FY2010

RADFORD ARMY AMMUNITION PLANT

Army Defense Environmental Restoration Program

Installation Action Plan

Printed 15 October 2010

Table of Contents

Table of Contents

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
CA	Corrective Action
CAP	Corrective Action Plan
CC	Compliance-related Cleanup
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CMS	Corrective Measures Study
COC	Contaminants of Concern
CORA	Corrective Action Permit
CR	Compliance Restoration
cy	cubic yard
DD	Decision Document
DERP	Defense Environmental Restoration Program
DNT	Dinitrotoluene
EE/CA	Engineering Evaluation / Cost Analysis
EPA	Environmental Protection Agency
ER	Emergency Removal
ER,A	Environmental Restoration, Army
FLFA	Former Lead Furnace Area
FRA	Final Remedial Action
FS	Feasibility Study
ft	feet
FY	Fiscal Year
GIS	Geographic Information System
GPS	Groundwater Protection Standard
HBN	Health-Based Numbers
HHRA	Human Health Risk Assessment
HWMU	Hazardous Waste Management Unit
IAA	Igniter Assembly Area
IAP	Installation Action Plan
IC	Institutional Controls
ID	Identification
IDM	Investigative Derived Material
IM	Interim Measure
IMWP	Interim Measure Work Plan
IRA	Interim Remedial Action
IRP	Installation Restoration Program
K	thousand
LTM	Long-Term Management
LUC	Land Use Control
MC	Munitions Constituents

Acronyms

MCL	Maximum Contaminant Level
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
ODUSD (I&E)	Office of the Deputy Under Secretary of Defense for Installations and Environment
PBA	Performance-Based Acquisition
PBC	Performance-Based Contract
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethylene
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	Sewage Sludge Application
SSP	Site Screening Process
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TAPP	Technical Assistance for Public Participation
TBD	To Be Determined
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leachate Procedure
TNT	Trinitrotoluene
TRC	Technical Review Committee
USACE	US Army Corps of Engineers
USACHPPM	US Army Center for Health Promotion and Preventive Medicine
USAEC	US Army Environmental Command
USATHAMA	US Army Toxic and Hazardous Materials Agency

Acronyms

USEPA	US Environmental Protection Agency
VDEQ	Virginia Department of Environmental Quality
VI	Verification Investigation
VOC	Volatile Organic Compound
WBG	Western Burning Ground
WPA	Work Plan Addendum

Acronym Translation Table

CERCLA		RCRA
Preliminary Assessment(PA)	=	RCRA Facility Assessment(RFA)
Site Inspection(SI)	=	Confirmation Sampling(CS)
Remedial Investigation/Feasiblity Study(RI/FS)	=	RCRA Facility Investigation/Corrective Measures Study(RFI/CMS)
Remedial Design(RD)	=	Design(DES)
Remedial Action (Construction)(RA(C))	=	Corrective Measures Implementation (Construction)(CMI(C))
Remedial Action (Operation)(RA(O))	=	Corrective Measures Implementation (Operation)(CMI(O))
Long Term Management(LTM)	=	Long Term Management(LTM)
Interim Remedial Action(IRA)	=	Interim Measure(IM)

CERCLA		RCRA Underground Storage Tank (UST) Site Phase Terms
Preliminary Assessment(PA)	=	Initial Site Characterization(ISC)
Remedial Investigation(RI)	=	Investigation(INV)
Feasibility Study(FS)	=	Corrective Action Plan(CAP)
Remedial Design(RD)	=	Design(DES)
Remedial Action (Construction)(RA(C))	=	Implementation (Construction)(IMP(C))
Remedial Action (Operation)(RA(O))	=	Implementation (Operations)(IMP(O))
Long Term Management(LTM)	=	Long Term Management(LTM)
Interim Remedial Action(IRA)	=	Interim Remedial Action(IRA)

Site Alias List

AEDB-R Site ID to Alias List

AEDB-R #	Alias
CC 001	SSA72
CC 002	SSA77
PBC @ Radford	PBC site
RAAP-005	SWMU 13
RAAP-009	SWMU 40
RAAP-010	S35,37,38
RAAP-011	SWMU 41
RAAP-013	SWMU 49
RAAP-014	SWMU 54
RAAP-018	SWMU 48
RAAP-022	SWMU 57
RAAP-023	SWMU 43
RAAP-037	AOC P
RAAP-039	HWMU 16
RAAP-042	HWMU #5
RAAP-043	HWMU #7
RAAP-044	NRU
RFAAP-001-R-01	

Installation Information

Installation Locale

Installation Size (Acreage): 6900
City: Radford
County: Pulaski and Montgomery Counties
State: Virginia
Other Locale Information

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

Installation Mission

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

Lead Organization

Army Materiel Command (AMC)

Lead Executing Agencies for Installation

Investigation Phase Executing Agency: RAAP and United States Army Corps of Engineers (USACE), Baltimore District

Remedial Design/Action Phase Executing Agency: The USACE, Baltimore District as well as some interim remedial actions (IRAs) conducted through RAAP

Regulator Participation

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

National Priorities List (NPL) Status

RADFORD ARMY AMMUNITION PLANT is not on the NPL

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

RAB established 199807

Installation Program Summaries

IRP

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

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

MMRP

Primary Contaminants of Concern: Munitions constituents (MC)

Affected Media of Concern: Soil

CR

Primary Contaminants of Concern: Dioxins/Dibenzofurans, Metals, Polychlorinated Biphenyls (PCB)

