FY2008

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 multi-year 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, with the costs and schedules required to conduct investigations and take the necessary remedial actions (RAs).

In an effort to coordinate planning information between the restoration manager, the US Army Environmental Command (USAEC), the Radford Army Ammunition Plant (RAAP), executing agencies, and regulatory agencies, an IAP was completed. The IAP is used to track requirements, schedules and tentative budgets for all 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
AST	Aboveground Storage Tank
BDDT	Building Debris Disposal Trench
BLA	Bag Loading Area
COC	Contaminants of Concern
CORA	Corrective Action Permit
cy	cubic yard
DD	Decision Document
ER,A	Environmental Restoration, Army
FLFA	Former Lead Furnace Area
FRA	Final Remedial Action
FY	Fiscal Year
HBN	Health-Based Numbers
HHRA	Human Health Risk Assessment
HRR	Historical Records Review
HWMU	Hazardous Waste Management Unit
IAA	Igniter Assembly Area
IAP	Installation Action Plan
ID	Identification
IDM	Investigative Derived Material
IRA	Interim Remedial Action
IRP	Installation Restoration Program
K	thousand
LTM	Long-Term Management
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
NRU	New River Unit
NRV	New River Valley
PBC	Performance-Based Contract
PCE	Tetrachloroethylene
RA	Remedial Action
RAAP	Radford Army Ammunition Plant
RAB	Restoration Advisory Board
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation

Acronyms

RIP	Remedy-in-Place
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
RY	Rail yard
SLERA	Screening Level Ecological Risk Assessment
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
TPH	Total Petroleum Hydrocarbons
TRC	Technical Review Committee
USACE	US Army Corps of Engineers
USACHPPM	US Army Center for Health Promotion and Preventive Medicine
USAEC	US Army Environmental Command
USATHAMA	US Army Toxic and Hazardous Materials Agency
USEPA	US Environmental Protection Agency
VDEQ	Virginia Department of Environmental Quality
VI	Verification Investigation
VOC	Volatile Organic Compound
WBG	Western Burning Ground

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*
PBC @ Radford	PBC site
RAAP-001	SWMU 51
RAAP-002	SWMU 71
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-016	SWMU 39
RAAP-018	SWMU 48
RAAP-022	SWMU 57
RAAP-023	SWMU 43
RAAP-024	SWMU 45
RAAP-025	SWMU 50
RAAP-026	SWMU 31
RAAP-028	SWMU 59
RAAP-031	AOC A
RAAP-037	AOC P
RAAP-038	AOC O
RAAP-039	HWMU 16
RAAP-040	FLFA
RAAP-042	HWMU #5
RAAP-043	HWMU #7
RAAP-044	NRU
RAAP-047	RAAP-047
RFAAP-001-R-01	

Installation Information

Installation Locale

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

RAAP is located in the western part of Virginia, approximately 40 miles west of Roanoke. It consists of two locations in mountainous terrain: the New River Unit (NRU), located approximately six miles from the main manufacturing area (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, 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 USACE, Baltimore District

Remedial Design/Action Phase Executing Agency: The USACE, Baltimore Districts as well as some IRAs conducted through RAAP

Regulator Participation

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

National Priorities List (NPL) Status

No NPL Sites have been identified

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, Semi-volatiles, Volatiles

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

MMRP

Primary Contaminants of Concern: Munitions constituents

Affected Media of Concern: Soil

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 five miles northeast of the city of Radford, Virginia which is approximately ten 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.

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. RAAP lies along the New River in the relatively narrow northeastern corner of the valley. The New River divides RAAP into two areas. The Horseshoe Area (which is part of the MMA) lies within a meander of the New River.

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

Installation Program Cleanup Progress

IRP

Prior Year Progress: Work Plan 17 (SWMUs 48, 49, 50, 59, 41, 43, AOCs O, P, and FLFA), Work Plan 20 (SWMUs 35, 37, 38, and AOC Q) and Work Plan 21 (SWMU 57) were approved by the EPA and the VDEQ. RFIs were completed and associated reports were started.
The Bldg 4343 Closeout Report was approved by the EPA and the VDEQ.
Work Plan 22, the SSP for SWMUs 45 and 23 was submitted as were the RFI for SWMU 13 & RFI/CMS reports for SWMUs 51, 54 and AOC FLFA.

A PBC was awarded for the NRU.

Future Plan of Action: The RFI/CMS for SWMUs 13, 51, 54, 40/71, 45, 31, 41, 48, 49, 50, 59, 43, 35, 37, 38, AOCs O, P, FLFA, A, Q, NRU, and RAAP-047 will be completed, as will the cleanup at SWMUs 39, 41, 48, 49, 51, 54 and AOC FLFA.

