2005 IAP

Radford Army Ammunition Plant

Installation Action Plan

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2005 IAP

Radford Army Ammunition Plant

Radford, Virginia

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Statement of Purpose

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

In an effort to coordinate planning information between the IRP manager, U.S. Army Environmental Center (USAEC), installations, executing agencies, regulatory agencies, and the public, an IAP has been completed for the Radford Army Ammunition Plant (RFAAP). The IAP is used to track requirements, schedules and tentative budgets for all major Army installation restoration programs.

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

The following persons contributed to the formulation and completion of this 2005 Installation Action Plan for Radford Army Ammunition Plant at a planning workshop held on 28 and 29 April 2004:

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Jim McKenna	**Radford Army Ammunition Plant**
Tony Perry	**HQ, Army Environmental Center**
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Debora Richert	**Installation Management Agency, North East**
John Tesner	**U.S. Army Corps of Engineers, Baltimore District**
Rob Thomson	**U.S. Environmental Protection Agency, Region III**

Approval

Radford Army Ammunition Plant 2005 Installation Action Plan Approval Signatures

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Approval

US Army Environmental Center Approval Signatures for the Radford Army Ammunition Plant 2005 Installation Action Plan

James D. Daniel
Acting Chief, Cleanup Division

Robert A. Snyder
Acting Chief, Oversight North Branch

Information Sharing

ACSIM, as well as the installations believe that it should make its environmental restoration information available openly. This 2005 Radford Army Ammunition Plant Installation Action Plan was forwarded to the following people:

RAB Members
Commonwealth of Virginia
EPA Region III
Information Repository

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HWMU 7	(RFAAP-043)
HWMU 16	(RFAAP-039)
BLDG 4343	(RFAAP-045)
FLFA	(RFAAP-040)
N.R.U.	(RFAAP-044)
SEWERLINES	(RFAAP-035)

Acronyms & Abbreviations

µg/dL	micrograms per deciliter
µg/g	micrograms per gram
µg/L	micrograms per liter
135TNB	1,3,5-trinitrobenzene
13DNB	1,3-dinitrobenzene
2,4-D	2,4-dichlorophenoxyacetic acid
246TNT	2,4,6-trinitrotoluene
24DNT	2,4-dinitrotoluene
26DNT	2,6-dinitrotoluene
AAP	Army Ammunition Plant
ACD	Air Curtain Destructor
Acetone	a compound used in propellant manufacture
ACM	asbestos-containing material
ACO	Administrative Contracting Officer
ACSIM	Assistant Chief of Staff for Installation Management
AEDBR	Army Environmental Database Restoration
Alliant Ammunition and Powder Company, L.L.C.	Operating Contractor for Radford Army Ammunition Plant
AMC	Army Materiel Command
AOC	Area of Concern
AOP	ammonia oxidation process
argillaceous	containing clay or clay minerals, clayey
AST	aboveground storage tank
BDDT	Building Debris Disposal Trench
bgs	below ground surface
BLA	Bag Loading Area
Blacksburg, Virginia	located approximate 10 miles east of Radford, Virginia
BRA	baseline risk assessment
Braddock Loam	one of four major soil types occurring in all the areas of concern of the Main Section of RFAAP, it underlies 14 SWMUs located in the interior region of the Horseshoe Area
breccia	rock consisting of sharp fragments embedded in a fine-grained matrix
BTAG	Biological Technical Assistance Group
CaCO3	calcium carbonate
CAMBL	Continuous Automated Multi-Base Line
CASBL	Continuous Automated Single-Base Line
CaSO4	calcium sulfate
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIL	Canadian Industries, Limited
CM	Commander
cm/sec	centimeters per second
CMO	Corrective Measure Operation
CMS, CMI	Corrective Measures Study, Investigation
COC	chemical of concern
CORA	Corrective Action Permit
CTC	Cost to Complete
cryolite	potassium aluminum flouride
CS	Confirmatory Sampling
cy	cubic yards
DAA	Draper Aden & Associates
DCA	1,1-dichloroethane
DD	Decision Document
DERA	Defense Environmental Restoration Account (currently called ER,A)
DERP	Defense Environmental Restoration Program
DES	Design
di-n-butyl phthalate	an inert, gelatinizing agent used in propellant manufacture to improve physical and processing characteristics, including decreasing the propellant ignitability
diphenylamine	a principal stabilizer for nitrocellulose
DNT	Dinitrotrotoluene
dolomite	CaMg(C03)2, a compact limestone
dolomite/dolostone	CaMg(C03)2, a compact limestone / a sedimentary carbonate rock composed of the mineral dolomite, which differs from limestone in not reacting as vigorously to hydrochloric acid
dolostone	a sedimentary carbonate rock composed of the mineral dolomite, which differs from limestone in not reacting as vigorously to hydrochloric acid
DPG	Defense Planning Goals
DSERTS	Defense Site Environmental Restoration Tracking System
dye trace study	a study to identify groundwater flow paths
EE/CA	Engineering Evaluation/Cost Analysis
Elbrook Formation	a geologic formation underlying most of RFAAP, characterized by Cambrian-aged carbonates and clastic rocks
EM	electromagnetic
EP	extraction procedure
EPA	Environmental Protection Agency
ER,A	Environmental Restoration, Army (formerly DERA)
ERIS	Environmental Restoration Information System
ethyl centralite	stabilizer for nitrocellulose
FAL	Fly Ash Landfill
FLFA	Former Lead Furnace Area
FMR	Financial Management Regulation (formerly named DPG)
FS	Feasibility Study
ft/day	feet per day
ft/ft	feet per foot
ft/yr	feet per year
FY	Fiscal Year
Geoprobe	trade name for a truck-mounted drilling unit designed to advance surface and subsurface soil borings

