

FY2016

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

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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

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
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CIP	Community Involvement Plan
CMI(C)	Corrective Measures Implementation (Construction)
CMI(O)	Corrective Measures Implementation (Operation)
CMS	Corrective Measures Study
COC	Contaminants of Concern
CORA	Corrective Action Permit
CR	Compliance Restoration
CS	Confirmation Sampling
DD	Decision Document
DES	Design
EE/CA	Engineering Evaluation/Cost Analysis
EOD	Explosive Ordnance Detachment
ER,A	Environmental Restoration, Army
FLFA	Former Lead Furnace Area
FRA	Final Remedial Action
FS	Feasibility Study
ft	feet
FY	Fiscal Year
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
IM	Interim Measure
IMCR	Interim Measures Completion Report
IMP(C)	Implementation (Construction)
IMP(O)	Implementation (Operations)
INV	Investigation
IRA	Interim Remedial Action
IRP	Installation Restoration Program
ISC	Initial Site Characterization
LF	Landfill
LTM	Long-Term Management
LUC	Land Use Control

Acronyms

MC	Munitions Constituents
MMA	Main Manufacturing Area
MMRP	Military Munitions Response Program
MNA	Monitored Natural Attenuation
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
PA	Preliminary Assessment
PBA	Performance-Based Acquisition
PCB	Polychlorinated Biphenyl
PCCP	Post-Closure Care Permit
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
TCE	Trichloroethylene
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
USEPA	US Environmental Protection Agency
VDEQ	Virginia Department of Environmental Quality
VI	Verification Investigation

Acronyms

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
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-044	NRU
RFAAP-001-R-01	
RFAAP-002-R-01	

Installation Information

Installation Locale

Installation Size (Acreage): 6900

City: Radford

County: Pulaski and Montgomery Counties

State: Virginia

Other Locale Information

Radford Army Ammunition Plant (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 6 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, Sediment, Soil, Surface Water

MMRP

Primary Contaminants of Concern: Explosives, Munitions constituents (MC)

Affected Media of Concern: Groundwater, Soil

CR

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

Affected Media of Concern: Soil

5-Year / Periodic Review Summary

5-Year / Periodic Review Summary

Status	Start Date	End Date	End FY
Complete	201302	201403	2014
Planned	201711	201812	2019

Last Completed 5-Year / Periodic Review Details

Associated ROD/DD Name	Sites
Post Closure Permit for HWMUs 5, 7, 16	RAAP-039, RAAP-042, RAAP-043
RAAP-09 (SWMU 40 & 71)	RAAP-009
SSP Report SSAs 18, 72, 30, 79, 60, & 77	CC 001, CC 002, CC-003
SWMU 13 RFI Report Final	RAAP-005
SWMU 41 RFI Final	RAAP-011
SWMU 43 RFI	RAAP-023
SWMU 45 SSP Report Final	RAAP-024
SWMU 51 (RAAP-001) RFI/CMS Report	RAAP-001

Results Signs need to be installed at CC001, CC002, CC003, RAAP005, and RAAP024.

Actions A contract has been awarded to install signs.

Plans Install signs in accordance with the awarded contract.

Recommendations and Implementation Plans:

Plans are not needed. The effort is straightforward and a contract has been awarded. The actions are being implemented.

Land Use Control (LUC) Summary

LUC Title: HWMUs 5, 7, 16

Site(s): RAAP-039, RAAP-042, RAAP-043

ROD/DD Title: Post Closure Permit for HWMUs 5, 7, 16

Location of LUC

In the operating contractor's management manual

Land Use Restriction: Landfill restriction - Prohibit activities that would impact the LF cap (or cover system) and drainage system, Restrict land use - No residential use

Types of Engineering Controls: Markers

Types of Institutional Controls: Dig Permits

Date in Place: 198910

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, Markers

Contaminants: ORGANICS, PCBs

Additional Information

N/A

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

Land Use Control (LUC) Summary

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

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)

Land Use Control (LUC) Summary

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 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

Land Use Control (LUC) Summary

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

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

Land Use Control (LUC) Summary

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

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

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 5 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 6 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, 8 miles wide at the southeast end and narrowing to 2 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: The remedy review report was submitted for RAAP009 solid waste management unit (SWMU) 40 which terminated ground water monitoring; however, the land and groundwater use controls are to continue.