An Alternate Source Demonstration (ASD) will be achieved at HWMU 5.

MMRP

Prior Year Progress: A Site Investigation (SI) is underway.

Future Plan of Action: The SI will be completed in FY09.

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IRP Summary

Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/RC Sites: 47/21

Installation Site Types with Future and/or Underway Phases

2 Burn Area
(RAAP-002, RAAP-005)

1 Chemical Disposal
(RAAP-039)

1 Contaminated Ground Water
(RAAP-047)

1 Contaminated Soil Piles
(RAAP-040)

1 Drainage Ditch
(RAAP-031)

12 Landfill
(PBC @ Radford, RAAP-001, RAAP-009, RAAP-011, RAAP-013, RAAP-014, RAAP-016, RAAP-018, RAAP-023, RAAP-024, RAAP-025, RAAP-028)

1 Spill Site Area
(RAAP-038)

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

5 Surface Impoundment/Lagoon
(RAAP-010, RAAP-022, RAAP-026, RAAP-042, RAAP-043)

Most Widespread Contaminants of Concern

Explosives, Metals, Perchlorate, Pesticides, Polychlorinated Biphenyls, Semi-volatiles, Volatiles

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

Duration of IRP

Date of IRP Inception: 198409

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201208/201208

Date of IRP completion including Long Term Management (LTM): 203909

IRP Contamination Assessment

Contamination Assessment Overview

The initial requirements for the corrective action process were specified in a Resource Conservation and Recovery Act (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 (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 has been impacted. 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

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: no further action (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
	Final SWMU 6 Decision Document	Radford Army Ammunition	OCT-2002

IRP Previous Studies

	Title	Author	Date
2002			
		Plant	
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, 37, 38, 46, 57, 68, 69 and Areas of Concern A, F, Q	URS	MAY-2007

IRP Previous Studies

	Title	Author	Date
2007			
	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

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

Phases	Start	End
RFA	199909	200101
DES	200609	200909
CMI(C)	200609	200910
LTM	200910	201909

RIP Date: N/A

RC Date: 200910

SITE DESCRIPTION

This site tracks the costs from two 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, 018, and 038.

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

CLEANUP/EXIT STRATEGY

Please refer to the individual cleanup strategies for each site.

Site ID: RAAP-001
Site Name: TNT WASTE ACID NEUTRALIZATION PITS(S51)
Alias: SWMU 51

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Explosives, Metals, Semi-volatiles, Volatiles

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	200207	200801
DES	200709	200802
CMI(C)	200709	200909

RIP Date: N/A

RC Date: 200909

SITE DESCRIPTION

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

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

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

Groundwater and soil samples were collected and analyzed for semi-volatilve organic compounds (SVOCs), volatile organic compounds (VOCs) and explosives to support a quantitative human health risk assessment. Due to the nature of the karst geology, source removal is recommended. LTM will be performed for five years. SWMUs 28 and 52 are in the same vicinity. During the May 2006 IAP workshop, Department of the Army representatives understood that this site would not be RIP/RC by FY07. In September 2006, a PBC was awarded with a RIP of September 2009.

CLEANUP/EXIT STRATEGY

An RFI/CMS effort is to be produced and will address site-specific groundwater. Source removal (clean closure) is anticipated. The site is included in the PBC that was awarded in 2006.

Site ID: RAAP-002
Site Name: FLASH BURN PARTS AREA(S71)
Alias: SWMU 71

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Metals, Semi-volatiles

Media of Concern: Soil

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	200507	200908

RIP Date: N/A

RC Date: 200908

SITE DESCRIPTION

SWMU 71 consists of an open, hard-packed gravel area approximately 25 feet wide by 50 feet long. From 1962 to 1982 the SWMU was used to flash-burn metal process pipes contaminated with propellant. The pipes were then reused or sold for scrap.

A 1992 RCRA verification investigation (VI) by Dames & Moore detected metals and total petroleum hydrocarbons (TPH) from soil samples which led to a 1994 Supplementary VI, also by Dames & Moore. A 1993 dye-trace study by Engineering-Science indicated a nearby karst conduit to the New River; however, this site is not believed to affect groundwater.

This site and SWMU 40 (RAAP-009) are combined for the initial RFI. Based on the 2000 RCRA CORA permit, additional soil investigations are required. Soil samples were collected in FY03 to confirm previous investigative results and to provide additional data to support a quantitative HHRA and SLERA. In FY04 the RFI was submitted to the VDEQ and the USEPA for review. In FY05 there were several comment review cycles and stakeholders agreed that additional sampling was needed to address soil and groundwater data gaps. In FY06 additional sampling was procured and in 2008 a new RFI report was submitted.

CLEANUP/EXIT STRATEGY

RAAP is in the process of implementing this additional effort. The RFI/CMS report is to be revised to address site-specific groundwater as part of the site conceptual model.