Acronyms continues next page

Acronyms & Abbreviations

GIS	Geographic Information System
GOCO	Government-owned, contractor-operated
GPR	ground-penetrating radar
GPS	Groundwater Protection Standards
GQA	groundwater quality assessment
GW	Groundwater
HBN	health-based number
HCOC	hazardous constituent of concern
HHRA	Human Health Risk Assessment
HMX	Her Majesty's Explosive, a colorless solid used in various kinds of explosives and rocket fuels; also known as cyclotetramethylenitetranitramine
Horseshoe Area	Part of the Main Manufacturing Area
HQ	Headquarters
HRS	Hazard Ranking Score
HWMU	hazardous waste management unit
IAA	Igniter Assembly Area
IAP	Installation Action Plan
ICF KE	ICF Kaiser Engineers, a contractor used by RFAAP
IDM	Investigative-Derived Material
IDW	Investigative-Derived Waste
IMA	Installation Management Agency
IR	Installation Restoration
IRA	Interim Remedial Action
IRDMIS	Installation Restoration Data Management Information System
IRM	Interim Remedial Measure
IRP	Installation Restoration Program
ISP	Incinerator Spray Pond
IT	The IT Group, a contractor used by RFAAP
karst	geology consisting of sinkholes, caverns, and caves
LAP	Load, Assemble and Pack
LOEL	lowest-observed-effect-level
LTC	Lieutenant Colonel
LTM	Long-Term Monitoring
MACOM	Major Command
Max Meadows Breccia	a geologic rock unit abundant in the southeastern region of the Horseshoe Area
MCA	Military Construction Army
McCrady/Price Formation	a geologic formation underlying the eastern border of RFAAP, characterized by Mississippian-aged shales and mudstones
MCL	maximum contaminant level, the maximum permissible level of a contaminant in water that is delivered to any user of a public water system
methyl centralite	stabilizer for nitrocellulose
MACT	Maximum Achievable Control Technology
mg/kg	milligrams per kilogram
mgd	million gallons per day
MMA	Main Manufacturing Area, one of the two installation areas, which includes the Horseshoe Area
MSC	Major Subordinate Command
msl	mean sea level
MTBE	methyl tert-butylether, an oxygenate compound blended in gasoline as an octane enhancer
NAC	nitric acid concentration
NBG	Northern Burning Grounds
NC	Nitrocellulose
ND	not detected
NE	not evaluated
New River	a river that flows through the MMA of RFAAP and forms the Horseshoe Area
NFA	No Further Action
NG	nitroglycerin
nitrated glycols	an energetic plasticizer used in propellant manufacture
Nitrocellulose Line A-Rainwater Ditch	Area A
nitroglycerin	an energetic plasticizer used in propellant manufacture
N-nitrosodiphenylamine	a principal stabilizer for nitrocellulose
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NQLs	nominal quantification limits
NRO	Northeast Regional Office
NROW	New River Ordnance Works
NRU	New River Unit, one of the two installation areas, which is located about one mile north of Claytor Lake
nt	not tested
O&M	operation and maintenance
Oakite	an acidic rust stripper consisting of phosphoric acid and butyl cellosolve
OB	Open Burn
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PFWWTP	Peppers Ferry Wastewater Treatment Plant
phenanthrene	a polynuclear aromatic compound generally associated with petroleum products
POL	Petroleum, Oil and Lubricants
potassium aluminum fluoride	cryolite

Acronyms continues next page

Acronyms & Abbreviations

potassium nitrate	an alkali metal salt used as a flash reducer in propellant manufacture
potassium sulfate	an alkali metal salt used as a flash reducer in propellant manufacture
ppb	parts per billion
ppm	parts per million
PQL	Practical Quantitation Limit
psi	pounds per square inch
QA/QC	quality assurance/quality control
QC	quality control
RA	Remedial Action
RA (C)	Remedial Action-Construction
RA (O)	Remedial Action-Operation
RAAP	Radford Army Ammunition Plant
RAB	Restoration Advisory Board
RACER	Remedial Action Cost Engineering & Requirements System
Radford, Virginia	location of RFAAP, approximately 10 miles west of Blacksburg, Virginia, and 47 miles southwest of Roanoke, Virginia
RBC	risk-based concentration
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RDX	Royal Dutch Explosive, a white powder used as an explosive and in combination with other ingredients in explosives; also known as cyclonite
red water	a waste product generated during TNT production that includes alpha-, beta-, and gamma-TNT isomers and TNT sodium disulfates
REM	Removal
RFA	RCRA Facility Assessment
RFAAP	Radford Army Ammunition Plant
RfD	reference dose
RFI	RCRA Facility Investigation
RI	remedial investigation
RIP	Remedy In Place
ROD	Record of Decision
ROW	Radford Ordnance Works
RPM	Remedial Project Manager
RQD	rock quality density
RRSE	Relative Risk Site Evaluation
RY	Rail Yard
SAC	sulfuric acid concentration
saprolite	soft, disintegrated, usually more or less decomposed rock remaining in its original place
SAR	sulfuric acid regeneration
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
sellite	sodium sulfite
SO3	sulfur trioxide
Shaw Environmental	aka ICF Kaiser, IT Corporation
SLERA	Screening Level Ecological Risk Assessment
soda ash	sodium carbonate
SOP	Standard Operating Procedure
SPCC/ISCP	Spill Control & Countermeasures Plan/Installation Spill Contigency Plan
SSA	Site Screening Area
SSL	Soil Screening Level
Troubles Creek	largest local tributary of the New River, it flows through the southeast sector of RFAAP
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TAL	target analyte list
TCE	trichloroethylene
TCL	target compound list
TCLP	Toxicity Characteristic Leachate Procedure
TETRYL	2,4,6-trinitrophenylmethylnitramine, an intermediary detonating agent for less sensitive high explosives and as a booster charge in certain military munitions, its use was discontinued in the United States in 1979
TIC	tentatively identified compound
TKN	total kjeldahl nitrogen
TNT	trinitrotoluene
TNT Waste Acid Neutralization Pits	SWMU 51
TOC	total organic carbon
TOX	total organic halogen
TPH	total petroleum hydrocarbon
TSDF	Treatment Storage & Disposal Facility
UBK	uptake biokinetic
Underground Fuel Oil Spill	Area O
Unison-Urban Land Complex	one of four major soil types occurring in all the areas of concern of the Main Section of RFAAP, it underlies most of the Manufacturing Area
URS	aka Dames & Moore
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency (currently called USACHPPM)
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency (currently called USAEC)
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank

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Acronyms & Abbreviations

Valley and Ridge Province	a physiographic division of the Appalachian Mountain chain, the environmental location of the RFAAP Main Section and NRU, which is characterized by a series of long, narrow, flat-topped mountain ridges separated by valleys of varying widths
VDEQ	Virginia Department of Environmental Quality
VDH	Virginia Department of Health
VDWM	Virginia Department of Waste Management
VHWMR	Virginia Hazardous Waste Management Regulations
VI	Verification Investigation
VI/RFI	Verification Investigation/RCRA Facility Investigation
VOC	volatile organic compound
VPDES	Virginia Pollutant Discharge Elimination System
vug	a small cavity in a rock or vein, often lined with crystals
WBG	Western Burning Grounds
Wheeling Sandy Loam	one of four major soil types occurring in all the areas of concern of the Main Section of RFAAP, it constitutes about 25 percent of the upland regions of the Horseshoe Area at RFAAP
WPA	Workplan Addendum
WWTP	Waste Water Treatment Plant
XRF	X-ray fluorescence spectrometry

CERCLA and RCRA Acronym Conversions

CERCLA		**RCRA**
Preliminary Assessment (PA)	=	RCRA Facility Assessment (RFA)
Site Inspection (SI)	=	Confirmation Sampling (CS)
Remedial Investigation/ Feasibility Study (RI/FS)	=	RCRA Facility Investigation/Corrective Measures Study (RFI/CMS)
Remedial Design (RD)	=	Corrective Measures Implementation (Work Plan) (CMI(WP))
Remedial Action (Construction) (RA(C))	=	Corrective Measures Implementation (Construction) (CMI(C))
Remedial Action (Operation) (RA(O))	=	Corrective Measures Implementation (Operation) (CMI(O))
Long Term Monitoring (LTM)	=	Long Term Monitoring (LTM)
Interim Remedial Action (IRA)	=	Interim Corrective Measure (ICM)

Summary

STATUS: RCRA Corrective Action Permit (Sept 2000) - EPA and Virginia HRS of 43 (Internal Score)

TOTAL # OF AEDB-R SITES: 45
ACTIVE ER,A SITES: 26 (4 are RIP with LTM)
RESPONSE COMPLETE (RC) SITES: 19

DIFFERENT SITE TYPES:

Burn Area - 3	Surface Impoundment/Lagoon - 9
Contaminated Soil Piles - 1	Plating Shop - 1
Chemical Disposal - 1	Spill Site Area - 2
Landfill - 22	Above Ground Storage Tank - 1
Storage Area - 3	Waste Lines - 1

CONTAMINANTS OF CONCERN: Explosives, Metals, POL, VOCs, SVOCs

MEDIA OF CONCERN: Groundwater, Soil, Sediment, Surface Water

COMPLETED REM/IRA/RA:

- IRM at RFAAP-014, SWMU #54, 1998 & 1999 ($1,899,900)
- IRM at RFAAP-045, NRU, 1999 ($107,400)

(For a full list of past REM/IRA/RAs, see the REM/IRA/RAs section)

RA FIVE YEAR REVIEW:

- ROD/DD at SWMU 54 (RAAP-014) Interim Action Planned for 1 Sept 2005.
- FY 04: RFAAP-039, 041, 042, and 043
- FY 09: RFAAP-039, 041, 042, 043, 01, 011, and 014
- FY 14: RFAAP-039, 041, 042, 043, 011, 016, 018, 028, and 038

CURRENT IRP PHASES: RFI at 24 sites LTM at 4 sites
(Includes each AEDB-R Site. Total Number of AEDB-R sites are different from Phase Totals as one site can be in more than one phase)

PROJECTED IRP PHASES: RFI at 13 sites DES at 11 sites CMI(C) at 12 sites LTM at 10 sites
(Includes each AEDB-R Site. Total Number of AEDB-R sites are different from Phase Totals as one site can be in more than one phase)

IDENTIFIED POSSIBLE REM/IRA/RA:

- Source removal at 11 sites
- Air Sparging at one site
- Capping at 1 site

FUNDING:

Prior Year Funding (FY 1976-2004):	$26,416,200
FY2005:	$4,722,000
Future Requirements (FY2006-2015+):	$42,841,000
Total:	**$73,979,200**

DURATION:
Year of IRP Inception: **1990**
Year of IRP Completion Excluding LTM: **2014**
Year of IRP Completion Including LTM: **2028**

Installation Information

SITE DESCRIPTION:

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

COMMAND ORGANIZATION:

ACSIM (Assistant Chief of Staff for Installation Management)
Installation: RFAAP, Restoration Program Manager. RFAAP is a government owned, contractor operated facility. Alliant Ammunition and Powder Company, LLC is the operating contractor.