Future Plan of Action: Continue with groundwater monitoring at RAAP042 HWMU 5 and RAAP039 HWMU 16. Continue with monitored natural attenuation (MNA) monitoring at RAAP014 SWMU 54 and RAAP013 SWMU 49. Look for opportunities to reduce groundwater monitoring at RAAP014 SWMU 54. Continue with the land and groundwater use controls at RAAP009 SWMU 40.

MMRP

Prior Year Progress: Performed annual inspection of RFAAP-001-R-01, Army Reserve and Small Arms Range. Prepared and submitted site inspection work plan for RFAAP-002-R-01, Former Gun and Mortar Range.

Future Plan of Action: Perform annual inspection of RFAAP-001-R-01. Obtain approval for the site inspection work plan for RFAAP-002-R-01, Former Gun and Mortar Range, execute the effort and then procure follow-on RFI/CMS effort.

CR

Prior Year Progress: In 2011, obtained approval for the site screening process (SSP) report with no further action (NFA)/land use control (LUC) recommendation for Compliance-related Cleanup (CC) sites 001, 002, and 003. LUC was implemented at each site with annual inspection. This is the end point for these sites.

Future Plan of Action: Perform annual inspection at each site.

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: 47/35

Installation Site Types with Future and/or Underway Phases

1	Burn Area (RAAP-005)
1	Chemical Disposal (RAAP-039)
8	Landfill (RAAP-001, RAAP-009, RAAP-011, RAAP-013, RAAP-014, RAAP-018, RAAP-023, RAAP-024)
1	Storage Area (RAAP-044)
1	Surface Impoundment/Lagoon (RAAP-042)

Most Widespread Contaminants of Concern

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

Media of Concern

Groundwater, 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
PBC @ Radford	PBC site	FRA	OTHER	2013

Duration of IRP

Date of IRP Inception: 198409

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201405/201405

Date of IRP completion including Long Term Management (LTM): 204609

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 solid waste management units (SWMU) 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 (COC) 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 sites are NFA or have LTM. Continue with LTM for the sites that are in the LTM phase.

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 and 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, and 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 NRU Additional Characterization Sampling and Groundwater Investigation Data Report	Radford AAP, Shaw	OCT-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 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 and 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			
	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
	Final Study Area at Solid Waste Management Unit 13 RCRA Facility Investigation Report	URS	JUL-2010

IRP Previous Studies

2010	Title	Author	Date
	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, and 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/Kemron	JUN-2011
	Final SWMU 40 Landfill Nitro Area Interim Measures Work Plan	UXB/Kemron	AUG-2011
2012	Final SWMU 40 Landfill Nitro Area Interim Measures Completion Report	Kemron	MAY-2012
	Draft SWMUs 48 and 49 RCRA Facility Investigation/Corrective Measures Study Report	Shaw	JUN-2012
	Draft SWMU 48 Interim Measures Completion Report	Shaw	JUN-2012
2013	Draft SWMU 54 Monitored Natural Attenuation Sampling Year One Report	Shaw	FEB-2013
	Draft Final SWMU 40 Landfill Nitro Area Annual LTM Report	Kemron	APR-2013
	Draft Final SWMU 40 Landfill Nitro Area Annual LTM Report	Kemron	OCT-2013
	Final SWMU 54 Monitored Natural Attenuation Sampling Year Two Report	Shaw	DEC-2013

IRP Previous Studies

	Title	Author	Date
2014	Draft SWMUs 48 and 49 RCRA Facility Investigation Report	Shaw	JAN-2014
	Draft Final SWMU 40 Landfill Nitro Area Annual LTM Report: LTM Year 3	Kemron	JUL-2014
	Draft Final SWMU 49 MNA Groundwater Monitoring Work Plan	CBI	OCT-2014
	Draft SWMU 54 Monitored Natural Attenuation Sampling Year Three Report	CBI	OCT-2014
2015	Draft Final SWMU 40 Landfill Nitro Area Annual LTM Report: LTM Year 4	Kemron	MAR-2015
	Draft Final SWMU 40 Landfill Nitro Area Remedy Review	Kemron	MAY-2015
	Draft SWMU 49 Monitored Natural Attenuation Sampling Baseline Report	CBI	JUL-2015

RADFORD ARMY AMMUNITION PLANT
Installation Restoration Program
Site Descriptions

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.....	204606

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 (ft) wide by 200 ft 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 and Moore evaluated groundwater and soil samples and a CMS was recommended. The soil and groundwater concentrations of COCs exceeded health-based numbers (HBN) in the 1989 RCRA corrective action permit (CORA) and could indicate risk under an industrial worker scenario.