NFA is anticipated beyond the RFI/CMS.

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, Volatiles

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	200505	200810
DES	200910	201009
CMI(C)	201010	201208

RIP Date: N/A

RC Date: 201208

SITE DESCRIPTION

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

A 1992 RFI by Dames & Moore evaluated groundwater quality and potential soil contamination for explosives, VOCs, SVOCs and heavy metals.

The concentrations of COCs exceeded HBNs in the 1989 CORA and could indicate risk under an industrial worker scenario.

In FY04 a site-screening sampling was performed. The site-screening effort identified off-site migration associated with activities before 1986. A final Site-Screening Process (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 anticipation of those approvals, in FY05 a RFI/CMS was procured. Also, a permit was issued in FY05 by the VDEQ governing burning operations at the open burning ground. A groundwater and soil monitoring program is part of the permit.

CLEANUP/EXIT STRATEGY

The RFI/CMS and soil cleanup will address the area outside of the permitted unit from the fence to the river (about 30 to 50 feet). The soil cleanup is likely to be a hot spot removal with off-site disposal.

The RFI/CMS report will be submitted in FY08.

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	200810
LTM	200811	203810

RIP Date: N/A

RC Date: 200810

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 the unit was covered with soil and grass.

A 1992 RCRA 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 HHRA and SLERA. A portion (20 cubic yards (cy)) of the investigative derived material (IDM) was determined to be hazardous waste (lead) and was stabilized and disposed of in a permitted treatment storage and disposal facility.

In FY04 the RFI was submitted to the VDEQ and the USEPA for review. In FY05 there were several comment review cycles. Stakeholders agreed that additional sampling was needed to address soil and groundwater data gaps and in FY06 additional sampling was procured. In 2008 a new RFI/CMS report was submitted.

CLEANUP/EXIT STRATEGY

Cap repair, institutional controls and LTM are anticipated.

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, Volatiles

Media of Concern: Other (Sludge), Soil

Phases	Start	End
RFA	198409	198410
CS	198410	198412
RFI/CMS	199201	200903
DES	200904	200909
CMI(C)	200910	201109

RIP Date: N/A

RC Date: 201109

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 the closure documentation was submitted to the USEPA Region III and the VDEQ demonstrating NFA is required. 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 encompassed both SWMUs 8 and 36 contained a recommendation for NFA and was approved by the USEPA and 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 the 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 160 feet by 80 feet with approximately eight feet of sediment remaining in the basin. The SWMU 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 a 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 is an unlined drying bed approximately 100 feet long, 80 feet wide, and eight feet deep located in the northwest section of the MMA. The SWMU 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 is an unlined drying bed approximately 225 feet long, 40 feet wide, and eight feet deep located in the northwest section of the MMA. The drying bed received calcium sulfate sludge and, when it reached capacity, 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 exceedences 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 of an acre and is immediately northwest and adjacent to SWMU 38. It was reportedly used as a sludge drying bed when SWMU 38 reached capacity.

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

In FY04 a site-screening report was submitted for multiple sites including SWMUs 35, 37, 38 and AOC Q. In FY05 there were several comment review cycles. 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 by the VDEQ on April 13, 2007 on an earlier draft.

CLEANUP/EXIT STRATEGY

Based on the SSP report, SWMU 35, 37, 38 and Area Q will go to RFI. These sites contain identical wastes and are close to one another. Source removal is anticipated.

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

Media of Concern: Groundwater, Soil, Surface Water

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	200207	200812
DES	200609	200903
CMI(C)	200609	200904
LTM	200905	203904

RIP Date: N/A

RC Date: 200904

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 feet by 70 feet, which was backfilled. The southern area consisted of a clay-lined disposal area approximately 100 feet by 150 feet. Prior to construction of the red water treatment plant, red water was concentrated by evaporation and burned in four rotary kilns located in the TNT manufacturing area. From 1967 to 1971 the ash produced from these kilns was disposed of in SWMU 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 soil and SVOCs and metals in groundwater above 1989 RCRA CORA permit HBNs. The soil samples for the SSP, a quantitative HHRA, and a SLERA were collected in FY04.

In September 2006, a PBC was awarded with a RIP of September 2009.

CLEANUP/EXIT STRATEGY

An RFI/CMS effort is underway to address site-specific groundwater, and repairs to the existing cap are anticipated for the southern area. A request for NFA is anticipated for the northern area. 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, Volatiles

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	199712	200807
DES	200807	200809
CMI(C)	200809	200909
LTM	200910	203909

RIP Date: N/A

RC Date: 200909

SITE DESCRIPTION

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

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.