IRP EXECUTING AGENCIES:

- Investigation Phase Executing Agency: Radford Army Ammunition Plant and U.S. Army Corps of Engineers (USACE), Baltimore District.
- Remedial Design/Action Phase Executing Agency: The U.S. Army Corps of Engineers (USACE), Baltimore Districts as well as some IRAs conducted through Radford Army Ammunition Plant.

REGULATORY PARTICIPATION:

Federal: U.S. Environmental Protection Agency (EPA), Region III (RCRA and Office of Superfund)
State: Virginia Department of Environmental Quality, Federal Facilities Restoration Program

REGULATORY STATUS:

- Non-NPL (National Priorities List), but future listing is possible. EPA Region III, Office of Superfund has shown interest in RFAAP-044, The New River Unit in Dublin, VA.
- Resource Conservation and Recovery Act (RCRA) Permit, September 26, 2000.

MAJOR CHANGES TO IAP FROM PREVIOUS YEAR (2004):

- Four site estimates were affected by the conversion from RACER 2003 to RACER 2004. These sites are RFAAP-039, RFAAP-041, RFAAP-042, RFAAP-043.
- RFAAP-010: The remedial action assumption was changed regarding the nature of material that may be excavated from the site based on FY04 sampling results. It is now likely that removed material can be disposed as non-hazardous solid waste instead of hazardous waste.
- RFAAP-022: This site was reopened so that funding could be added for RFI sampling, human health and screening-level environmental risk assessments, and associated A/E effort in FY08 as a result of FY04 sampling results.
- A new site, RFAAP-046, was created to address groundwater studies and GIS support. Funding for this effort was previously included in RFAAP-038. Therefore funding in RFAAP-038 was reduced and placed in RFAAP-046.

Installation Information

DESCRIPTION:

Radford Army Ammunition Plant (RFAAP) is located in the mountains of southwest Virginia in Pulaski and Montgomery Counties. RFAAP consists of two noncontiguous areas: Main Manufacturing Area (MMA) and New River Unit (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 New River Unit is located about six miles west of the MMA, near the town of Dublin.

RFAAP 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 in width at southeast end and narrowing to two miles in the northeast end. RFAAP lies along the New River in the relatively narrow northeastern corner of the valley. The New River divides RFAAP into two areas. The "Horseshoe Area" (which is part of the Main Manufacturing Area) exists within a meander of the New River.

HISTORY & MISSION:

RFAAP's primary mission, the manufacturing of propellants, began in 1941 and continues today. Since 1968, RFAAP has also produced TNT on an intermittent basis. RFAAP's TNT facilities have been in stand-by status since the mid 1980s. The working population at RFAAP varies greatly with mission requirements.