Affected Media of Concern: Soil

5-Year / Periodic Review Summary

No 5-Year / Periodic Reviews have been scheduled

Cleanup Program Summary

Installation Historic Activity

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

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

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

Installation Program Cleanup Progress

IRP

Prior Year Progress:	An interim measure (IM) effort was completed at SWMUs 51 and 39, and former lead furnace area (FLFA). An engineering evaluation/cost analysis (EE/CA) removal action was completed at NRU northern burning ground (NBG). RFI reports for no further action (NFA) were approved for RAAP-047, AOC A, SWMU 31, AOC O. RFI/CMS reports were approved for SWMU 40/71, SWMUs 50 and 59, SWMU 57. The HWMU 5 corrective action plan (CAP) was approved. SWMU 45 site screening process (SSP) report was approved for NFA.
Future Plan of Action:	Comply with the hazardous waste management unit (HWMU) 5 CAP. Negotiate the following: RCRA facility investigations (RFI) reports at solid waste management units (SWMUs) 13, 41, 43, AOC P, 35, 37, 38, AOC Q; RFI/CMS report at SWMU 48/49 and NRU remedial investigation/feasibility study (RI/FS) report. Implement cleanup actions at SWMUs 40, 57, 48/49, and NRU.

MMRP

Prior Year Progress:	A performance-based acquisition (PBA) was awarded for this site to implement the RFI/corrective measures study (CMS) with options for cleanup.
Future Plan of Action:	Complete the RFI/CMS and award PBA options as necessary.

CR

Prior Year Progress:	Negotiate SSP report NFA recommendation for compliance-related cleanup (CC) 001 and 002.
Future Plan of Action:	Obtain approval of NFA on the SSP report or program and procure RFI/CMS for CC 001 and 002.

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: 47/32

Installation Site Types with Future and/or Underway Phases

1 Burn Area
(RAAP-005)

1 Chemical Disposal
(RAAP-039)

7 Landfill
(PBC @ Radford, RAAP-009, RAAP-011, RAAP-013, RAAP-014, RAAP-018, RAAP-023)

2 Storage Area
(RAAP-037, RAAP-044)

4 Surface Impoundment/Lagoon
(RAAP-010, RAAP-022, RAAP-042, RAAP-043)

Most Widespread Contaminants of Concern

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

Media of Concern

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

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

Site ID	Site Name	Action	Remedy	FY	Cost
RAAP-041	SURFACE IMPOUNDMENT #4 (HWMU #4)	FRA	REMOVAL	1988	TBD
RAAP-014	PROPELLANT BURNING ASH DISPOSAL (S54)	IRA	REMOVAL	2000	$2,205.3 K
RAAP-045	FORMERCADMIUM PLATING FACILTY(BLDG 4343)	FRA	REMOVAL	2007	TBD
RAAP-001	TNT WASTE ACID NEUTRALIZATION PITS(S51)	FRA	REMOVAL	2009	TBD
RAAP-016	WASTEWATER PONDS FROM PROP INCINER(S39)	FRA	REMOVAL	2009	TBD
RAAP-040	FORMER LEAD FURNACE AREA	FRA	WASTE REMOVAL - SOILS	2009	TBD

Duration of IRP

Date of IRP Inception: 198409

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

Date of IRP completion including Long Term Management (LTM): 203512

IRP Contamination Assessment

Contamination Assessment Overview

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

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

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

Cleanup Exit Strategy

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

IRP Previous Studies

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

	Title	Author	Date
2002			
	Final SWMU 6 Decision Document	Radford Army Ammunition Plant	OCT-2002
2003			
	Final Work Plan Addendum 16, Site Screening Process fro 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

	Title	Author	Date
2007			
	37, 38, 46, 57, 68, 69 and Areas of Concern A, F, Q Final		
	Closure Evaluation for Hazardous Waste Management Unit 4 (HWMU #4)-Interim Status, Radford Army Ammunition Plant, EPA ID VA 1210020730	ATK letter 07-815-129 dated 28 June 2007	JUN-2007
	Final SWMU 31 RCRA Facility Investigation Report	Radford AAP, URS Corp	JUL-2007
	Final Master Work Plan Addendum 19: SWMU 48, SWMU 49, SWMU 50, SWMU 59, SWMU 41, Area O, FLFA, SWMU 43, Area P	Radford AAP, URS Corp	JUL-2007
	Decision Document SWMU 46: Propellant Burial Area No Further Action	Radford AAP, URS Corp	AUG-2007
	Decision Document SWMU 68: Chromic Acid Treatment Tanks No Further Action	Radford AAP, URS Corp	AUG-2007
	Decision Document SWMU 69: Pond by Chromic Acid Treatment Tanks No Further Action	Radford AAP, URS Corp	AUG-2007
	Decision Document SWMU 75: Used Oil Storage Tank (Inert Gas Plant) No Further Action	Radford AAP, URS Corp	AUG-2007
	Decision Document SWMU 76: Used Oil Tanks No Further Action	Radford AAP, URS Corp	AUG-2007
	Decision Document AOC F: Former Drum Storage Area No Further Action	Radford AAP, URS Corp	AUG-2007
	Final Work Plan Addendum 021 RCRA Facility Investigation for Solid Waste Management Unit 57	Radford AAP, URS Corp	OCT-2007
	Final Work Plan Addendum 020 RCRA Facility Investigation for Solid Waste Management Units 35, 37, 38 and Area of Concern Q	Radford AAP, URS Corp	OCT-2007
	Final NRU Additional Characterization Sampling & Groundwater Investigation Data Report	Radford AAP, Shaw	OCT-2007
	Final Work Plan Addendum 022 Site Screening Process at Solid Waste Management Unit 45	Radford AAP, URS Corp	DEC-2007
2008			
	Final Historical Records Review Radford Army Ammunition Plant, Virginia, Military Munitions Response Program	Radford AAP, URS Corp	JAN-2008
	Master Work Plan Addendum 025: TCE Plume at Bldgs 1549,1041, 1034 (RAAP-047)	ARCADIS	MAY-2008
	Draft RFI Workplan RAAP-031: Area of Concern A - Nitrocellulose Rainwater Ditch	ARCADIS	JUN-2008
	Draft Remedial Investigation Work Plan New River Unit (RFAAP-044)	ARCADIS	JUN-2008
	Work Plan Addendum 023: RFI at SWMU 13, Radford Army Ammunition Plant, Virginia	URS	JUL-2008
	SWMU 51 RCRA Facility Investigation/Corrective Measures Study Radford Army Ammunition Plant, Radford, VA	Shaw	JUL-2008
	Final SWMU 39 Interim Measures Work Plan, Radford Army Ammunition Plant, Virginia	Shaw	JUL-2008
	Draft SWMU 51 Interim Measures Work Plan, Radford Army Ammunition Plant, Radford, VA	Shaw	JUL-2008
	Semiannual Groundwater Monitoring Report, HWMUs 5, 7, 10 & 16, Second Quarter, 2008	Radford Army Ammunition Plant	AUG-2008
	Final Master Work Plan Addendum 024: MMRP Site Screening Process	URS	SEP-2008