NFAis anticipated for soil at RAAP-013 (SWMU 49). 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

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

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	199601	200809
DES	200809	200811
IRA	199808	200001
CMI(C)	200901	201006
LTM	201007	201506

RIP Date: N/A

RC Date: 201006

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 to 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.

CLEANUP/EXIT STRATEGY

The SWMU 54 RFI/CMS report is in process. Final source identification and removal are anticipated.

Site ID: RAAP-016
Site Name: WASTEWATER PONDS FROM PROP INCINER(S39)
Alias: SWMU 39

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	199802	200512
DES	200802	200805
CMI(C)	200805	200909

RIP Date: N/A

RC Date: 200909

SITE DESCRIPTION

SWMU 39 consists of two unlined earthen ponds totaling approximately two acres, located in the north-central section of the horseshoe area, adjacent to and associated with SWMU 14 (hazardous waste incinerator). The settling ponds were excavated approximately six to eight feet into the natural grade. These ponds received overflow from the former incinerator spray pond. Caustic was reportedly added to neutralize the water. Sludges are believed to remain in the former ponds.

A 1992 RCRA VI and a 1994 Supplemental VI, both by Dames & Moore, installed and sampled three monitoring wells near the ponds. Metals exceeding 1989 RCRA CORA permit HBNs were detected in the soil and groundwater.

In 1999 a draft RFI was submitted by ICF Kaiser and in FY04 the RFI/CMS was submitted. This latter document was subsequently reviewed, revised and approved by the USEPA on June 6, 2005 and by the VDEQ on December 9, 2004. On August 17, 2005 an internal Army decision document (DD) was prepared and submitted by RAAP. In September 2006, a PBC was awarded with RC of September 2009 at SWMU 39.

CLEANUP/EXIT STRATEGY

Effort will be directed to implement the remedy in the approved RFI/CMS. Contaminated soil removal is expected.

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

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	200808
DES	200807	200809
CMI(C)	200809	200909
LTM	200910	203909

RIP Date: N/A

RC Date: 200909

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 off-plant used oil recycling.

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.

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.

Land use control is anticipated for soil at RAAP-018 (SWMU 48). MNA/LTM is anticipated for groundwater at and in the vicinity of RAAP-013 (SWMU 49) and RAAP-018 (SWMU 48).

The 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	200901

RIP Date: N/A

RC Date: 200901

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 feet 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 COCs 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.

CLEANUP/EXIT STRATEGY

Based on the SSP report, this site will go to RFI. The RFI effort will follow and build upon the SSP. NFA is anticipated. Closeout documentation is to be prepared in accordance with the CORA permit.

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	200909
LTM	200910	203909

RIP Date: N/A

RC Date: 200909

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 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 a RFI/CMS by September 2009.

CLEANUP/EXIT STRATEGY

RFI/CMS will be completed, followed by LTM.

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

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

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Semi-volatiles

Media of Concern: Groundwater

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	200503	200909

RIP Date: N/A

RC Date: 200909

SITE DESCRIPTION

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

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

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

CLEANUP/EXIT STRATEGY

An SSP will be conducted in accordance with the RCRA CORA 2000 Permit. NFA is anticipated based on results of the initial SSP. If the initial SSP results are not confirmed, an RFI will be required. Closeout documentation will be prepared in accordance with CORA.

Site ID: RAAP-025
Site Name: CASO4 TREATMENT/DISPOSAL AREA (S50)
Alias: SWMU 50

STATUS

Regulatory Driver: RCRA

RRSE: LOW

Contaminants of Concern: Explosives, Metals, Semi-volatiles, Volatiles

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	199201	200903
DES	200609	200906
CMI(C)	200609	200909

RIP Date: N/A

RC Date: 200909

SITE DESCRIPTION

SWMU 50, an open area south of SWMU 48, is approximately 300 feet long by 300 feet wide and is located within the horseshoe area. Until 1982, SWMU 50 was one of the major disposal areas at RAAP for sludge removed from the calcium sulfate drying beds (SWMUs 35, 36, 37, 38, and Area Q).

A 1992 RCRA VI by Dames & Moore collected two subsurface soil samples. 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.

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 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.

NFA is anticipated for soil and groundwater from RAAP-025 (SWMU 50). Separate closeout documentation is to be submitted.

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

Site ID: RAAP-026
Site Name: COAL ASH SETTLING LAGOONS (S31)
Alias: SWMU 31

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Metals, Semi-volatiles

Media of Concern: Soil, Surface Water

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	199601	200902
DES	200802	200905
CMI(C)	200802	201003
LTM	201004	203003

RIP Date: N/A

RC Date: 201003

SITE DESCRIPTION

SWMU 31 consists of three unlined settling lagoons totaling approximately 2.5 acres, located in the northwest section of the Horseshoe Area. The site received fly ash wastewater flow from Power House No. 2 when it was operating and filter backwash from the active potable water plant.