SITE LOCATION MAP - MAIN MANUFACTURING AREA

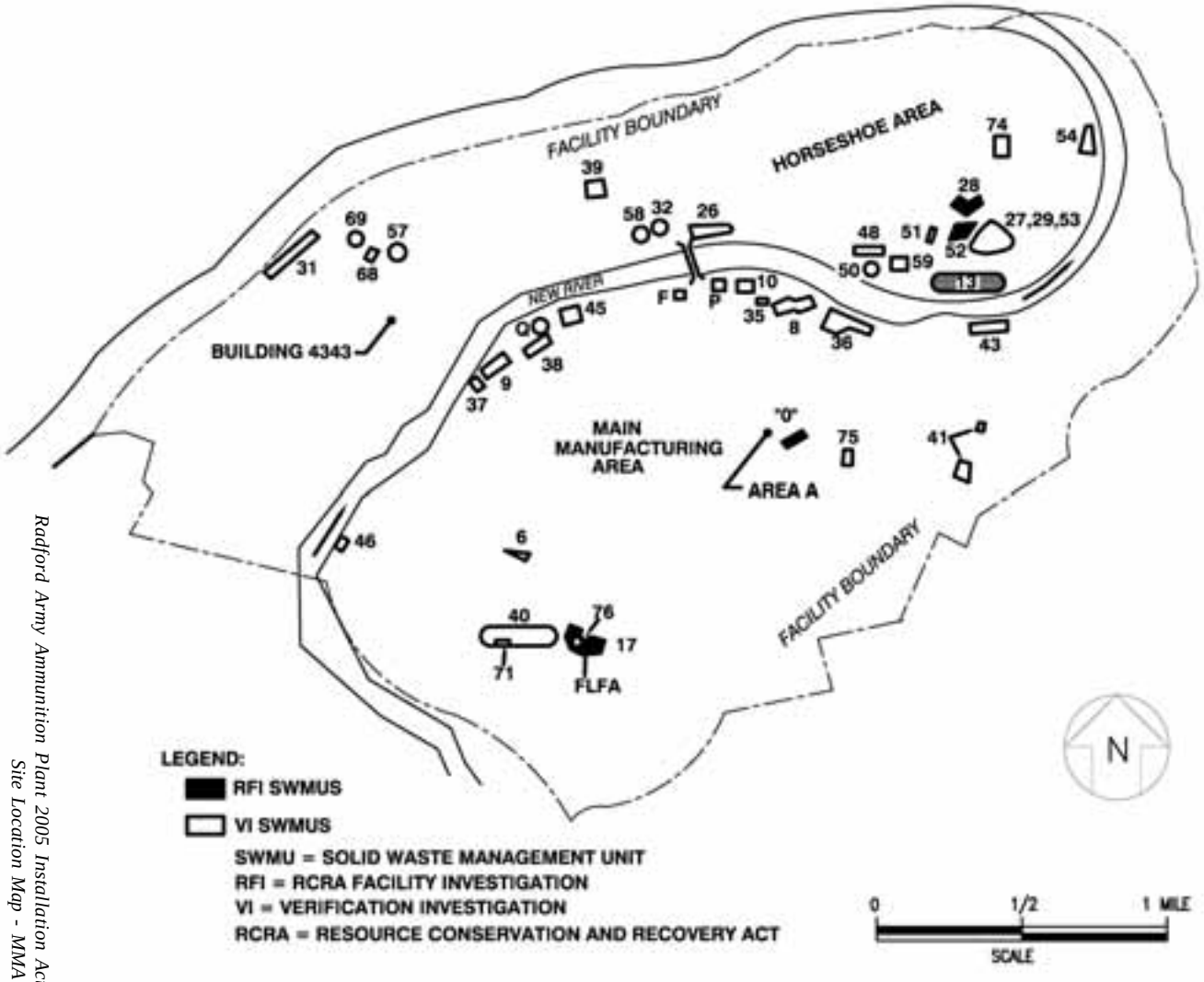
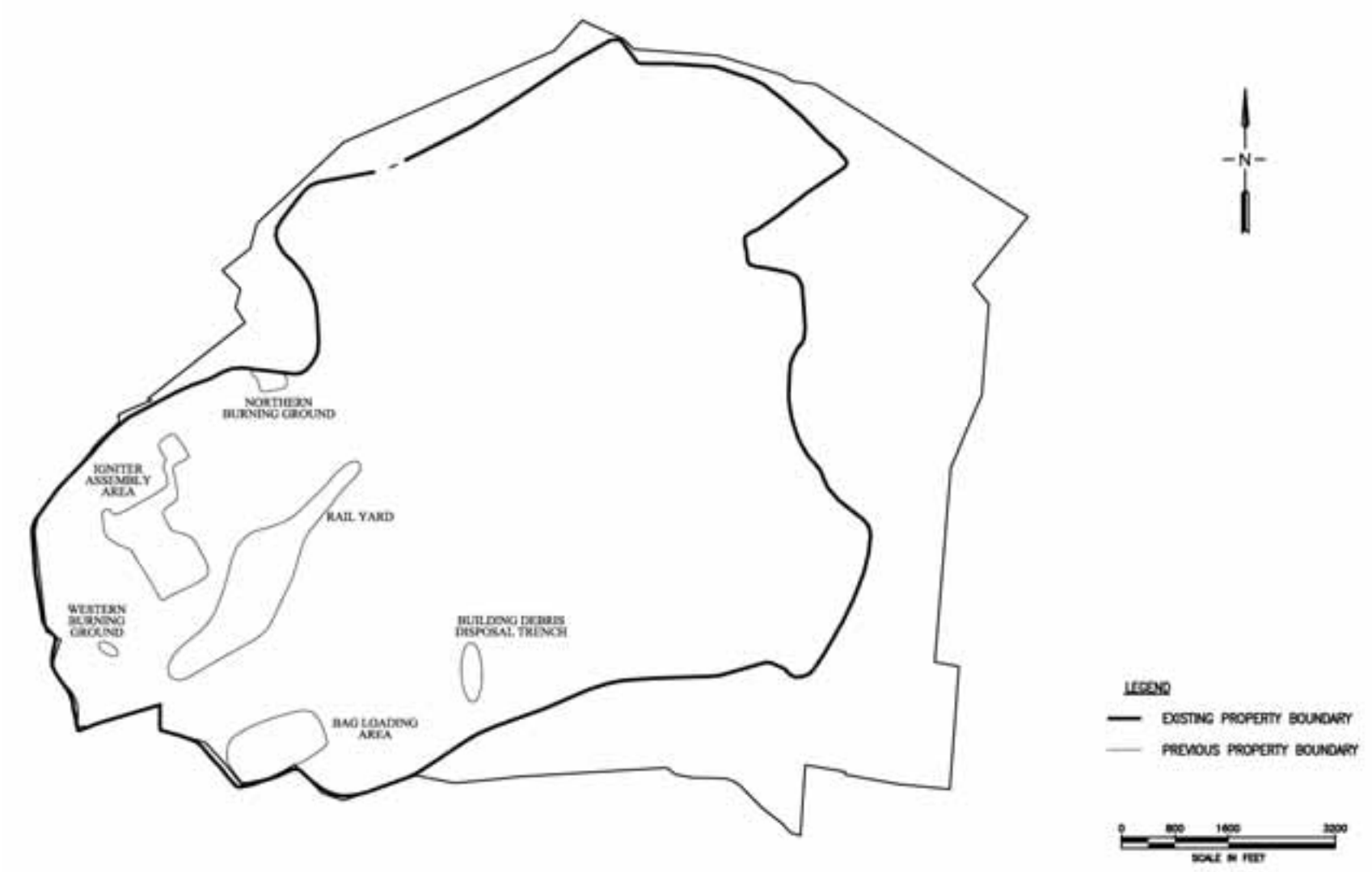