In fiscal year (FY) 04 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 (SVOC), volatile organic compounds (VOC) and explosives to support a quantitative HHRA. Due to the nature of the karst geology, source removal was recommended. During the May 2006 IAP workshop, Department of the Army representatives understood that this site would not be remedy-in-place (RIP)/response complete (RC) by FY07. In September 2006, a performance-based acquisition (PBA) 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. The SWMU 51 RFI/CMS Report Final Document, July 2008 was prepared and approved by the stakeholders that contained a recommendation for source removal (clean closure) as groundwater was not affected with LUCs. A follow-on interim measure work plan was prepared and similarly approved to implement this recommendation. The IM effort was completed in 2009. Closeout documentation, the interim measures completion reports (IMCR): SWMU 51, SWMU 39 and Former Lead Furnace Area (FLFA), Final Document, February 2010 was submitted in accordance with (IAW) the CORA. On April 1, 2010 the regulators approved the report and its recommendation of LUC to prevent excavation below 15 ft.

A five-year review effort started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

CLEANUP/EXIT STRATEGY

The LTM phase is open to handle LUCs.

The LUCs are to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent excavation below 15 ft. Yearly inspections and periodic reviews are needed.

Site ID: RAAP-001

Site Name: TNT WASTE ACID NEUTRALIZATION PITS(S51)

Alias: SWMU 51

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.....	204606

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 and 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, an SSP sampling was performed. The SSP 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, WPA 023 was prepared and approved by the stakeholders for sampling the area from the fence to the river (i.e. outside of the active unit). In November 2008 sampling was performed in accordance with WPA 023. In July 2009 the draft RFI report was submitted. Review comments were addressed. The SWMU 13 RFI Report Final July 2010 addressed the area outside of the permitted unit from the fence to the river (about 30 to 50 ft) which is mostly a steep slope and recommended NFA beyond implementing LUCs to prevent digging in this area. On Aug. 26, 2010 USEPA/VDEQ approved the final RFI report.

A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

CLEANUP/EXIT STRATEGY

Per the final RFI report, NFA beyond LUCs 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 the LUC. Yearly inspections and periodic reviews are needed.

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: Groundwater, Soil

Phases	Start	End
RFA.....	198410.....	198412
CS.....	198410.....	198412
RFI/CMS.....	200105.....	200909
DES.....	201007.....	201106
CMI(C).....	201007.....	201106
LTM.....	201106.....	204606
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 RCRA verification investigation (VI) by Dames and 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 an RFI/CMS was procured and in FY03 field investigations were completed. Soil samples were collected to confirm previous investigative results and provide additional data to support a quantitative HHRA and SLERA. A portion (20 cubic yards) of the investigative derived material 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 June 2010, a PBA 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. RAAP subsequently repaired the cap, installed an additional groundwater monitoring well and began LTM in accordance with the work plan.

A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

In May 2015 a remedy review report was submitted. It indicated that the remedy is protective and recommended that no further groundwater monitoring is necessary. On July 7, 2015 the USEPA and VDEQ approved this report.

CLEANUP/EXIT STRATEGY

In 2010 a PBA was awarded to implement the RFI/CMS remedy. At that time LUCs and LTM were anticipated.

In May 2015 the remedy review was submitted. It indicated that the remedy is protective with LUCs only and recommended that no further groundwater monitoring is required. On July 7, 2015 USEPA and VDEQ approved this report.

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

The LTM phase is to handle LUCs.

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

Yearly inspections and periodic reviews are needed.

