RAAP-040 - FORMER LEAD FURNACE AREA, RAAP-041 - SURFACE IMPOUNDMENT #4 (HWMU #4), RAAP-042 - SURFACE IMPOUNDMENT #5 (HWMU #5), RAAP-043 - SURFACE IMPOUNDMENT #7 (HWMU #7))

RFA (RAAP-001 - TNT WASTE ACID NEUTRALIZATION PITS(S51), RAAP-002 - FLASH BURN PARTS AREA (S71), RAAP-003 - POND BY CR ACID TREATMENT TANKS(S69), RAAP-004 - INERT LANDFILL NO3 (S74), RAAP-005 - WASTE PROPELLANT BURNING GROUND (S13), RAAP-006 - FORMER DRUM STORAGE AREA 9387-2(F), RAAP-007 - CLOSED SANITARY LANDFILL (S28), RAAP-008 - CASO4 TREATMENT/DISPOSAL AREA (S27), RAAP-009 - LANDFILL NITRO AREA (S40), RAAP-010 - CASO4 TRMT/DISP (8,9,35,36,37,38,Q), RAAP-011 - RED WATER ASH BURIAL GROUND (S41), RAAP-012 - ACID WASTEWATER LAGOON(S6), RAAP-013 - RED WATER ASH BURIAL #2 (S49), RAAP-014 - PROPELLANT BURNING ASH DISPOSAL (S54), RAAP-015 - FLY ASH LANDFILL #1 (S26), RAAP-016 - WASTEWATER PONDS FROM PROP INCINER(S39), RAAP-017 - ACTIVATED CARBON DISPOSAL AREA(S53), RAAP-018 - OILY WATER BURIAL AREA (S48), RAAP-019 - INERT LANDFILL NO.1 (S32), RAAP-020 - FLY ASH LANDFILL #2 (S29), RAAP-021 - PROPELLANT BURIAL (S46), RAAP-022 - POND BY BLDGS 4931 & 4928 (S57), RAAP-023 - SANITARY LANDFILL NO.2 (S43), RAAP-024 - LANDFILL NO.3 (S45), RAAP-025 - CASO4 TREATMENT/DISPOSAL AREA (S50), RAAP-026 - COAL ASH SETTLING LAGOONS (S31), RAAP-027 - RUBBLE PILE(S58), RAAP-028 - BOTTOM ASH PILE(S59), RAAP-029 - CLOSED SANITARY LANDFILL (S52), RAAP-030 - AIR CURTAIN DESTRUCTOR & OPEN BURN (S17), RAAP-031 - AREA A NITROCELLULOSE RAINWTR DITCH, RAAP-033 - CHROMIC ACID TREATMENT TANKS (S68), RAAP-035 - SEWAGE LINES, RAAP-036 - BIOPANT BASIN (S10), RAAP-037 - BATTERY STORAGE AREA (P), RAAP-038 - UNDERGROUND FUEL OIL SPILL (O), RAAP-039 - HAZARDOUS WASTE LANDFILL (HWMU16), RAAP-040 - FORMER LEAD FURNACE AREA, RAAP-041 - SURFACE IMPOUNDMENT #4 (HWMU #4), RAAP-042 - SURFACE IMPOUNDMENT #5 (HWMU #5), RAAP-043 - SURFACE IMPOUNDMENT #7 (HWMU #7))

1987

RFA (RAAP-032 - MOBILE USED OIL TANKS (S61,75,76))

1988

CMI(C) (RAAP-041 - SURFACE IMPOUNDMENT #4 (HWMU #4))

RFA (RFAAP-046 - MMA GROUNDWATER STUDY)

RFI/CMS (RAAP-041 - SURFACE IMPOUNDMENT #4 (HWMU #4))

1993

RFI/CMS (RAAP-006 - FORMER DRUM STORAGE AREA 9387-2(F))