A 1992 RCRA VI by Dames & Moore and a 1996 RFI by Parsons Engineering-Science collected sludge, groundwater, and subsurface soil samples to determine the migration of metals from the lagoons. In 1999 a draft RFI was submitted by ICF Kaiser and in FY01 a contract for additional RFI effort was procured. In the summer of 2002 the RFI fieldwork was completed. The draft RFI report needs to be revised based on the March 29-30, 2006 meeting of the stakeholders. The revised RFI report was submitted in January 2007 and went through several review and comment cycles. In July 2007 a final report was submitted that recommended a CMS and was approved by the EPA on September 20, 2007 and by the VDEQ on September 26, 2007. In February 2008, a PBC was awarded to achieve RC by March 2010.

CLEANUP/EXIT STRATEGY

NFA is anticipated. Closeout documentation will need to be prepared in accordance with the RCRA CORA.

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

Site ID: RAAP-028
Site Name: BOTTOM ASH PILE(S59)
Alias: SWMU 59

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	199102	200903
DES	200609	200906
CMI(C)	200609	200909

RIP Date: N/A

RC Date: 200909

SITE DESCRIPTION

SWMU 59, the Bottom Ash Pile, is located near SWMUs 48 and 50 in the horseshoe area of RAAP, approximately 3,400 feet east of the main bridge over the New River. Although there are currently no bottom ash accumulation piles, bottom ash has been spread within the immediate SWMU vicinity.

A 1992 RCRA VI by Dames & Moore collected soil samples. The soil data indicates metals in excess of 1989 RCRA CORA permit HBNs. Groundwater data indicates VOCs in excess of 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 close to each other.

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 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.

NFA is anticipated for soil and groundwater from RAAP-028 (SWMU 59); separate closeout documentation is to be submitted.

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

Site ID: RAAP-031
Site Name: AREA A NITROCELLULOSE RAINWTR DITCH
Alias: AOC A

STATUS

Regulatory Driver: RCRA

RRSE: LOW

Contaminants of Concern: Metals

Media of Concern: Soil

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	199201	200811
DES	200802	200902
CMI(C)	200802	201003
LTM	201004	203003

RIP Date: N/A

RC Date: 201003

SITE DESCRIPTION

AOC A is located in the eastern portion of the MMA, near Building 1558. It was identified during the April 1987 Visual Site Inspection as a one-foot-deep soil depression that received runoff from the A-Line (Visual Inspection Field Notes 1987).

In FY04 an SSP was performed and a report was submitted. In FY05 several comment review cycles followed. In May 2007 a final SSP report was submitted that contained a recommendation for further investigation. It was subsequently approved by the USEPA on June 7, 2007 and the VDEQ on April 13, 2007 on an earlier draft. In February 2008 a PBC was awarded to achieve RC by March 2010.

CLEANUP/EXIT STRATEGY

Based on the SSP report, Area A will go to RFI.

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

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	200909
DES	200910	201009
CMI(C)	201010	201204

RIP Date: N/A

RC Date: 201204

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. This area is approximately 50 feet by 200 feet long and is located within the former scrap metal salvage yard, 600 feet 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.

CLEANUP/EXIT STRATEGY

Excavation, transportation and disposal of impacted soil are anticipated based on the 1992 RCRA VI.

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

Site ID: RAAP-038
Site Name: UNDERGROUND FUEL OIL SPILL (O)
Alias: AOC O

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Semi-volatiles, Volatiles

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	198409	198410
CS	198410	198410
RFI/CMS	200310	200807
DES	200807	200809
CMI(C)	200809	200909
LTM	200910	203909

RIP Date: N/A

RC Date: 200909

SITE DESCRIPTION

Area O consists of one inactive 269,000-gallon fuel oil aboveground storage tank (AST) situated on a concrete base and surrounded by a concrete secondary containment system. The underground fuel oil spill was located in the east section of the MMA.

An oil audit conducted by the USACE in 1982 placed fuel leakage of an underground pipeline at approximately 3,000 gallons. In 1983, four monitoring wells were installed to characterize groundwater flow and quality at the site.

The 1992 RFI and a 1994 Phase II RFI, both by Dames & Moore, collected groundwater samples at previously sampled wells. VOCs and SVOCs exceeded 1989 RCRA CORA permit HBNs.

In September 2006 a PBC was awarded with a RIP of September 2009.

CLEANUP/EXIT STRATEGY

An RFI/CMS effort is underway to address site-specific groundwater and MNA/LTM is anticipated for this site.

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

Media of Concern: Groundwater

Phases	Start	End
RFA	198410	198412
CS	198410	198412
RFI/CMS	200010	200210
LTM	200210	203809

RIP Date: N/A

RC Date: 200210

SITE DESCRIPTION

Hazardous waste management unit (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 1980's which was used for lab chemicals, burning ground and incinerator residue.