Site ID: RAAP-011

Site Name: RED WATER ASH BURIAL GROUND (S41)

Alias: SWMU 41

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: 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.....	204609

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 ft by 70 ft, which was backfilled. The southern area (41B) consisted of a clay-lined disposal area approximately 100 ft by 150 ft. 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 and 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 PBA 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. LUC was recommended for 41B to prevent residential use. A revised SWMU 41 RFI, Final Document, February 2011 was submitted in February 2011 with the same recommendations and approved March 23, 2011 by the USEPA and the VDEQ.

A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

CLEANUP/EXIT STRATEGY

Per the RFI report and 2010 41A groundwater data, NFA was obtained for SWMU 41A, and LUCs were implemented at SWMU 41B.

The LUCs are 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 LUCs at SWMU 41B. Yearly inspections and periodic reviews are needed.

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.....	201405
LTM.....	201406.....	204609

RIP Date: N/A

RC Date: 201405

SITE DESCRIPTION

SWMU 49 is approximately 75 ft by 50 ft 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 and 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 PBA 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 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.

An RFI/CMS report was submitted in June 2012 to USEPA and VDEQ. USEPA and VDEQ comments on the RFI/CMS were sent on Nov. 5, 2012. After various discussions the document was edited to incorporate responses to comments and resubmitted as SWMUs 48 and 49 RFI Report, Draft Document, January 2014 to the regulators on Jan. 14, 2014 which recommended NFA for soil at SWMUs 48 and 49, and MNA LTM for VOCs, primarily carbon tetrachloride and trichloroethylene (TCE) in groundwater at SWMU 49. The USEPA and VDEQ approved the RFI on May 30, 2014; however, in August 2014 the USEPA issued a Final Decision And Response To Comments that implements land and groundwater use controls at SWMUs 48 and 49. 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.

A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

CLEANUP/EXIT STRATEGY

The RFI outlines the effort needed to address this site.

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 are to be addressed under a monitored natural attenuation (MNA)/LTM plan for RAAP-013 (SWMU 49). Source removal was previously performed at RAAP-018 (SWMU 48), as these two sites are thought to be the likely source areas.

NFA for soil was attained at RAAP-13 (SWMU 49) and NFA for soil at RAAP-018 (SWMU 48) was attained through source

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

removal. MNA/LTM is needed for groundwater at and in the vicinity of RAAP-013 (SWMU 49) and RAAP-018 (SWMU 48).

The LUCs are to maintain SWMU 49 in its current industrial/commercial state as a closed SWMU and to prevent residential use. Yearly inspections and periodic reviews are needed.

The site is included in the PBA that was awarded in 2006 and a follow on PBA that was awarded in 2014.

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, Volatiles (VOC)

Media of Concern: Groundwater, Soil

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.....	204609

RIP Date: N/A

RC Date: 201109

SITE DESCRIPTION

SWMU 54 is an inactive disposal area situated on approximately 5 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 and 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, USAEC, USACE, US Army Center for Health Promotion and Preventive Medicine (USACHPPM), VDEQ and USEPA. In FY06 additional sampling was procured and the field effort was completed in fall 2007. The SWMU 54 RFI/CMS Report, Final September 2008 was prepared and approved by the USEPA and the VDEQ on Oct. 16, 2008. The report recommended source removal (clean closure) to prevent further leaching to groundwater and allow for continued MNA. 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. The MNA LTM and LUC effort continues.

A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

CLEANUP/EXIT STRATEGY

The RFI/CMS report 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 and 2014, an initial and follow on PBAs were awarded to implement this remedy. Yearly inspections and periodic reviews are needed.

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.....	204606

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 and 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 PBA 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 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 was submitted in June 2012 to USEPA and VDEQ. Later this effort was combined into the SWMU 48 and 49 RFI report which recommended NFA for the soil at SWMU 48 and MNA/LTM for the groundwater in the vicinity of SWMUs 48 and 49. The USEPA and VDEQ approved the RFI on May 30, 2014.

A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

CLEANUP/EXIT STRATEGY

The RFI outlines the effort needed to address this site.

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 are to be addressed under a MNA/LTM plan for RAAP-013 (SWMU 49). Source removal was previously performed at RAAP-018 (SWMU 48), as these two sites are thought to be the likely source areas.

NFA for soil was attained at RAAP-13 (SWMU 49) and NFA for soil at RAAP-018 (SWMU 48) was attained through source removal. MNA/LTM is needed for groundwater at and in the vicinity of RAAP-013 (SWMU 49) and RAAP-018 (SWMU 48).