	Title	Author	Date
2008			
	Final SWMU 54 RCRA Facility Investigation/ Corrective Measures Study Radford Army Ammunition Plant, Radford, VA Volumes I and II	URS	SEP-2008
	Draft Former Lead Furnace Area Interim Measures Work Plan	Shaw	NOV-2008
	Final Former Lead Furnace Area RCRA Facility Investigation/Corrective Measures Study Report	Shaw	NOV-2008
	Draft Work Plan Addendum 29 Supplemental Work Plan RAAP-031: Area of Concern A-Nitrocellulose Rainwater Ditch	ARCADIS	DEC-2008
2009			
	Draft SWMUs 48 and 49 RCRA Facility Investigation/Corrective Measures Study Report	Shaw	FEB-2009
	Final Corrective Action Plan for Hazardous Waste Management Unit 5 (RAAP-042)	ARCADIS	APR-2009
	Final Solid Waste Management Units 40 (RAAP-009) and 71 (RAAP-002) RCRA Facility Investigation/Corrective Measures Study Report Volumes I and II	URS	APR-2009
	Final Site Screening Process Report Radford Army Ammunition Plant, Virginia, Military Munitions Response Program	URS	MAY-2009
	Final Work Plan Addendum 028 Site Screening Process at Site Screening Areas 18, 72, 30, 79, 60, and 77	URS	JUN-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
	Draft Study Area at Solid Waste Management Unit 13 RCRA Facility Investigation Report	URS	JUL-2009
	Draft Solid Waste Management Units 35, 37, 38, and Area of Concern Q (RAAP-10) RCRA Facility Investigation Report	URS	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 Remedial Investigation Report New River Unit (RAAP-044) BDDT, BLA, IAA, RY, WBG and Groundwater Volumes I and II	ARCADIS	OCT-2009
	Draft Feasibility Study Report New River Unit (RAAP-044) Bag Loading Area, Igniter Assembly Area, and Western Burning Ground	ARCADIS	OCT-2009
	Draft SWMU 41 RCRA Facility Investigation Report	Shaw	NOV-2009
	Draft SWMU 43 RCRA Facility Investigation Report	Shaw	NOV-2009
	Draft Area P RCRA Facility Investigation Report	Shaw	NOV-2009

	Title	Author	Date
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
	Draft Site Screening Process Report for Site Screening Areas 18, 72, 30, 79, 60 and 77	URS	MAR-2010
	Draft Response Action Completion and Closure Report for the Northern Burning Ground New River Unit (RAAP-044)	ARCADIS	APR-2010

RADFORD ARMY AMMUNITION PLANT

Installation Restoration Program

Site Descriptions

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

STATUS

Regulatory Driver: RCRA

RRSE: LOW

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

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	199909	200101
DES	200609	201106
CMI(C)	200609	201212
CMI(O)	201009	201212

RIP Date: 201212

RC Date: 201912

SITE DESCRIPTION

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

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

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

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

CLEANUP/EXIT STRATEGY

Please refer to the individual cleanup strategies for each site.

Site ID: RAAP-005
Site Name: WASTE PROPELLANT BURNING GROUND (S13)
Alias: SWMU 13

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

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

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	200505	201012

RIP Date: N/A

RC Date: 201012

SITE DESCRIPTION

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

A 1992 RFI by Dames & Moore evaluated groundwater quality and potential soil contamination for explosives, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and heavy metals. The concentrations of contaminants of concern (COCs) exceeded health-based numbers (HBNs) in the 1989 corrective action permit (CORA) and could indicate risk under an industrial worker scenario.

In fiscal year (FY)04, a site-screening sampling was performed. The site-screening effort identified off-site migration associated with activities before 1986. A final SSP report was submitted in May 2007; it contained a recommendation for further investigation that was subsequently approved on June 7, 2007 by the USEPA and on April 13, 2007 by the VDEQ on an earlier draft. In FY05, in anticipation of those approvals, an RFI/CMS was procured. Also in FY05, a permit was issued by the VDEQ governing burning operations at the open burning ground. A groundwater and soil monitoring program is part of the permit.

In 2008, the work plan addendum (WPA) 023 RFI work plan for sampling the area from the fence to the river was prepared and approved by the stakeholders. In November 2008 sampling was performed in accordance with WPA 023. In July 2009 the draft RFI report was submitted. Review comments are being addressed.

CLEANUP/EXIT STRATEGY

The RFI will address the area outside of the permitted unit from the fence to the river [about 30 to 50 feet (ft)] which is mostly a steep slope. NFA is anticipated.

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

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Metals

Media of Concern: Soil, Surface Water

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	200105	200909
DES	201007	201101
CMI(C)	201007	201101
LTM	201104	202104

RIP Date: N/A

RC Date: 201104

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

In FY04 the RFI was submitted to the VDEQ and the USEPA for review. In FY05 there were several comment review cycles. Stakeholders agreed that additional sampling was needed to address soil and groundwater data gaps, and in FY06 additional sampling was procured. In 2008 a new RFI/CMS report was submitted. Regulatory comments were addressed and a final RFI/CMS report was submitted in April 2009. It was approved June 30, 2009.