TABLE OF SWMU'S	
SWMU NUMBERS	SWMU NAME
SWMU 6	ACID WASTEWATER LAGOON
SWMU 8, 9, 35, 36, 37, 38 & AREA "A"	CaSO4 TREATMENT DISPOSAL AREA
SWMU 10	BIOPLANT BASIN
SWMU 13	WASTE PROPELLANT BURNING GROUND
SWMU 17	AIR CURTAIN DESTRUCTOR AND OPEN BURNING GROUND
SWMU 26	FLY ASH LANDFILL NO. 1
SWMU 27	CaSO4 TREATMENT DISPOSAL AREA
SWMU 28	CLOSED SANITARY LANDFILL
SWMU 29	FLY ASH LANDFILL NO. 2
SWMU 31	COAL ASH SETTLING LAGOONS
SWMU 32	INERT LANDFILL NO. 1
SWMU 39	WASTEWATER PONDS FROM PROPELLANT INCINERATOR
SWMU 40	LANDFILL NITRO AREA
SWMU 41	RED WATER ASH BURIAL GROUND
SWMU 43	SANITARY LANDFILL NO. 2
SWMU 45	LANDFILL NO. 3
SWMU 46	PROPELLANT BURIAL
SWMU 48	OILY WATER BURIAL AREA
SWMU 49	RED WATER ASH BURIAL GROUND
SWMU 50	CaSO4 TREATMENT/DISPOSAL AREA
SWMU 51	TNT WASTE ACID NEUTRALIZATION PITS
SWMU 52	CLOSED SANITARY LANDFILL
SWMU 53	ACTIVATED CARBON DISPOSAL AREA
SWMU 54	PROPELLANT BURNING ASH DISPOSAL AREA
SWMU 57	POND BY BUILDING 4931/4932
SWMU 58	RUBBLE PILE
SWMU 59	BOTTOM ASH PILE
SWMU 68	CHROMIC ACID TREATMENT TANKS
SWMU 69	POND BY CHROMIC ACID TREATMENT TANKS
SWMU 71	FLASH BURN PARTS AREA
SWMU 74	INERT LANDFILL NO. 3
SWMU 76	MOBILE USED OIL TANKS
AREA F	FORMER DRUM STORAGE AREA
AREA O	UNDERGROUND FUEL OIL SPILL
AREA P	BATTERY STORAGE AREA
AREA Q	CaSO4 TREATMENT DISPOSAL AREA
BUILDING 4343	BUILDING 4343
FLFA	FORMER LEAD FURNACE AREA

SITE LOCATION MAP - NEW RIVER UNIT



Contamination Assessment

OVERVIEW

In a RCRA Facility Assessment completed by EPA in 1987, 98 Solid Waste Management Units (SWMUs) were identified. The initial requirements for the corrective action process were specified in a RCRA permit issued by EPA in 1989. The permit which governs corrective action was re-issued in October, 2000. The first phase of investigations at the SWMUs was completed in October 1992 under the 1989 permit. Various investigations and actions have since been completed and submitted to the EPA and the Commonwealth of Virginia. EPA and the Commonwealth of Virginia are currently reviewing results of these investigations. In some cases SWMUs are grouped together based on similar histories or proximity.

The October 2000 Corrective Action Permit is the Region III EPA's enforceable document to manage the Radford AAP IRP and specific ER,A eligible sites. Radford AAP has separate permits issued by the Commonwealth of Virginia that 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 Radford AAP IRP and specific ER,A eligible sites.

The primary contaminants of concern at RFAAP include metals and explosives. Groundwater within the RFAAP 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 groundwater. The efforts are complicated due to the presence of karst geology (highly fractured and channelized limestone). Due to the nature of the karst geology, source removal (clean closure) is the preferred alternative.

Contamination Assessment

PREVIOUS STUDIES

The following documents were submitted to the EPA in accordance with the 1989 RCRA permit:

1992

- Verification Investigation Report, Dames and Moore, October 29, 1992, Draft Final.
- RCRA Facility Investigation Report, Dames and Moore, October 29, 1992, Draft Final.

1994

- SWMU 69 Closure Report, Dames & Moore, Draft. August 1994.
- Draft Section 8.0, SWMU O, Dames and Moore, September 16, 1994 of the 1992 RFI report.
- The following sections of the 1992 VI were revised by: Draft Section 7.0 SWMUs 10 and 35, Dames and Moore, September 8, 1994; Draft Section 9.0 SWMUs 27, 29 and 53, Dames and Moore, August 19, 1994; Draft Section 11.0 SWMU 39, Dames and Moore August 31, 1994; Draft Section 24.0 SWMU 71, Dames and Moore, August 19, 1994.

1995

- Final Community Relations Plan, September 5, 1995.

1996

- RCRA Facility Investigation for Solid Waste Management Units 17, 31, 48, 54, Parsons Engineering and Science, Inc., Draft. January 1996.