The LUCs are to maintain SWMU 49 in its current industrial/commercial state as a closed SWMU and to prevent residential use. Yearly inspections and periodic reviews are needed.

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

The site is included in the PBA that was awarded in 2006 and a follow on PBA that was awarded in 2014.

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.....	204606

RIP Date: N/A

RC Date: 201101

SITE DESCRIPTION

SWMU 43 is a closed, unlined sanitary landfill of approximately 2 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 and 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 PBA contract was awarded to produce an RFI/CMS by September 2009. The SWMU 43 RFI Report Final Document January 2011 was submitted and recommended NFA beyond LUCs. The regulators approved this report on Jan. 28, 2011.

A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

CLEANUP/EXIT STRATEGY

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

The LUCs are to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent residential use. Yearly inspections and periodic reviews are needed.

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.....	204606

RIP Date: N/A
RC Date: 201003

SITE DESCRIPTION

SWMU 45 is an inactive sanitary landfill of approximately 5 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 and Moore included monitoring well installation, a geophysical survey, and a baseline HHRA.

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 which recommended NFA was submitted and regulatory comments were addressed. The SWMU 45 SSP Report Final January 2010 was submitted which recommended NFA beyond LUCs. 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 VDEQ on March 29, 2010.

A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

CLEANUP/EXIT STRATEGY

The LTM phase is open to handle LUCs.

The LUCs are to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent residential use. Yearly inspections and periodic reviews are needed.

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.....	204603

RIP Date: N/A

RC Date: 200210

SITE DESCRIPTION

HWMU 16 covers about 2 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 (PCCP) requiring LTM and LUCs was issued by the VDEQ.

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

A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014

CLEANUP/EXIT STRATEGY

LTM is planned for 30 years, since the post-closure requirement is for 30 years or site closeout. Wells will be sampled as required in the post-closure permit. Yearly inspections and periodic reviews are needed.

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.....	204603

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 and TCE were detected in groundwater. TCE exceeded groundwater protection standards. In FY04 an alternate source demonstration (ASD) report for TCE was resubmitted to VDEQ.

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 was to facilitate elimination LTM. In October 2002 a PCCP, LTM and LUCs, were issued by the VDEQ.

In 2007, several documents were submitted to the VDEQ to reduce or eliminate LTM; one of the documents was an ASD for TCE, later formalized in a multisite 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 did not show TCE within and below HWMU 5, so there was 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 PBA was awarded to achieve a HWMU 5 ASD by March 2009.

Two sampling events occurred during May and July 2008 IAW WPA 025 that was approved by the stakeholders. Over the summer of 2008 several stakeholder discussions of the preliminary data and assessments occurred. It was concluded that an ASD could not be approved for TCE at HWMU 5; therefore, the process to modify the PCCP 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 did indicate that NFA was appropriate for RAAP-047. On Nov. 5, 2009 VDEQ approved the HWMU 5 CAP for MNA/LTM.

A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

CLEANUP/EXIT STRATEGY

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

LTM is planned for 30 years, since the post-closure requirement is for 30 years or until clean closure has been demonstrated through the CAP and the PCCP. Yearly inspections and periodic reviews are needed.

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

STATUS

Regulatory Driver: CERCLA

RRSE: HIGH

Contaminants of Concern: Asbestos, Metals

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.....	204609

RIP Date: N/A

RC Date: 201109

SITE DESCRIPTION

The NRU is located approximately 6 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:

- Bag Loading Area (BLA),
- Igniter Assembly Area (IAA),
- Northern Burning Ground (NBG),
- Western Burning Ground (WBG),
- Rail Yard (RY),
- 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 PBA at the NRU. In February 2008, a PBA 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 and NFA was achieved.

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 (DD). The proposed plan was approved Dec. 13, 2010. In November 2010 a final RA work plan was submitted and RA started at that time and was completed in May 2011. VDEQ approved the IAA and BLA work plan on Dec. 9, 2011 and the WBG work plan on April 27, 2011. The results of the effort was that NFA was achieved at the WBG and the RY and LUCs are to be implemented at IAA, BLA, and BDDT to maintain them in their current industrial/commercial

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

as closed sites and to prevent residential use.