IRP Schedule

| | |
|-------------|--|
| 1996 | |
| RFA | (RAAP-045 - FORMERCADMIUM PLATING FACILITY(BLDG 4343)) |
| 1997 | |
| PA | (RAAP-044 - NEW RIVER UNIT) |
| 1998 | |
| SI | (RAAP-044 - NEW RIVER UNIT) |
| 1999 | |
| RFI/CMS | (RAAP-036 - BIOPANT BASIN (S10)) |
| 2000 | |
| IRA | (RAAP-014 - PROPELLANT BURNING ASH DISPOSAL (S54)) |
| RFI/CMS | (RAAP-004 - INERT LANDFILL NO3 (S74), RAAP-007 - CLOSED SANITARY LANDFILL (S28), RAAP-008 - CASO4 TREATMENT/DISPOSAL AREA (S27), RAAP-015 - FLY ASH LANDFILL #1 (S26), RAAP-017 - ACTIVATED CARBON DISPOSAL AREA(S53), RAAP-019 - INERT LANDFILL NO.1 (S32), RAAP-020 - FLY ASH LANDFILL #2 (S29), RAAP-029 - CLOSED SANITARY LANDFILL (S52), RAAP-030 - AIR CURTAIN DESTRUCTOR & OPEN BURN (S17)) |
| 2001 | |
| RFA | (PBC @ Radford - PBC site) |
| 2002 | |
| RFI/CMS | (RAAP-012 - ACID WASTEWATER LAGOON(S6), RAAP-035 - SEWAGE LINES) |
| 2003 | |
| RFI/CMS | (RAAP-039 - HAZARDOUS WASTE LANDFILL (HWMU16), RAAP-042 - SURFACE IMPOUNDMENT #5 (HWMU #5), RAAP-043 - SURFACE IMPOUNDMENT #7 (HWMU #7)) |
| 2004 | |
| RFI/CMS | (RAAP-045 - FORMERCADMIUM PLATING FACILITY(BLDG 4343)) |
| 2005 | |
| RFI/CMS | (RAAP-027 - RUBBLE PILE(S58)) |
| DES | (RAAP-045 - FORMERCADMIUM PLATING FACILITY(BLDG 4343)) |
| 2006 | |
| RFI/CMS | (RAAP-016 - WASTEWATER PONDS FROM PROP INCINER(S39)) |
| 2007 | |
| CS | (RAAP-047 - TCE Plume at BLDGS 1549,1041&1034) |
| RFA | (RAAP-047 - TCE Plume at BLDGS 1549,1041&1034) |
| RFI/CMS | (RFAAP-046 - MMA GROUNDWATER STUDY) |
| CMI(C) | (RAAP-045 - FORMERCADMIUM PLATING FACILITY(BLDG 4343)) |
| 2008 | |
| LTM | (RAAP-041 - SURFACE IMPOUNDMENT #4 (HWMU #4)) |
| DES | (RAAP-001 - TNT WASTE ACID NEUTRALIZATION PITS(S51), RAAP-016 - WASTEWATER PONDS FROM PROP INCINER(S39)) |
| RFI/CMS | (RAAP-001 - TNT WASTE ACID NEUTRALIZATION PITS(S51), RAAP-003 - POND BY CR ACID TREATMENT TANKS(S69), RAAP-021 - PROPELLANT BURIAL (S46), RAAP-033 - CHROMIC ACID TREATMENT TANKS (S68)) |
| 2009 | |
| CMI(C) | (RAAP-001 - TNT WASTE ACID NEUTRALIZATION PITS(S51), RAAP-016 - WASTEWATER PONDS FROM PROP INCINER(S39), RAAP-040 - FORMER LEAD FURNACE AREA) |
| RFI/CMS | (RAAP-002 - FLASH BURN PARTS AREA (S71), RAAP-009 - LANDFILL NITRO AREA (S40), RAAP-014 - PROPELLANT BURNING ASH DISPOSAL (S54), RAAP-022 - POND BY BLDGS 4931 & 4928 (S57), RAAP-025 - CASO4 TREATMENT/DISPOSAL AREA (S50), RAAP-026 - COAL ASH SETTLING LAGOONS (S31), RAAP-028 - BOTTOM ASH PILE(S59), RAAP-031 - AREA A NITROCELLULOSE RAINWTR DITCH, RAAP- |

IRP Schedule

DES 038 - UNDERGROUND FUEL OIL SPILL (O), RAAP-040 - FORMER LEAD FURNACE AREA, RAAP-047 - TCE Plume at BLDGS 1549,1041&1034)
 (RAAP-040 - FORMER LEAD FURNACE AREA)

2010

RFI/CMS (RAAP-005 - WASTE PROPELLANT BURNING GROUND (S13), RAAP-024 - LANDFILL NO.3 (S45))

RD (RAAP-044 - NEW RIVER UNIT)

CMI(C) (RAAP-005 - WASTE PROPELLANT BURNING GROUND (S13), RAAP-024 - LANDFILL NO.3 (S45))