CLEANUP/EXIT STRATEGY

Cap repair, institutional controls (IC), additional groundwater well and LTM are anticipated. In 2010 a PBA contract was awarded to implement this remedy.

Site ID: RAAP-010
Site Name: CASO4 TRMT/DISP (8,9,35,36,37,38,Q)
Alias: S35,37,38

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

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

Media of Concern: Other (Sludge), Soil

Phases	Start	End
RFA	198409	198410
CS	198410	198412
RFI/CMS	199201	201101
LTM	201107	202007

RIP Date: N/A

RC Date: 201101

SITE DESCRIPTION

SWMU 8 consisted of two unlined, below-grade earthen lagoons located in the MMA along the New River. The lagoons were designed to neutralize acidic wastewater from the acidic wastewater treatment plant with hydrated lime. The supernatant is discharged to the New River via Outfall 007. In 1998 the eastern lagoon was closed and replaced with a concrete tank. In 1999 NFA closure documentation was submitted. In 2005 the western lagoon was replaced with a concrete tank. Sludge was dredged from the lagoons and was placed in the adjacent unlined drying beds (SWMU 36). In 2004 an RFI report (non-ER,A funded) that addressed both SWMUs 8 and 36 recommended NFA and was approved by the USEPA and the VDEQ. In 2006 concrete drying beds were constructed within the SWMU 36 area.

SWMU 9 consists of two unlined, below-grade earthen lagoons located in the northwest section of the MMA operated similar to SWMU 8. The supernatant is discharged to the New River via Outfall 005. Operations as a sludge settling lagoon ceased in 1993, so SWMU 9 is ineligible for ER,A. Between 1982 and 1991, sludge was dredged from the lagoons and was placed in the adjacent drying beds then to SWMU 29. In 1987, a RCRA facility assessment (RFA) was conducted by USEPA that included a preliminary data review, evaluation, and visual site inspection. A VI was performed in 1992.

SWMU 35 is an unlined calcium sulfate drying bed that is 160 ft by 80 ft with approximately eight ft of sediment remaining in the basin. SWMU 35 is located along the New River in the northeast section of the MMA. Calcium sulfate sludge was dredged from SWMU 8 prior to 1980 and pumped into SWMU 35. RAAP reported that sediment from SWMU 10 was also deposited in SWMU 35 during the early-1980s. A RCRA VI and supplemental VI that included groundwater sampling were performed. Explosives and metals in soil, groundwater, surface water and sediment exceeded HBNs as per the 1989 RCRA CORA permit.

SWMU 37, an unlined drying bed approximately 100 ft long, 80 ft wide, and eight ft deep, is located in the northwest section of the MMA. SWMU 37 is immediately southwest of and adjacent to SWMU 9 and received calcium sulfate sludge. Beds have been inactive since the 1980s. A 1992 RCRA VI by Dames & Moore included the collection of one composite sludge sample to determine whether concentrations exceeded permit levels for VOCs, SVOCs, and toxicity characteristic leachate procedure (TCLP) metals. Although VOCs and SVOCs were detected, reported results were below 1989 RCRA CORA permit levels.

SWMU 38, an unlined drying bed approximately 225 ft long, 40 ft wide, and eight ft deep, is located in the northwest section of the MMA. The drying bed received calcium sulfate sludge, the overflow was pumped to Area Q via pipes that ran through a depression in the berm surrounding the drying bed. Beds have been inactive since the 1980s. A 1992 RCRA VI by Dames & Moore included the collection of one composite sludge sample to determine whether concentrations exceeded permit specifications for VOCs, SVOCs, and TCLP metals. The limited data indicates no exceedances of 1989 RCRA CORA permit HBNs.

Area Q is an abandoned lagoon located in the northwest section of the MMA. This site is less than a quarter acre and is immediately northwest of SWMU 38. It was reportedly used as a sludge drying bed when SWMU 38 reached capacity. In FY04 a site-screening report was submitted for SWMUs 35, 37, 38 and AOC Q. In May 2007 a final SSP report was submitted that contained a recommendation for further investigation that was subsequently approved by the USEPA on June 7, 2007 and VDEQ on April 13, 2007 in an earlier draft.

Site ID: RAAP-010
Site Name: CASO4 TRMT/DISP (8,9,35,36,37,38,Q)
Alias: S35,37,38

In 2007, WPA 020 RFI work plan for SWMUs 35, 37, 38 and AOC Q was approved by stakeholders. In 2008, sampling was performed in accordance with WPA 020. In July 2009 the draft RFI report was submitted. Regulatory comments are being addressed with an additional well at SWMU 37 that was installed in June 2010.

CLEANUP/EXIT STRATEGY

SWMU 35, 37, 38 and Area Q will have further action. These sites contain identical wastes and are close to one another. NFA is anticipated if the additional groundwater monitoring well that was installed in June 2010 as requested by the regulatory agencies can confirm there is no release to the environment. LTM is planned.

Site ID: RAAP-011
Site Name: RED WATER ASH BURIAL GROUND (S41)
Alias: SWMU 41

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

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

Media of Concern: Groundwater, Soil, Surface Water

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	200207	201012
LTM	201109	203512

RIP Date: N/A

RC Date: 201012

SITE DESCRIPTION

SWMU 41 is located in the MMA and consists of two noncontiguous disposal areas for red water ash. The northern area consisted of an unlined lagoon approximately 50 ft by 70 ft, which was backfilled. The southern area 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 41.

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

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

In September 2006 a PBC was awarded with a remedy-in-place (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. Regulatory comments are being addressed.