The final DD for RAAP NRU, November 2011, reflects that the above was signed by the USAEC in April 11, 2013. VDEQ concurred July 24, 2013.

CLEANUP/EXIT STRATEGY

The LTM phase is open to handle LUC.

The LUCs (IAA, BLA, BDDT) are to maintain the site in its current industrial/commercial state as a closed site and to prevent residential use. Yearly inspections and periodic reviews are needed.

Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
PBC @ Radford	PBC site	201212	
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 Sept. 21, 2007 and VDEQ Oct. 1, 2007.
RAAP-004	INERT LANDFILL NO3 (S74)	200009	Active Landfill - not eligible for ER,A funding.
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

Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
			USEPA Sept. 21, 2007 and VDEQ Oct. 1, 2007.
RAAP-022	POND BY BLDGS 4931 & 4928 (S57)	201109	Final RFI/CMS was submitted in 2009 and was approved by USEPA and VDEQ on Sept. 21, 2009. In November 2010 the interim measures work plan (IMWP) was prepared and submitted IAW the RFI/CMS. This draft work plan was approved by USEPA and VDEQ via email dated Jan. 6, 2011. The draft Final IM Completion Report was submitted in June 2011 and was approved by USEPA and 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 Dec. 16, 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 Aug. 12, 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 and 76 and was approved by USEPA Sept. 21, 2007 and VDEQ Oct. 1, 2007.
RAAP-033	CHROMIC ACID TREATMENT TANKS (S68)	200710	A final SSP report was submitted in May

Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
			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.
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 Jan 23, 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-043	SURFACE IMPOUNDMENT #7 (HWMU #7)	201306	Additional data was collected in the fall of 2012 and a closure report addendum was submitted in January 2013. VDEQ review and action was completed on June 26, 2013 where it was approved to discontinue groundwater monitoring and HWMU 7 will be removed from the post-closure care permit that is to be reissued.
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

Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
			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 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

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))

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))

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	
DES	(RAAP-045 - FORMERCADMIUM PLATING FACILITY(BLDG 4343))
RFI/CMS	(RAAP-027 - RUBBLE PILE(S58))
2006	
RFI/CMS	(RAAP-016 - WASTEWATER PONDS FROM PROP INCINER(S39))
2007	
CMI(C)	(RAAP-045 - FORMERCADMIUM PLATING FACILITY(BLDG 4343))
RFI/CMS	(RFAAP-046 - MMA GROUNDWATER STUDY)
RFA	(RAAP-047 - TCE Plume at BLDGS 1549,1041&1034)
CS	(RAAP-047 - TCE Plume at BLDGS 1549,1041&1034)
2008	
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))
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))
2009	
DES	(RAAP-040 - FORMER LEAD FURNACE AREA)
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-038 - UNDERGROUND FUEL OIL SPILL (O), RAAP-040 - FORMER LEAD FURNACE AREA, RAAP-047 - TCE Plume at BLDGS 1549,1041&1034)

2010

RD (RAAP-044 - NEW RIVER UNIT)
 RI/FS (RAAP-044 - NEW RIVER UNIT)
 RFI/CMS (RAAP-005 - WASTE PROPELLANT BURNING GROUND (S13), RAAP-024 - LANDFILL NO.3 (S45))
 CMI(C) (RAAP-005 - WASTE PROPELLANT BURNING GROUND (S13), RAAP-024 - LANDFILL NO.3 (S45))

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

2012

CMI(C) (RAAP-018 - OILY WATER BURIAL AREA (S48))

2013

CMI(C) (PBC @ Radford - PBC site)
 CMI(O) (PBC @ Radford - PBC site)
 DES (PBC @ Radford - PBC site)
 LTM (RAAP-043 - SURFACE IMPOUNDMENT #7 (HWMU #7))

2014

RFI/CMS (RAAP-013 - RED WATER ASH BURIAL #2 (S49))

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
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Final RA(C) Completion Date: 201212