RI/FS (RAAP-044 - NEW RIVER UNIT)

2011

CMI(C) (RAAP-009 - LANDFILL NITRO AREA (S40), RAAP-011 - RED WATER ASH BURIAL GROUND (S41), RAAP-014 - PROPELLANT BURNING ASH DISPOSAL (S54), RAAP-022 - POND BY BLDGS 4931 & 4928 (S57), RAAP-023 - SANITARY LANDFILL NO.2 (S43))

RA(C) (RAAP-044 - NEW RIVER UNIT)

RFI/CMS (RAAP-010 - CASO4 TRMT/DISP (8,9,35,36,37,38,Q), RAAP-011 - RED WATER ASH BURIAL GROUND (S41), RAAP-018 - OILY WATER BURIAL AREA (S48), RAAP-023 - SANITARY LANDFILL NO.2 (S43), RAAP-037 - BATTERY STORAGE AREA (P))

DES (RAAP-009 - LANDFILL NITRO AREA (S40), RAAP-014 - PROPELLANT BURNING ASH DISPOSAL (S54), RAAP-022 - POND BY BLDGS 4931 & 4928 (S57))

Projected Phase Completion Milestones

See attached schedule

Projected Record of Decision (ROD)/Decision Document (DD) Approval Dates

| Site ID | Site Name | ROD/DD Title | ROD/DD Date |
|---------|-----------|--------------|-------------|
|---------|-----------|--------------|-------------|

Final RA(C) Completion Date: 201212

Schedule for Next Five-Year Review: N/A

Estimated Completion Date of IRP at Installation (including LTM phase): 204209

RADFORD ARMY AMMUNITION PLANT IRP Schedule

[Green Box] = phase underway

| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
|---------------|---|---------|------|------|------|------|------|-------|
| PBC @ Radford | PBC site | DES | | | | | | |
| | | CMI(C) | | | | | | |
| | | CMI(O) | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-001 | TNT WASTE ACID NEUTRALIZATION PITS(S51) | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-005 | WASTE PROPELLANT BURNING GROUND (S13) | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-009 | LANDFILL NITRO AREA (S40) | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-011 | RED WATER ASH BURIAL GROUND (S41) | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-013 | RED WATER ASH BURIAL #2 (S49) | RFI/CMS | | | | | | |
| | | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-014 | PROPELLANT BURNING ASH DISPOSAL (S54) | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-018 | OILY WATER BURIAL AREA (S48) | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-023 | SANITARY LANDFILL NO.2 (S43) | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-024 | LANDFILL NO.3 (S45) | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-039 | HAZARDOUS WASTE LANDFILL (HWMU16) | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-042 | SURFACE IMPOUNDMENT #5 (HWMU #5) | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-043 | SURFACE IMPOUNDMENT #7 (HWMU #7) | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| RAAP-044 | NEW RIVER UNIT | LTM | | | | | | |

RADFORD ARMY AMMUNITION PLANT
Army Defense Environmental Restoration Program
Military Munitions Response Program

MMRP Summary

Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count: 1/0

Installation Site Types with Future and/or Underway Phases

1 Small Arms Range
(RFAAP-001-R-01)

Most Widespread Contaminants of Concern

Munitions constituents (MC)

Media of Concern

Soil

Completed Remedial Actions (Interim Remedial Actions/ Final Remedial Actions (IRA/FRA))

| Site ID | Site Name | Action | Remedy | FY |
|---------|-----------|--------|--------|----|
| N/A | | | | |

Duration of MMRP

Date of MMRP Inception 200202

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201212/201212

Date of MMRP completion including Long Term Management (LTM): 201212

MMRP Contamination Assessment

Contamination Assessment Overview

In May 2003 the phase III Army range inventory was completed at RAAP. The phase III inventory serves as the preliminary assessment under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). One site was identified as eligible for the Military Munitions Response Program (MMRP). In October 2006 a site inspection (SI) was initiated. In January 2008 a historical records review was completed. In 2009 a PBA was awarded to complete the RFI/CMS and contains options for future effort as needed.

Cleanup Exit Strategy

The cleanup/exit strategy includes the completion of a combined interim measures RA and RFI/CMS effort from the 2009 PBA. The RA includes source removal (soil excavation and off-site transport); it is ongoing and is being implemented as an interim measure as part of the RFI/CMS field effort. RA may eventually include MNA and LTM at the completion of the RFI/CMS.