CLEANUP/EXIT STRATEGY

Per the draft RFI report NFA with IC is being negotiated with the regulatory agencies. LTM is planned.

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

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

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

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

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	199712	201012
LTM	201012	201912

RIP Date: N/A

RC Date: 201012

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 redwater ash during its active life.

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

The RFI sampling was completed in FY02. In September 2006, a PBC was awarded with a RIP of September 2009 at SWMUs 49, 48, 50, and 59, which are close to each other. In 2007, additional samples were collected in accordance with WPA 019 that was approved by the stakeholders. In February 2009 a draft RFI/CMS report was submitted. Regulatory review comments are being addressed.

CLEANUP/EXIT STRATEGY

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

An NFA or possibly a land use control (LUC) is anticipated for soil at RAAP-013 (SWMU 49) and RAAP-018 (SWMU 48). MNA/LTM is anticipated for groundwater at and in the vicinity of RAAP-013(SWMU 49) and RAAP-018 (SWMU 48).

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

Site ID: RAAP-014
Site Name: PROPELLANT BURNING ASH DISPOSAL (S54)
Alias: SWMU 54

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

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

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

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	199601	200810
DES	200907	201012
IRA	199808	200001
CMI(C)	201009	201212
LTM	201212	202112

RIP Date: N/A

RC Date: 201212

SITE DESCRIPTION

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

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

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

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

CLEANUP/EXIT STRATEGY

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

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

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Explosives, Metals

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	198409	198410
CS	198410	198412
RFI/CMS	199712	201012
LTM	201012	201509

RIP Date: N/A

RC Date: 201012

SITE DESCRIPTION

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

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

In 1999 a draft RFI was submitted by ICF Kaiser. Soil data from the RFI indicated the presence of metals above 1989 RCRA CORA permit HBNs. In FY02 the RFI sampling was completed. In September 2006, a PBC was awarded with a RIP of September 2009 at SWMUs 49, 48, 50, and 59, which are in proximity to each other. In 2007, additional samples were collected in accordance with WPA 019 that was approved by the stakeholders. In February 2009 a draft RFI/CMS report was submitted. Regulatory review comments are being addressed.

CLEANUP/EXIT STRATEGY

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

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

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

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

Site ID: RAAP-022
Site Name: POND BY BLDGS 4931 & 4928 (S57)
Alias: SWMU 57

STATUS

Regulatory Driver: RCRA

RRSE: LOW

Contaminants of Concern: Metals

Media of Concern: Sediment

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	199201	200909
DES	201007	201010
CMI(C)	201007	201105

RIP Date: N/A

RC Date: 201212

SITE DESCRIPTION

SWMU 57 is an acid settling pond that supported the Nike program. It is located in the western section of the horseshoe area, is approximately 30 ft in diameter, surrounded by a gravel berm, and is enclosed by a perimeter fence. The pond is connected to a maintenance shop (Building 4931) by an underground pipe. A similar practice occurred at Building 4343 (RAAP-045), where subsequent investigations found metal concentrations above action levels.

A 1992 RCRA VI by Dames & Moore collected one surface water and one sediment sample. No COC were detected against HBNs. The VI never received regulatory approval.

Site-screening sampling was performed in FY04 to comply with the 2000 RCRA CORA. The report was submitted in FY04 and there were several comment review cycles in FY05. A final SSP report was submitted in May 2007 that contained a recommendation for further investigation that was subsequently approved by the USEPA on June 7, 2007 and the VDEQ on April 13, 2007 on an earlier draft.

In 2007, additional samples were collected in accordance with WPA 021 that was approved by the stakeholders. In September 2009 a final RFI/CMS report was submitted which addressed regulatory comments and was approved Sept. 21, 2009. The report recommended source removal (clean closure) as groundwater was not affected. In 2010, a PBC was awarded to implement the CMS recommendation.

CLEANUP/EXIT STRATEGY

Based on the final RFI/CMS, source removal (clean closure) is recommended. In 2010, a PBA contract was awarded to implement this remedy.

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

STATUS

Regulatory Driver: RCRA

RRSE: LOW

Contaminants of Concern: Metals

Media of Concern: Groundwater, Sediment, Surface Water

Phases	Start	End
RFA	198409	198410
CS	198410	198412
RFI/CMS	200610	201012
LTM	201012	201912

RIP Date: N/A

RC Date: 201012

SITE DESCRIPTION

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

In September 2006, a PBC was awarded to produce an RFI/CMS by September 2009. In November 2009 a draft RFI report was submitted. Regulatory comments are being addressed.

CLEANUP/EXIT STRATEGY

Per the draft RFI report NFA with IC is being negotiated with the regulatory agencies. LTM is planned.

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

Site ID: RAAP-037
Site Name: BATTERY STORAGE AREA (P)
Alias: AOC P

STATUS

Regulatory Driver: RCRA

RRSE: LOW

Contaminants of Concern: Explosives, Metals

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	200610	201012

RIP Date: N/A

RC Date: 201012

SITE DESCRIPTION

The spent battery storage area (Area P) consists of an open lot of several acres that was used to store shredded scrap metal, decommissioned tanks, powder cans, and batteries prior to off-post shipment. The area is approximately 50 ft by 200 ft long and is located within the former scrap metal salvage yard, 600 ft west of the biological treatment plant (SWMU 10).

A 1992 RCRA VI by Dames & Moore evaluated surface and subsurface soils within the SWMU to determine the impact of spent battery acid spillage. Data from the soil sampling indicates metals in excess of 1989 RCRA CORA permit HBNs.

In September 2006, a PBC was awarded to produce an RFI/CMS to cover all media of concern by September 2009. In December 2009, a draft RFI report was submitted. Regulatory review comments are being addressed.

CLEANUP/EXIT STRATEGY

Per the draft RFI submitted in November 2009, NFA is being negotiated.