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

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

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

CLEANUP/EXIT STRATEGY

LTM is planned for 30 years at this site. Wells will be sampled as required in the 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-040
Site Name: FORMER LEAD FURNACE AREA
Alias: FLFA

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	199803	200804
DES	200803	200804
CMI(C)	200804	200909

RIP Date: N/A

RC Date: 200909

SITE DESCRIPTION

The Former Lead Furnace Area (FLFA), which is located in the south-central portion of the MMA adjacent to SWMU 17A (Stage and Burn Area), was operational during World War II. Typically, lead recovered during routine operations would be melted in the furnace and cast into ingots for salvage. The precise time period during which the lead furnace was in operation is not known. Apparently, the SWMU location has been used for various activities and is listed in the RCRA Permit as a used oil and transfer location.

The FLFA was added to the VI of 1992 by the USATHAMA after solid lead slag was discovered in the soil during the removal of used oil tanks in SWMU 76. The VI included the sampling and analysis of subsurface soil in the vicinity of the FLFA, located within SWMU 17A. A RFI was conducted to verify VI results; it included the sampling and removal of lead hot spots and the collection and analysis of subsurface soil samples. In FY02 RFI sampling was completed.

In September 2006, a PBC was awarded with RC of September 2009 for soil. In addition, the PBC is to produce a RFI/CMS to address site-specific groundwater by September 2009.

CLEANUP/EXIT STRATEGY

Soil removal is expected. An RFI/CMS will be completed for groundwater.

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

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	203809

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 (GPS). 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 is to facilitate elimination of LTM. In October 2002 a post-closure care permit requiring LTM was issued by the VDEQ.

In 2007 RFAAP 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 a HWMU 5 ASD by March 2009.

CLEANUP/EXIT STRATEGY

LTM is planned for 30 years at this site or until clean closure has been demonstrated through the post closure care permit process. Wells will be sampled as required in the permit. The revised ASD is to be submitted per the PBC. Subsequent to the approval of the ASD, an amended closure plan and closure report will need to be submitted to reduce LTM along with a permit modification request.

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	203209

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 to facilitate elimination of LTM. In October 2002 a post-closure care permit requiring LTM was issued by the VDEQ.

The following RFAAP document submissions are provided as LTM reduction status:
- January 9, 2007: ASD,
- February 9, 2007: amended closure plan,
- May 29, 2007: Class 1 minor modification request,
- August 9, 2007: Class 3 permit modification request.

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

CLEANUP/EXIT STRATEGY

LTM is planned for 30 years at this site or until clean closure has been demonstrated through the post closure 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

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

Phases	Start	End
PA	199705	199708
SI	199712	199806
RI/FS	199806	200909
RD	200802	201005
RA(C)	200802	201008
LTM	201010	203009

RIP Date: N/A

RC Date: 201008

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.

A Remedial Investigation 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), northern burning grounds (NBG), western burning grounds (WBG), 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 February 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.

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, IAA, NBG, WBG, and BDDT.

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

Site ID: RAAP-047
Site Name: TCE Plume at BLDGS 1549,1041&1034
Alias: RAAP-047

STATUS

Regulatory Driver: RCRA

RRSE: MEDIUM

Contaminants of Concern: Volatiles

Media of Concern: Groundwater, Soil

Phases	Start	End
RFA	200704	200704
CS	200704	200704
RFI/CMS	200802	200903
LTM	200904	202903

RIP Date: N/A

RC Date: 200903

SITE DESCRIPTION

The April 2007 HWMU 5 (RAAP-041) TCE ASD was used by RAAD to identify Buildings 1549, 1041, and 1034 in the vicinity of HWMU-5 as sources of TCE detected in the groundwater. Between 1960 and 1970 chlorinated solvents were used at these buildings.

Building 1549 is an area maintenance shop located approximately 300 feet southeast of HWMU-5 and was constructed on a filled sinkhole. Products used to clean equipment included Varsol and WD-40. Disposal of the used solvents consisted of pouring the solvents down the nearest floor drain.

Building 1041 was used as the Degreasing Shop. This building is located approximately 980 feet southeast of HWMU-5. It contained a dip tank which has been removed.

Building 1034 housed a facility nitrocellulose laboratory and currently houses the electric and refrigeration shop. This building is located approximately 950 feet southeast of HWMU-5. DuPont Cleaning Solvent #49, which contains PCE, is one of the solvents commonly used in electric motor cleaning and it was used at Building 1034. TCE is a daughter product of the degradation of PCE. There is no available documentation of lab waste disposal practices. Surface drainage and geologic features generally would direct surface water and groundwater along with any contaminates from these buildings into the groundwater monitoring network of HWMU 5 where TCE has been detected above the maximum contaminant level (MCL).