MMRP Previous Studies

| | Title | Author | Date |
|-------------|---|----------------------|-------------|
| 2002 | US Army Closed, Transferred and Transferring Range/Site Inventory for Radford Army Ammunition Plant, Virginia | Malcolm Pirnie, Inc. | NOV-2002 |
| 2008 | Final Historical Records Review, Radford Army Ammunition Plant, Virginia | URS | JAN-2008 |
| 2009 | Draft Site Screening Process Report | URS | JAN-2009 |
| 2011 | Final Army Reserve Small Arms Range RCRA Facility Investigation and Interim Measures Work Plan | Shaw | MAR-2011 |

RADFORD ARMY AMMUNITION PLANT
Military Munitions Response Program
Site Descriptions

Site ID: RFAAP-001-R-01

Site Name: ARMY RESERVE SMALL ARMS RANGE

Alias: None

STATUS

Regulatory Driver: RCRA

MRSPP Score: 07

Contaminants of Concern: Munitions constituents (MC)

Media of Concern: Soil

| Phases | Start | End |
|---------------|--------------|------------|
| RFA..... | 200202..... | 200305 |
| CS..... | 200703..... | 200905 |
| RFI/CMS..... | 200909..... | 201212 |
| DES..... | 200909..... | 201212 |
| CMI(C)..... | 200909..... | 201212 |

RIP Date: N/A

RC Date: 201212

SITE DESCRIPTION

The closed Army Reserve small arms range occupied approximately 7.6 acres which was used for small arms training from about 1941 to 1967. This closed range is located along the southeastern boundary of RAAP. A berm (approximately 200 feet long by 10 feet high) is still present and indicates that the direction of fire was southeast. The berm is adjacent to a stream which forms the installation boundary. This range most likely contained between 10 and 15 stations. The Radford ordnance works historic investigation states that 155,375 rounds of ammunition were "expended in the pistol range by the RAAP police department from October 1941 to October 1945." From 1946 to 1967 the local rifle club also may have used the range.

The former small arms range is not within the secure limited manufacturing area, but public access is restricted. The range is currently a grass field surrounded by an unlocked fence. It was once used as a baseball field and until the late-1960s it was accessible to the public. In 2009, a PBA was awarded to complete the RFI/CMS and contains options for future effort as needed. In June 2010 a draft work plan for a combined interim measures and RFI/CMS was submitted. A final work plan was submitted on April 1, 2011 and was approved by USEPA and the VDEQ on April 11, 2011. The IM effort was completed and consisted of source removal. RFI/CMS report is under internal review.

CLEANUP/EXIT STRATEGY

The cleanup/exit strategy includes the completion of a combined interim measures RA and RFI/CMS effort from the 2009 PBA.

The initial RA was executed as a limited source removal (soil excavation and off-site transport) as part of the RFI/CMS field effort.

Site Closeout (No Further Action) Summary

| Site ID | Site Name | NFA Date | Documentation |
|------------------------|-----------|----------|---------------|
| There are no NFA sites | | | |

MMRP Schedule

Date of MMRP Inception 200202

Past Phase Completion Milestones

2003

RFA (RFAAP-001-R-01 - ARMY RESERVE SMALL ARMS RANGE)

2009

CS (RFAAP-001-R-01 - ARMY RESERVE SMALL ARMS RANGE)

Projected Phase Completion Milestones

See attached schedule

Projected Record of Decision (ROD)/Decision Document (DD) Approval Dates

To Be Determined

Final RA(C) Completion Date: 201212

Schedule for Next Five-Year Review: N/A

Estimated Completion Date of MMRP at Installation (including LTM phase): 201212

RADFORD ARMY AMMUNITION PLANT MMRP Schedule

= phase underway

| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
|----------------|-------------------------------|---------|------|------|------|------|------|-------|
| RFAAP-001-R-01 | ARMY RESERVE SMALL ARMS RANGE | RFI/CMS | | | | | | |
| | | DES | | | | | | |
| | | CMI(C) | | | | | | |

RADFORD ARMY AMMUNITION PLANT
Army Defense Environmental Restoration Program
Compliance Restoration