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

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	202003

RIP Date: N/A

RC Date: 200210

SITE DESCRIPTION

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

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

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

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

CLEANUP/EXIT STRATEGY

LTM is planned for 10 years per Army policy although the post closure requirement is for 30 years or site close out. Wells will be sampled as required in the post closure permit. The costs for geographic information system (GIS) upgrades and modifications to the RCRA CORA permit to close out sites are also included under this site.

Site ID: RAAP-042
Site Name: SURFACE IMPOUNDMENT #5 (HWMU #5)
Alias: HWMU #5

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Metals

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	200010	200210
LTM	200210	202003

RIP Date: N/A

RC Date: 200210

SITE DESCRIPTION

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

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

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

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

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

CLEANUP/EXIT STRATEGY

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

LTM is planned for 10 years per Army policy although the post closure requirement is for 30 years or until clean closure has been demonstrated through the CAP and the post closure care permit.

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

Site ID: RAAP-043
Site Name: SURFACE IMPOUNDMENT #7 (HWMU #7)
Alias: HWMU #7

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Metals

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	200010	200210
LTM	200210	202003

RIP Date: N/A

RC Date: 200210

SITE DESCRIPTION

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

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

The following RAAP document submissions are provided as LTM reduction status:
- Jan. 9, 2007: ASD,
- Feb.9, 2007: Amended closure plan,
- May 29, 2007: Class 1 minor modification request, and
- Aug. 9, 2007: Class 3 permit modification request.

On June 14, 2007, the VDEQ approved the ASD and Class 1 modification. The VDEQ action is pending on the Class 3 modification because it combines actions on several sites.

CLEANUP/EXIT STRATEGY

LTM is planned for 10 years per Army policy although the post closure requirement is for 30 years or until clean closure has been demonstrated the post closure care permit process.

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

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

STATUS

Regulatory Driver: CERCLA

RRSE: HIGH

Contaminants of Concern: Metals, Polychlorinated Biphenyls (PCB)

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

Phases	Start	End
PA	199705	199708
SI	199712	199806
RI/FS	199806	201009
RD	201009	201012
RA(C)	201009	201104

RIP Date: N/A

RC Date: 201104

SITE DESCRIPTION

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

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

An RI sampling effort included the collection of surface soil, sludge, and water samples. Metals have been detected in excess of the 1989 RCRA CORA permit HBNs; however, this site is not subject to any RCRA CORA permit. Six areas within the NRU are being investigated:
- the bag loading area (BLA),
- the igniter assembly area (IAA),
- the NBGs,
- the western burning grounds (WBGs),
- the rail yard (RY), and
- the building debris disposal trench (BDDT).

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

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

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

In 2008 draft WPA 027 was submitted to the VDEQ. The VDEQ is the sole regulatory review agency and provided comments but formal approval has not occurred. In any case, sampling was performed in accordance with WPA 027 during summer 2008. In 2009 an EE/CA removal action was completed at the NBG. In November 2009 a draft RI/FS document was submitted for the remaining five areas and groundwater.

CLEANUP/EXIT STRATEGY

The effort will include groundwater as part of the site conceptual model. Excavation, transportation and disposal of contaminated soil are anticipated at the BLA and IAA. RY, WBG, and BDDT are anticipated NFA. In 2009 an EE/CA removal action was

completed at the NBG, NFA is expected.

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

Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
RAAP-001	TNT WASTE ACID NEUTRALIZATION PITS(S51)	200909	Interim Measures Completion Reports: SWMU 51, SWMU 39 and FLFA, Final Document February 2010, approved by USEPA April 1, 2010
RAAP-002	FLASH BURN PARTS AREA (S71)	200909	The RFI was completed and no further action is required.
RAAP-003	POND BY CR ACID TREATMENT TANKS(S69)	200710	A final Site Screening Process (SSP) report was submitted in May 2007 that contained a recommendation for no further action, which was subsequently approved by USEPA June 7, 2007 and VDEQ April 13, 2007. A subsequent NFA Decision Document was approved by USEPA September 21, 2007 and VDEQ October 1, 2007
RAAP-004	INERT LANDFILL NO3 (S74)	200009	Active Landfill - not eligible for ER,A
RAAP-006	FORMER DRUM STORAGE AREA 9387-2(F)	200009	A final SSP report was submitted in May 2007 that contained a recommendation for no further action that was subsequently approved by USEPA June 7, 2007 and VDEQ April 13, 2007 on an earlier draft. In accordance with the RCRA CORA Permit, a decision document for no further action was submitted in August 2007 and was approved by USEPA September 21, 2007 and VDEQ October 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-012	ACID WASTEWATER LAGOON(S6)	200209	The Decision Document was approved by USEPA on October 9, 2002 and by VDEQ on October 24, 2002
RAAP-015	FLY ASH LANDFILL #1 (S26)	200009	Completed post-closure care under VDEQ permit 399. Not eligible for ER,A funding
RAAP-016	WASTEWATER PONDS FROM PROP INCINER(S39)	200909	Interim Measures Completion Reports: SWMU 51, SWMU 39 and FLFA, Final Document February 2010, approved by USEPA April 1, 2010
RAAP-017	ACTIVATED CARBON DISPOSAL AREA(S53)	200009	See RAAP-007, S28. Not eligible for ER,A funding
RAAP-019	INERT LANDFILL NO.1 (S32)	200009	Site closed under VDEQ permit 400. Not eligible for ER,A funding
RAAP-020	FLY ASH LANDFILL #2 (S29)	200009	Site is active - VDEQ permit 353. Not eligible for ER,A funding
RAAP-021	PROPELLANT BURIAL (S46)	200710	A final SSP report was submitted in May 2007 that contained a recommendation for no further action, which was subsequently approved by USEPA June 7, 2007 and VDEQ April 13, 2007. A subsequent NFA Decision Document was approved by USEPA September 21, 2007 and VDEQ October 1, 2007

Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
RAAP-024	LANDFILL NO.3 (S45)	201003	In 2010 a final Site Screening Process Report was submitted which recommended NFA. It was approved March 10, 2010.
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 December 14, 2009.
RAAP-027	RUBBLE PILE(S58)	200412	VDEQ approved the RFI Report on August 5, 2003 and USEPA approved it on May 24, 2004. A Decision Document was submitted to USEPA and VDEQ on September 10, 2004. USEPA approved DD on 16 December 2004.
RAAP-028	BOTTOM ASH PILE(S59)	200909	In 2009 a final RFI was submitted which recommended NFA and approved Oct 23, 2009.
RAAP-029	CLOSED SANITARY LANDFILL (S52)	200009	Handled under post closure care permit for RAAP-039, HWMU 16
RAAP-030	AIR CURTAIN DESTRUCTOR & OPEN BURN (S17)	200009	VDEQ approve closure action for the Air Curtain Destructor on 12 Aug 2005. The Open Burn Pit is still active. Not eligible for ER,A funding
RAAP-031	AREA A NITROCELLULOSE RAINWTR DITCH	200909	In 2009 a final draft RFI report was submitted which recommended NFA and was approved October 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 October 3, 1995 and USEPA approval of Work Plan Addendum 16 on September 8, 2003; SWMU 76: VDEQ letter of August 28, 1992 and USEPA approval of Work Plan Addendum 16 on September 8, 2003. In accordance with the RCRA CORA Permit, a decision document for no further action was submitted in August 2007 for SWMUs 75 & 76 and was approved by USEPA September 21, 2007 and VDEQ October 1, 2007.
RAAP-033	CHROMIC ACID TREATMENT TANKS (S68)	200710	A final Site Screening Process (SSP)report was submitted in May 2007 that contained a recommendation for no further action, which was subsequently approved by USEPA June 7, 2007 and VDEQ April 13, 2007. A subsequent NFA Decision Document was approved by USEPA September 21, 2007 and VDEQ October 1, 2007
RAAP-035	SEWAGE LINES	200205	Sewer system work plan, electronic data disk, line inspection and manhole reports

Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
			35 video tapes, etc. were submitted to USEPA and VDEQ on 23 Jan 2003. Not eligible for ER,A funding
RAAP-036	BIOPLANT BASIN (S10)	199812	Clean-closed for soils and groundwater is monitored according to post-closure permit for HWMUs 5, 7, 10, and 16. Not eligible for ER,A funding
RAAP-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 August 16, 2007, the VDEQ concurred that clean closure for groundwater had been achieved and advised RAAP to discontinue remaining post closure activities.
RAAP-045	FORMERCADMIUM PLATING FACILTY(BLDG 4343)	200709	Final RFI/CMS was submitted in FY04 and was approved by USEPA on August 16, 2004 and by VDEQ (draft) on August 28, 2003. In FY06, the interim measures work plan was prepared in accordance with the RFI/CMS and was approved by the USEPA Sep 20, 2006 and VDEQ Sep 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 October 23, 2009.
RFAAP-046	MMA GROUNDWATER STUDY	200703	Cleanup strategy changed from site-wide to site-specific.

IRP Schedule

Date of IRP Inception: 198409

Past Phase Completion Milestones

1985

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

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

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

RFA (RFAAP-046 - MMA GROUNDWATER STUDY)

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

1993

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

1996	
RFA	(RAAP-045 - FORMERCADMIUM PLATING FACILTY(BLDG 4343))
1997	
PA	(RAAP-044 - NEW RIVER UNIT)
1998	
SI	(RAAP-044 - NEW RIVER UNIT)
1999	
RFI/CMS	(RAAP-036 - BIOPLANT 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 FACILTY(BLDG 4343))
2005	
DES	(RAAP-045 - FORMERCADMIUM PLATING FACILTY(BLDG 4343))
RFI/CMS	(RAAP-027 - RUBBLE PILE(S58))
2006	
RFI/CMS	(RAAP-016 - WASTEWATER PONDS FROM PROP INCINER(S39))
2007	
RFA	(RAAP-047 - TCE Plume at BLDGS 1549,1041&1034)
RFI/CMS	(RFAAP-046 - MMA GROUNDWATER STUDY)
CMI(C)	(RAAP-045 - FORMERCADMIUM PLATING FACILTY(BLDG 4343))
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)

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
RAAP-010	CASO4 TRMT/DISP (8,9,35,36,37,38,Q)	RAAP-10 (SWMU's 35,37,38,AOC Q)CaSO	20111130

Final RA(C) Completion Date: 201212

Schedule for Next Five-Year Review: N/A

Estimated Completion Date of IRP at Installation (including LTM phase): 203512

RADFORD ARMY AMMUNITION PLANT IRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
PBC @ Radford	PBC site	DES						
		CMI(C)						
		CMI(O)						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-005	WASTE PROPELLANT BURNING GROUND (S13)	RFI/CMS						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-009	LANDFILL NITRO AREA (S40)	DES						
		CMI(C)						
		LTM						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-010	CASO4 TRMT/DISP (8,9,35,36,37,38,Q)	RFI/CMS						
		LTM						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-011	RED WATER ASH BURIAL GROUND (S41)	RFI/CMS						
		LTM						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-013	RED WATER ASH BURIAL #2 (S49)	RFI/CMS						
		LTM						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-014	PROPELLANT BURNING ASH DISPOSAL (S54)	DES						
		CMI(C)						
		LTM						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-018	OILY WATER BURIAL AREA (S48)	RFI/CMS						
		LTM						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-022	POND BY BLDGS 4931 & 4928 (S57)	DES						
		CMI(C)						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-023	SANITARY LANDFILL NO.2 (S43)	RFI/CMS						
		LTM						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-037	BATTERY STORAGE AREA (P)	RFI/CMS						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-039	HAZARDOUS WASTE LANDFILL (HWMU16)	LTM						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-042	SURFACE IMPOUNDMENT #5 (HWMU #5)	LTM						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-043	SURFACE IMPOUNDMENT #7 (HWMU #7)	LTM						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RAAP-044	NEW RIVER UNIT	RD						
		RA(C)						