Schedule for Next Five-Year Review: 2018

Estimated Completion Date of IRP at Installation (including LTM phase): 204609

RADFORD ARMY AMMUNITION PLANT IRP Schedule

 = phase underway

SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
RAAP-001	TNT WASTE ACID NEUTRALIZATION PITS(S51)	LTM						
RAAP-005	WASTE PROPELLANT BURNING GROUND (S13)	LTM						
RAAP-009	LANDFILL NITRO AREA (S40)	LTM						
RAAP-011	RED WATER ASH BURIAL GROUND (S41)	LTM						
RAAP-013	RED WATER ASH BURIAL #2 (S49)	LTM						
RAAP-014	PROPELLANT BURNING ASH DISPOSAL (S54)	LTM						
RAAP-018	OILY WATER BURIAL AREA (S48)	LTM						
RAAP-023	SANITARY LANDFILL NO.2 (S43)	LTM						
RAAP-024	LANDFILL NO.3 (S45)	LTM						
RAAP-039	HAZARDOUS WASTE LANDFILL (HWMU16)	LTM						
RAAP-042	SURFACE IMPOUNDMENT #5 (HWMU #5)	LTM						
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: 2/0

Installation Site Types with Future and/or Underway Phases

- 1 Firing Range
(RFAAP-002-R-01)
- 1 Small Arms Range
(RFAAP-001-R-01)

Most Widespread Contaminants of Concern

Explosives, Munitions constituents (MC)

Media of Concern

Groundwater, Soil

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

Site ID	Site Name	Action	Remedy	FY
RFAAP-001-R-01	ARMY RESERVE SMALL ARMS RANGE	FRA	WASTE REMOVAL - SOILS	2014

Duration of MMRP

Date of MMRP Inception 200202

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201709/201709

Date of MMRP completion including Long Term Management (LTM): 204706

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 the RFAAP-001-R-01, Army Reserve Small Arms Range 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. In 2012 another site was discovered RFAAP-002-R-01, Former Gun and Mortar Range. In August 2014, a PBA was awarded to begin investigative effort at the RFAAP-002-R-01 Former Gun and Mortar Range with an SI.

Cleanup Exit Strategy

For the RFAAP-001-R-01, Army Reserve Small Arms Range an interim measure was completed in 2011 and an RFI report, which recommended LUCs, was completed in 2012. For the RFAAP-002-R-01 Former Gun and Mortar Range upon completion of the SI effort, it is anticipated that a follow on RFI/CMS will be needed that will eventually result in an LUC.

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
2012	Army Reserve Small Arms Range (ARSAR) RCRA Facility Investigation/Interim Measures Completion Report, Draft Document, February 2012	Shaw	FEB-2012
2013	Final Army Reserve Small Arms RFI/Interim Measures Completion Report	CBI	NOV-2013
2015	Draft Work Plan Former Gun and Mortar Range Munitions Response Site (RFAAP-002-R-01) Site Investigation at Radford Army Ammunition Plant	Bering Sea	DEC-2015

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.....	201401
DES.....	200909.....	201401
CMI(C).....	200909.....	201401
LTM.....	201401.....	204612

RIP Date: N/A

RC Date: 201401

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 ft long by 10 ft 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 contained options for future effort as needed. In June 2010 a draft work plan for a combined IMs 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. The RFI/IM report was submitted in February 2012 to USEPA and VDEQ. The report, Army Reserve Small Arms Range RFI/IM Completion Report, Final Document, November 2013 was revised to address their comments and was resubmitted in early December 2013. It was approved by USEPA and VDEQ on Jan. 14, 2014. It recommended LUCs for the southeast hillside portion of the site.

CLEANUP/EXIT STRATEGY

An LUC is anticipated for part of the site to prevent residential use. Yearly inspections and periodic reviews are needed.

Site ID: RFAAP-002-R-01
Site Name: Former Gun and Mortar Range
Alias: None

STATUS

Regulatory Driver: RCRA
MRSPP Score: Evaluation pending
Contaminants of Concern: Explosives
Media of Concern: Groundwater, Soil

Phases	Start	End
RFA.....	201305.....	201305
CS.....	201309.....	201606
RFI/CMS.....	201606.....	201709
LTM.....	201709.....	204706

RIP Date: N/A
RC Date: 201709

SITE DESCRIPTION

The site is made up of two adjacent areas the "Gun Range Area" (28 acres) and "Trench Mortar Range Area" (85 acres) that were apparently operational during WWII. The site is within and perhaps underneath the Nitroglycerin 2 and Automated Multi-Base Area. Only the Nitroglycerin 2 area is active, the Automated Multi-Base Area was built and never went into production and is being scrapped. Currently procedure when mortar rounds are found through excavation or wash out is to call Explosive Ordnance Detachment (EOD). In April 2012, a 4.2- inch white phosphorus and 60mm high explosive rounds were detonated by the 18th EOD from Ft. Bragg. There were sporadic, undocumented finds over the years of inert rounds. An SI effort was awarded in 2014 and that effort is expected to be complete in 2016.