1997

- New River and Tributaries Study, Radford Army Ammunition Plant, Parsons Engineering Science, Inc. December 1997.

1998

- Site Management Plan, ICF Kaiser Engineers, Inc., May 1997 and May 1998.
- RFAAP Master Work Plan, Draft Final, April 1998.
- SWMU 68 Closure Report, Draft Final. April, 1998.
- Ecological Risk Assessment Approach, Main Manufacturing Area and New River Unit, October 1998.
- Closure Documentation for Solid Waste Management Unit 10, Biological Treatment Plant Equalization Basin, Radford Army Ammunition Plant, Radford, VA, Final. December 8, 1998.
- Closure Report for the Eastern Lagoon of SWMU 8. Final December 1998.
- Supplemental RFI for SWMU 54, Draft, December 1998.

Previous Studies continues next page

PREVIOUS STUDIES, continued

1999

- RCRA Facility Investigation Report for SWMUs 31, 39, 48, 49, & 58, Draft, ICF Kaiser, January 1999.
- Work Plan Addenda for SWMU 54 Interim Stabilization Measure, ATK, Draft Final January 1999.
- Work Plan Addendum 8: RI/FS for the Northern and Western Burning Grounds (at the NRU) and RFI for Building 4343, ICF Kaiser, June 1999.
- Draft Screening Ecological Risk Assessment Report, The IT Group, September 1999.
- Work Plan Addendum 009: RFI Activities at Solid Waste Management Units 31, 48, and 49 and Horseshoe Area Groundwater Study, The IT Group, November 1999.

2000

- Work Plan Addendum 010: Background Study, August 2000.
- Final Work Plan Addendum 11: Soil Sampling and Reporting SWMU 6, November 2000.

2001

- Draft Facility-Wide Background Study Report, January 2001.
- Draft Work Plan Addendum 12: SWMU 39, 48, 49, 50, 58, 59, AOC-FLFA, AOC-Building 4343, New River Unit, April 2001.
- Draft Work Plan Addendum 009: SWMU 31 and Horseshoe Area Groundwater Study, April 2001.
- Final SWMU 6 Sampling Results Report, May 2001.
- Draft Current Conditions Report Horseshoe Area, May 2001.
- Site Screening Process, October 2001.
- Final Facility-wide Background Study Report, December 2001.

2002

- Draft Work Plan Addendum 009: SWMU 31 and Horseshoe Area Groundwater Study, February 2002.
- Draft Work Plan Addendum 12: SWMU 39, 48, 49, 50, 58, 59, AOC-FLFA, AOC-Building 4343, New River Unit, February 2002.
- Draft Master Work Plan, Master Quality Assurance Plan, Master Health & Safety Plan, February 2002.
- Draft Work Plan Addendum 13 RFI at SWMU 54, April 2002.
- Draft Work Plan Addendum 14 RFI at SWMU 40/71, April 2002.
- Draft SWMU 6 Decision Document, May 2002.
- Final Work Plan Addendum 009: SWMU 31 and Horseshoe Area Groundwater Study, September 2002.
- Final Work Plan Addendum 012: SWMUs 39, 48, 49, 50, 58, 59, AOC-FLFA, AOC-Building 4343, New River Unit, September 2002.
- Final Master Work Plan, September 2002.

Previous Studies continues next page

Contamination Assessment

PREVIOUS STUDIES, continued

2002, *continued*

- Final Work Plan Addendum 13 RFI at SWMU 54, Sept 2002.
- Final Work Plan Addendum 14 RFI at SWMU 40/71, Sept 2002.
- Final SWMU 6 Decision Document, Oct. 2002.
- Draft Work Plan Addendum 15: Soil Sampling Investigation for SWMUs 8 and 36, December 2002 (non-ER,A funded).

2003

- Draft Building 4343 RCRA Facility Investigation Report, Feb 2003.
- Draft Work Plan Addendum 16, Site Screening Process for SWMUs 13, 37, 38, 46, 57, 68, 69, 75, 76 and AOCs A, F, Q, Mar 2003.
- Draft Field Investigation Report and Risk Assessment for HWMUs 5 and 7, Mar 2003.
- Final Work Plan Addendum 15, Soil Sampling Investigation for SWMUs 8 and 36, Mar 2003 (non-ER,A funded).
- Draft SWMU 58 RCRA Facility Investigation Report, Mar 2003.
- Draft Work Plan Addendum 17, SWMU 51 RCRA Facility Investigation, July 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 Mar 2003.
- Draft Soil Sampling Report, SWMU 8 and 36, Aug 2003.
- Draft Work Plan Addendum 18, RCRA Facility Investigation at SWMU 41, Aug 2003.
- Draft Building 4343 RCRA Facility Investigation/Corrective Measures Study Report, Oct 2003.
- Draft NRU Additional Characterization Sampling: Work Instructions, Nov 2003.
- Final Work Plan Addendum 17 SWMU 51 RCRA Facility Investigation, Dec 2003.
- Final Work Plan Addendum 18, RCRA Facility Investigation at SWMU 41, Dec 2003.
- Final SWMU 58 RCRA Facility Investigation Report, Dec 2003.

2004

- Final Soil Sampling Report, SWMU 8 and 36, Jan 2004.
- Final Building 4343 RCRA Facility Investigation/Corrective Measures Study Report, Feb 2004.
- Final Work Plan Addendum 17 SWMU 51 RCRA Facility Investigation, Feb 2004.
- Draft SWMU 54 Additional Characterization: Work Instructions, Mar 2004.
- Draft SWMU 39 RCRA Facility Investigation/Corrective Measures Study Report, May 2004.