CR Summary

Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count: 3/0

Installation Site Types with Future and/or Underway Phases

1 Incinerator
(CC 002)
1 Landfill
(CC-003)
1 Waste Lines
(CC 001)

Most Widespread Contaminants of Concern

Asbestos, Dioxins/Dibenzofurans, Metals

Media of Concern

Soil

Completed Remedial Actions (Interim Remedial Actions/ Final Remedial Actions (IRA/FRA))

| Site ID | Site Name | Action | Remedy | FY |
|---------|------------------------------------|--------|------------------------|------|
| CC 001 | Oleum Plant Acidic Wastewater Sump | FRA | INSTITUTIONAL CONTROLS | 2011 |
| CC 002 | Garbage Incinerator (Bldg 7219) | FRA | INSTITUTIONAL CONTROLS | 2011 |
| CC-003 | Asbestos Disposal Trenches 1 and 2 | FRA | INSTITUTIONAL CONTROLS | 2011 |

Duration of CR

Date of CR Inception: 198601

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201101/201101

Date of CR completion including Long Term Management (LTM): 204206

CR Contamination Assessment

Contamination Assessment Overview

A site screening process performed for CC001, CC 002, and CC 003 found contamination below industrial, but above residential exposure levels.

Cleanup Exit Strategy

Land use control was recommended in the site screening process document and approved by the regulatory agencies.

CR Previous Studies

| 2010 | Title | Author | Date |
|------|--|--------|----------|
| | Final Site Screening Process Report for Site Screening Areas 18, 72, 30, 79, 60 and 77 | URS | NOV-2010 |

RADFORD ARMY AMMUNITION PLANT
Compliance Restoration
Site Descriptions

Site ID: CC 001
Site Name: Oleum Plant Acidic Wastewater Sump
Alias: SSA72

STATUS

Regulatory Driver: RCRA
Contaminants of Concern: Metals
Media of Concern: Soil

| Phases | Start | End |
|---------------|--------------|------------|
| RFA..... | 198601..... | 198712 |
| RFI/CMS..... | 200901..... | 201101 |
| CMI(C)..... | 201101..... | 201101 |
| LTM..... | 201106..... | 204206 |

RIP Date: N/A
RC Date: 201101

SITE DESCRIPTION

Site Screening Area (SSA) 72 was identified during the 1987 USEPA RCRA facility assessment (RFA) and was subsequently put into the 2000 RCRA CORA. It is a sump in the Oleum Plant Area that received acidic wastewater. An SSP effort was conducted IAW the CORA. A final report was submitted in December 2010 that recommended NFA with LUC. The LUC is to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent future residential use. The regulators approved this report on Jan. 28, 2011.

CLEANUP/EXIT STRATEGY

The LTM phase is open to handle the LUC.

The LUC is to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent future residential use.

Site ID: CC 002
Site Name: Garbage Incinerator (Bldg 7219)
Alias: SSA77

STATUS

Regulatory Driver: RCRA

Contaminants of Concern: Dioxins/Dibenzofurans, Metals

Media of Concern: Soil

| Phases | Start | End |
|---------------|--------------|------------|
| RFA..... | 198601..... | 198712 |
| RFI/CMS..... | 200901..... | 201101 |
| CMI(C)..... | 201101..... | 201101 |
| LTM..... | 201106..... | 204206 |

RIP Date: N/A

RC Date: 201101

SITE DESCRIPTION

SSA 77 was identified during the 1987 USEPA RFA and was subsequently put into the 2000 RCRA CORA. It is an old garbage incinerator that operated from the 1940s until 1974. An SSP effort was conducted IAW the CORA. A final report was submitted in December 2010 that recommended NFA with LUC. The LUC is to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent future residential use. The regulators approved this report on Jan. 28, 2011.

CLEANUP/EXIT STRATEGY

The LTM phase is open to handle the LUC.

The LUC is to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent future residential use.

Site ID: CC-003
Site Name: Asbestos Disposal Trenches 1 and 2
Alias: SSA 30 79

STATUS

Regulatory Driver: RCRA
Contaminants of Concern: Asbestos, Metals
Media of Concern: Soil

| Phases | Start | End |
|------------------|--------------|------------|
| RFA..... | 198601..... | 198712 |
| RFI/CMS..... | 200901..... | 201101 |
| CMI(C)..... | 201101..... | 201101 |
| LTM..... | 201106..... | 204206 |
| RIP Date: | N/A | |
| RC Date: | 201101 | |

SITE DESCRIPTION

Site Screening Areas (SSA) 30 and 79 Asbestos Disposal Trenches 1 and 2 were identified during the 1987 USEPA RFA and was subsequently put into the 2000 RCRA CORA. They were used for disposal of asbestos containing material (ACM). A site screening process (SSP) effort was conducted in accordance with (IAW the CORA. A final report was submitted in December 2010 that recommended NFA with LUC. The LUC is to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent future residential use. The regulators approved this report on Jan. 28, 2011.