RADFORD ARMY AMMUNITION PLANT

Army Defense Environmental Restoration Program
Military Munitions Response Program

MMRP Summary

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

Installation Site Types with Future and/or Underway Phases

1 Small Arms Range

(RFAAP-001-R-01)

Most Widespread Contaminants of Concern

Munitions constituents (MC)

Media of Concern

Soil

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

Site ID	Site Name	Action	Remedy	FY	Cost
N/A					

Duration of MMRP

Date of MMRP Inception: 200202

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201103/201103

Date of MMRP completion including Long Term Management (LTM): 202006

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 Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). One site was identified as eligible for the Military Munitions Response Program (MMRP). In October 2006 an SI was initiated.

Cleanup Exit Strategy

The SSP report is being completed in 2009. The installation will address potential munitions constituents (MC) issues at the site.

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

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	201101
DES	200909	201101
CMI(C)	200909	201103
LTM	201106	202006

RIP Date: N/A

RC Date: 201103

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 contains options for future effort as needed.

CLEANUP/EXIT STRATEGY

The cleanup/exit strategy includes the completion of the RFI/CMS, which was awarded in 2009. The RA phase includes soil excavation and off-site transport, along with MNA. LTM is anticipated.

Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation

There are no NFA sites

MMRP Schedule

Date of MMRP Inception: 200202

Past Phase Completion Milestones

2003
RFA (RFAAP-001-R-01 - ARMY RESERVE SMALL ARMS RANGE)
2009
CS (RFAAP-001-R-01 - ARMY RESERVE SMALL ARMS RANGE)

Projected Phase Completion Milestones

See attached schedule

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

To Be Determined

Final RA(C) Completion Date: 201103

Schedule for Next Five-Year Review: N/A

Estimated Completion Date of MMRP at Installation (including LTM phase): 202006

RADFORD ARMY AMMUNITION PLANT MMRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
RFAAP-001-R-01	ARMY RESERVE SMALL ARMS RANGE	RFI/CMS						
		DES						
		CMI(C)						
		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: 2/0

Installation Site Types with Future and/or Underway Phases

1 Incinerator
(CC 002)

1 Waste Lines
(CC 001)

Most Widespread Contaminants of Concern

Dioxins/Dibenzofurans, Metals, Polychlorinated Biphenyls (PCB)

Media of Concern

Soil

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

Site ID	Site Name	Action	Remedy	FY	Cost
N/A					

Duration of CR

Date of CR Inception: 198601

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

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

CR Contamination Assessment

Contamination Assessment Overview

The October 2000 CORA is the USEPA Region III enforceable document to manage the RAAP IRP and specific 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 COCs 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.

Environmental restoration activities include the IRP and MMRP. On Dec. 29, 2008, the Office of the Deputy Under Secretary of Defense for Installations and Environment, ODUSD (I&E), issued an interim policy for DERP eligibility that rescinded the 1986 eligibility date for the IRP and the 2002 eligibility date for the MMRP. This made many sites previously addressed in the Army's CC program eligible for the Defense Environmental Restoration Program (DERP). Sites that are now eligible for the munitions response (MR) program have been migrated from Army Environmental Database - Compliance-related Cleanup (AEDB-CC) and given the naming convention of other MR sites. The newly eligible non-MR type sites are considered to be IR sites; however, the newly eligible sites are being coded as compliance restoration (CR) in AEDB-R to distinguish them from the original IR sites and IR metrics.

Cleanup Exit Strategy

For both CR sites, NFA with IC is proposed. If negotiations fail, then a RFI/CMS effort is planned.

CR Previous Studies

Title	Author	Date
There are no Previous Studies		

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, Polychlorinated Biphenyls (PCB)

Media of Concern: Soil

Phases	Start	End
RFA	198601	198712
RFI/CMS	201107	201212

RIP Date: N/A

RC Date: 201212

SITE DESCRIPTION

Sewage sludge application (SSA) 72 was identified during the 1987 USEPA RFA and was subsequently put into the 2000 RCRA CORA. It is a sump in the Oleum Plant Area that received acidic wastewater. An SSP effort was conducted in accordance with (IAW) the CORA. A draft report was submitted in March 2010 that recommended NFA with ICs.

CLEANUP/EXIT STRATEGY

NFA with IC is proposed. If negotiations fail then a RFI/CMS effort is planned.

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	201107	201212

RIP Date: N/A

RC Date: 201212

SITE DESCRIPTION

SSA 77 was identified during the 1987 USEPA RFA and was subsequently put into the 2000 RCRA CORA. It is an old garbage incinerator that operated from the 1940s until 1974. An SSP effort was conducted IAW the CORA. A draft report was submitted in March 2010 that recommended NFA with ICs.

CLEANUP/EXIT STRATEGY

NFA with IC is proposed. If negotiations fail then a RFI/CMS effort is planned.

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))

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:

Schedule for Next Five-Year Review: N/A

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

RADFORD ARMY AMMUNITION PLANT CR Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
CC 001	Oleum Plant Acidic Wastewater Sump	RFI/CMS						
SITE ID	SITE NAME	PHASE	FY11	FY12	FY13	FY14	FY15	FY16+
CC 002	Garbage Incinerator (Bldg 7219)	RFI/CMS						

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 Pop. 83,959), Pulaski (2004 Pop. 35,152), Floyd (2004 Pop. 14,464), and Giles (2004 Pop. 16,989) and the city of Radford (Pop. 15,940).

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

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

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

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

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

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

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