In February 2008, a PBC was awarded to achieve an approved RFI/CMS report by March 2009.

CLEANUP/EXIT STRATEGY

An RFI/CMS effort is scheduled to be completed; it will address site-specific groundwater. MNA/LTM is anticipated for this site.

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

Response Complete (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
RAAP-003	POND BY CR ACID TREATMENT TANKS(S69)	200710	
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 Site Screening Process (SSP)report was submitted in May 2007 that contained a recommendation for no further action that was subsequently approved by EPA June 7, 2007 and VDEQ April 13, 2007 on an earlier draft. IAW the RCRA CORA Permit a decision document for no further action was submitted in August 2007 and was approved by EPA 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 EPA 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-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	
RAAP-027	RUBBLE PILE(S58)	200412	VDEQ approved the RFI Report on August 5, 2003 and EPA approved it on May 24, 2004. A Decision Document was submitted to EPA and VDEQ on September 10, 2004. EPA approved DD on 16 December 2004.
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-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 EPA approval of Work Plan Addendum 16 on September 8, 2003; SWMU 76: VDEQ letter of August 28, 1992 and EPA approval of Work Plan Addendum 16 on September 8, 2003.IAW the RCRA CORA Permit a decision document for no further action was submitted in August 2007 for SWMUs 75 & 76 and was approved by EPA

Response Complete (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
			September 21, 2007 and VDEQ October 1, 2007.
RAAP-033	CHROMIC ACID TREATMENT TANKS (S68)	200710	
RAAP-035	SEWAGE LINES	200205	Sewer system work plan, electronic data disk, line inspection and manhole reports 35 video tapes, etc. were submitted to EPA and VDEQ on 23 Jan 2003. Not eligible for ER,A funding
RAAP-036	BIOPLANT BASIN (S10)	199812	Clean-closed for soils and GW is monitored according to post-closure permit for HWMUs 5, 7, 10, and 16. Not eligible for ER,A funding
RAAP-041	SURFACE IMPOUNDMENT #4 (HWMU #4)	200809	
RAAP-045	FORMERCADMIUM PLATING FACILTY(BLDG 4343)	200709	The Final RFI/CMS was submitted in FY04 and was approved by EPA on August 16, 2004 and by VDEQ (draft) on August 28, 2003 In FY06, the interim measures workplan was prepared IAW the RFI/CMS and was approved by the EPA Sep 20, 2006 and VDEQ Sep 11, 2006. The Final Interim Measures Completion Report was submitted in Apr 2007 and was approved by the EPA 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.
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 - 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))
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))

1987

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

1988

RFA	(RFAAP-046 - MMA GROUNDWATER STUDY)
RFI/CMS	(RAAP-041 - SURFACE IMPOUNDMENT #4 (HWMU #4))
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))

IRP Schedule

1997	
PA	(RAAP-044 - NEW RIVER UNIT)
1998	
SI	(RAAP-044 - NEW RIVER UNIT)
1999	
RFI/CMS	(RAAP-036 - BIOPLANT BASIN (S10))
2000	
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))
IRA	(RAAP-014 - PROPELLANT BURNING ASH DISPOSAL (S54))
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	
RFI/CMS	(RAAP-027 - RUBBLE PILE(S58))
DES	(RAAP-045 - FORMERCADMIUM PLATING FACILTY(BLDG 4343))
2006	
RFI/CMS	(RAAP-016 - WASTEWATER PONDS FROM PROP INCINER(S39))
2007	
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)
CMI(C)	(RAAP-045 - FORMERCADMIUM PLATING FACILTY(BLDG 4343))

Projected Phase Completion Milestones

See attached schedule

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

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

Final RA(C) Completion Date: 201208

NPL Deletion Date: N/A

Schedule for Next Five-Year Review: 2010

Estimated Completion Date of IRP at Installation (including LTM phase): 203909

RADFORD ARMY AMMUNITION PLANT IRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY09	FY10	FY11	FY12	FY13	FY14+
PBC @ Radford	PBC site	RFA						
		DES						
		CMI(C)						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-001	TNT WASTE ACID NEUTRALIZATION PITS(S51)	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-002	FLASH BURN PARTS AREA(S71)	RFA						
		CS						
		RFI/CMS						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-005	WASTE PROPELLANT BURNING GROUND (S13)	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-009	LANDFILL NITRO AREA (S40)	RFA						
		CS						
		RFI/CMS						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-010	CASO4 TRMT/DISP (8,9,35,36,37,38,Q)	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-011	RED WATER ASH BURIAL GROUND(S41)	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
		LTM						