CLEANUP/EXIT STRATEGY

The LTM phase is open to handle the LUC.

The LUC is to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent future residential use.

Site Closeout (No Further Action) Summary

| Site ID | Site Name | NFA Date | Documentation |
|------------------------|-----------|----------|---------------|
| There are no NFA sites | | | |

CR Schedule

Date of CR Inception: 198601

Past Phase Completion Milestones

1988

RFA (CC 001 - Oleum Plant Acidic Wastewater Sump, CC 002 - Garbage Incinerator (Bldg 7219), CC-003 - Asbestos Disposal Trenches 1 and 2)

2011

CMI(C) (CC 001 - Oleum Plant Acidic Wastewater Sump, CC 002 - Garbage Incinerator (Bldg 7219), CC-003 - Asbestos Disposal Trenches 1 and 2)

RFI/CMS (CC 001 - Oleum Plant Acidic Wastewater Sump, CC 002 - Garbage Incinerator (Bldg 7219), CC-003 - Asbestos Disposal Trenches 1 and 2)

Projected Phase Completion Milestones

See attached schedule

Projected Record of Decision (ROD)/Decision Document (DD) Approval Dates

| Site ID | Site Name | ROD/DD Title | ROD/DD Date |
|---------|-----------|--------------|-------------|
|---------|-----------|--------------|-------------|

Final RA(C) Completion Date: 201101

Schedule for Next Five-Year Review: N/A

Estimated Completion Date of CR at Installation (including LTM phase): 204206

RADFORD ARMY AMMUNITION PLANT CR Schedule

= phase underway

| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
|---------|------------------------------------|-------|------|------|------|------|------|-------|
| CC 001 | Oleum Plant Acidic Wastewater Sump | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| CC 002 | Garbage Incinerator (Bldg 7219) | LTM | | | | | | |
| SITE ID | SITE NAME | PHASE | FY13 | FY14 | FY15 | FY16 | FY17 | FY18+ |
| CC-003 | Asbestos Disposal Trenches 1 and 2 | LTM | | | | | | |

Community Involvement

Technical Review Committee (TRC): None

Community Involvement Plan (Date Published): 200401

Restoration Advisory Board (RAB): RAB established 199807

RAB Adjournment Date: N/A

RAB Adjournment Reason: None

Additional Community Involvement Information

The surrounding community for RAAP includes the counties of Montgomery [2004 Population (Pop.) 83,959], Pulaski(2004 Pop. 35,152), Floyd (2004 Pop. 14,464), and Giles (2004 Pop. 16,989) and the city of Radford (Pop. 15,940).

In February 1995 and January 1998, surveys were conducted to determine if there was enough community interest to sustain a RAB. In September 1995 a community involvement plan was finalized.

In February 1995 and January 1998, RAAP, with the assistance of the USAEC, conducted community interviews with residents of the surrounding counties and the city of Radford and placed two newspaper advertisements soliciting community members to volunteer for RAB positions.

In June 1998 RAAP held a public meeting to share information about the RAAP cleanup program and about forming a RAB.

In August 1998, consistent with a RAB recommendation, RAAP held the first RAB-style meeting. A community co-chair person was selected and in September 1999 an information repository was established at the Christiansburg Branch of the Montgomery Floyd Regional Library.

RAB activities to date have included quarterly meetings with regulators present, plant tours, and project and program status briefings.

The RAAP is committed to involving the public in the restoration program and will do everything necessary to make it a success.

Just prior to the FY11 data call, the CIP was reviewed by RAAP's Public Affairs Office and subsequently concluded that updates were not needed.

Administrative Record is located at

Christiansburg Library, as CDs
125 Sheltman St
Christiansburg, VA 24073
540-382-6965 and online at www.radfordaapirp.org

Information Repository is located at

Christiansburg Library, as CDs
125 Sheltman St
Christiansburg, VA 24073
540-382-6965 and online at www.radfordaapirp.org

Current Technical Assistance for Public Participation (TAPP):N/A

TAPP Title: N/A

Potential TAPP: N/A