CLEANUP/EXIT STRATEGY

An SI effort was awarded 2014 and is expected to be complete with regulatory approval in 2016.

RFI/CMS and an LUC for safety management are the only future efforts anticipated at this time and would continue indefinitely. Yearly inspections and periodic reviews are anticipated. The LTM phase is open to handle the LUC.

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)

2013

RFA (RFAAP-002-R-01 - Former Gun and Mortar Range)

2014

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

RFI/CMS (RFAAP-001-R-01 - ARMY RESERVE SMALL ARMS RANGE)

CMI(C) (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: 201401

Schedule for Next Five-Year Review: 2018

Estimated Completion Date of MMRP at Installation (including LTM phase): 204706

RADFORD ARMY AMMUNITION PLANT MMRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
RFAAP-001-R-01	ARMY RESERVE SMALL ARMS RANGE	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
RFAAP-002-R-01	Former Gun and Mortar Range	RFI/CMS						
		LTM						

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): 204606

CR Contamination Assessment

Contamination Assessment Overview

An SSP performed for CC 001, CC 002, and CC 003 found contamination below industrial exposure levels but above residential exposure levels.

Cleanup Exit Strategy

An LUC was recommended in the SSP 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.....	204606
RIP Date:	N/A	
RC Date:	201101	

SITE DESCRIPTION

SSA72 was identified during the 1987 USEPA RFA and was subsequently put into the 2000 CORA permit. It is a sump in the Oleum Plant Area that received acidic wastewater. An SSP effort was conducted IAW the CORA. The Final SSP Report for SSAs 18, 72, 30, 79, 60, and 77, December 2010, was submitted 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.

A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

CLEANUP/EXIT STRATEGY

The LTM phase is open to handle the LUCs.

The LUCs are to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent future residential use. Yearly inspections and periodic reviews are needed.

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.....	204606

RIP Date: N/A

RC Date: 201101

SITE DESCRIPTION

SSA77 was identified during the 1987 USEPA RFA and was subsequently put into the 2000 CORA permit. It is an old garbage incinerator that operated from the 1940s until 1974. An SSP effort was conducted IAW the CORA. The Final SSP Report for SSAs 18, 72, 30, 79, 60, and 77, December 2010, was submitted 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.

A five-year review effort started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

CLEANUP/EXIT STRATEGY

The LTM phase is open to handle the LUCs.

The LUCs are to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent future residential use. Yearly inspections and periodic reviews are needed.

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.....	204606
RIP Date: N/A		
RC Date: 201101		

SITE DESCRIPTION

SSAs 30 and 79 were identified during the 1987 USEPA RFA and was subsequently put into the 2000 CORA permit. Asbestos Disposal Trenches 1 and 2 were used for disposal of asbestos containing material. An SSP effort was conducted IAW the CORA. The Final SSP Report for SSAs 18, 72, 30, 79, 60, and 77, December 2010, was submitted 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. A five-year review effort started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014.

CLEANUP/EXIT STRATEGY

The LTM phase is open to handle the LUCs.

The LUCs are to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent future residential use. Yearly inspections and periodic reviews are needed.

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

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

CMI(C) (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
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Final RA(C) Completion Date: 201101

Schedule for Next Five-Year Review: 2018

Estimated Completion Date of CR at Installation (including LTM phase): 204606

RADFORD ARMY AMMUNITION PLANT CR Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
CC 001	Oleum Plant Acidic Wastewater Sump	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
CC 002	Garbage Incinerator (Bldg 7219)	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
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 (CIP) was finalized and last updated in 2004.

In February 1995 and January 1998, RAAP with the assistance of 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-chairperson 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