RADFORD ARMY AMMUNITION PLANT IRP Schedule

SITE ID	SITE NAME	PHASE	FY09	FY10	FY11	FY12	FY13	FY14+
RAAP-013	RED WATER ASH BURIAL #2 (S49)	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-014	PROPELLANT BURNING ASH DISPOSAL (S54)	RFA						
		CS						
		RFI/CMS						
		DES						
		IRA						
		CMI(C)						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-016	WASTEWATER PONDS FROM PROP INCINER(S39)	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-018	OILY WATER BURIAL AREA (S48)	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-022	POND BY BLDGS 4931 & 4928 (S57)	RFA						
		CS						
		RFI/CMS						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-023	SANITARY LANDFILL NO.2 (S43)	RFA						
		CS						
		RFI/CMS						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-024	LANDFILL NO.3 (S45)	RFA						
		CS						
		RFI/CMS						

RADFORD ARMY AMMUNITION PLANT IRP Schedule

SITE ID	SITE NAME	PHASE	FY09	FY10	FY11	FY12	FY13	FY14+
RAAP-025	CASO4 TREATMENT/DISPOSAL AREA (S50)	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-026	COAL ASH SETTLING LAGOONS (S31)	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-028	BOTTOM ASH PILE(S59)	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-031	AREA A NITROCELLULOSE RAINWTR DITCH	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-037	BATTERY STORAGE AREA (P)	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-038	UNDERGROUND FUEL OIL SPILL (O)	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
		LTM						

RADFORD ARMY AMMUNITION PLANT IRP Schedule

SITE ID	SITE NAME	PHASE	FY09	FY10	FY11	FY12	FY13	FY14+
RAAP-039	HAZARDOUS WASTE LANDFILL (HWMU16)	RFA						
		CS						
		RFI/CMS						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-040	FORMER LEAD FURNACE AREA	RFA						
		CS						
		RFI/CMS						
		DES						
		CMI(C)						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-042	SURFACE IMPOUNDMENT #5 (HWMU #5)	RFA						
		CS						
		RFI/CMS						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-043	SURFACE IMPOUNDMENT #7 (HWMU #7)	RFA						
		CS						
		RFI/CMS						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-044	NEW RIVER UNIT	PA						
		SI						
		RI/FS						
		RD						
		RA(C)						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14+**
RAAP-047	TCE Plume at BLDGS 1549,1041&1034	RFA						
		CS						
		RFI/CMS						
		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/RC Sites: 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

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): 201609/201609

Date of MMRP completion including Long Term Management (LTM): 201609

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 CERCLA. It identified one site as eligible for the MMRP. In October 2006 a site inspection was initiated.

Cleanup Exit Strategy

The installation plans to complete the SI in 2008 and execute follow-on phases/actions as required.

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

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: CERCLA

MRSPP Score: Evaluation pending

Contaminants of Concern: Munitions constituents

Media of Concern: Soil

Phases	Start	End
PA	200202	200305
SI	200703	200812
RI/FS	201010	201209
RD	201210	201309
RA(C)	201310	201609

RIP Date: N/A

RC Date: 201609

SITE DESCRIPTION

The closed Army Reserve Small Arms Range occupied approximately 7.6 acres which was used for small arms training from about 1941 to 1967. This closed range is located along the southeastern boundary of RAAP. A berm (approximately 200 feet long by 10 feet high) is still present and indicates that the direction of fire was southeast. The berm is adjacent to a stream which forms the installation boundary. This range most likely contained 10-15 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.

CLEANUP/EXIT STRATEGY

Based on the Final HRR, the current MMRP cost-to-complete includes RI/FS and Remedial Design (RD). The Remedial Action-Construction (RA(C)) costs include excavation, removal, and off-site transport to address MC contamination.

Response Complete (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

PA (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: 201609

NPL Deletion Date: N/A

Schedule for Next Five-Year Review: 2010

Estimated Completion Date of MMRP at Installation (including LTM phase): 201609

RADFORD ARMY AMMUNITION PLANT MMRP
Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY09	FY10	FY11	FY12	FY13	FY14+
RFAAP-001-R-01	ARMY RESERVE SMALL ARMS RANGE	PA						
		SI						
		RI/FS						
		RD						
		RA(C)						

Community Involvement

Technical Review Committee (TRC): None

Restoration Advisory Board (RAB): RAB established 199807

RAB Adjournment Date: N/A
RAB Adjournment Reason: None

Community Involvement Plan (Date Published) 199509

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), 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, community interviews were conducted 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.

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 and online
125 Sheltman St
Christiansburg, VA 24073

Information Repository is located at

Christiansburg Library, as CDs and online
125 Sheltman St
Christiansburg, VA 24073

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

TAPP Title: N/A

Potential TAPP: N/A