2005 IAP

Radford AAP
Site Descriptions

TNT WASTE ACID NEUTRALIZATION PITS - SWMU 51
RFAAP-001

STATUS

RRSE RATING: High

CONTAMINANTS:
Metals, Explosives, VOCs, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE: RFI/ CMS (Funded)

FUTURE IRP PHASE: DES, CMI(C), LTM

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. An estimated 10 tons of red water ash was reportedly disposed of in the trench from 1968-1972. Additionally, the trench was used for disposal of TNT neutralization sludge from the treatment of red water in the 1970s. The pits were backfilled and revegetated.

A RCRA Facility Investigation (Dames & Moore 1992) evaluated groundwater and soil samples and a CMS was recommended. The soil and groundwater concentrations of COCs exceeded health based numbers (HBNs) in the 1989 RCRA CORA (Corrective Action Permit) and could indicate risk under an industrial worker scenario.

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 in FY04 and results are pending.

PROPOSED PLAN

The RFI/CMS is anticipated in FY05. Source removal (clean closure) and five years of monitoring is anticipated.

Groundwater will be addressed as part of the region-wide groundwater study included in RAAP-038.

FLASH BURN PARTS AREA - SWMU 71
RFAAP-002

STATUS

RRSE RATING: High

CONTAMINANTS: Metals, SVOCs

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, CS

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RFI

SITE DESCRIPTION

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

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

This site and SWMU 40 (RFAAP-09) 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 provide additional data to support a quantitative HHRA and SLERA. The RFI was submitted for review in FY04.

PROPOSED PLAN

No further action is anticipated pending review of the RFI report.

POND BY CHROMIC ACID TREATMENT TANKS - SWMU 69
RFAAP-003

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil, Sediment

COMPLETED IRP PHASE: RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200410

SITE DESCRIPTION

SWMU 69 was an unlined settling pond that received SWMU 68 neutralized wastewater from rocket encasement cleaning activities. Before 1974, runoff consisted of neutralized chromic acid (pH=8.6), which had been treated with sulfuric acid, sodium metabisulfate, and calcium lime. After 1974 up to the time operations ceased, “Oakite 33,” an acidic rust stripper consisting of phosphoric acid and butyl cellosolve mixture, was used to clean rocket encasements. Oakite 33 was adjusted to a pH of 5.0 with soda ash before discharge to SWMU 69.

A Verification Investigation (VI) (Dames & Moore 1992) performed a qualitative human health risk assessment. The VI recommended interim corrective measures to remove all accumulated pond water, pond sediments, and adversely impacted surficial soil. Impacted soils and sediments were removed as indicated by confirmatory samples (Dames & Moore 1994). The Closure Report was submitted to the regulators in August 1994.

Site-screening sampling was performed in FY04. The report was submitted in FY04.

PROPOSED PLAN

No further action is anticipated pending review of the report.

INERT LANDFILL NO.3 - SWMU 74
RFAAP-004

STATUS

RRSE RATING: Low

CONTAMINANTS:
Metals, VOCs, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200009

SITE DESCRIPTION

SWMU 74 is a four acre, unlined landfill located in the central portion of the Horseshoe Area. In May 1984, the Virginia Department of Health issued Permit No. 433 for "Inert Landfill No. 3". The SWMU was permitted to receive construction and demolition waste, wood, tree trimmings, stumps, and inert waste materials. The landfill is currently about half filled.

A RCRA Verification Identification (Dames & Moore 1992) installed one well downgradient of the landfill to a depth of 50.4 feet and was sampled for metals, VOCs, SVOCs, TOC, TOX, metals, and pH. The results from the chemical analysis of 74MW1 do not indicate the presence of contamination downgradient of Inert Landfill No. 3. Groundwater is monitored in accordance with the permit.

PROPOSED PLAN

The operation and closure of SWMU 74 are addressed under state permit No. 433, therefore this site is not eligible for ER,A funding.

WASTE PROPELLANT BURNING GROUND - SWMU 13
RFAAP-005

STATUS

RRSE RATING: High

CONTAMINANTS: Perchlorate, Metals, Explosives, VOCs, SVOCs

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA, CS

CURRENT IRP PHASE: RFI/CMS

FUTURE IRP PHASE: RFI, DES, CMI(C)

SITE DESCRIPTION

SWMU 13, approximately 20 acres in size, is located in the southeast section of the Horseshoe Area on the northern bank of the New River within the 100-year floodplain. The SWMU has been used for the burning of waste explosives, propellants, and laboratory wastes (propellant and explosive residues, samples, and analytical residues) since manufacturing operations began at RFAAP in 1941. Until 1985 burning was conducted on the soil. From that time burning is performed in pans.

A RCRA Facility Investigation (Dames & Moore 1992) evaluated groundwater quality and potential soil contamination for explosives, VOCs, SVOCs, and heavy metals.

The concentrations of COCs exceeded health based numbers (HBNs) in the 1989 RCRA CORA (Corrective Action Permit) and could indicate risk under an industrial worker scenario.

Site-screening sampling was performed in FY04. The site screening effort has identified off-site migration associated with activities before 1986.

PROPOSED PLAN

A RFI/CMS is scheduled for procurement in FY05.

FORMER DRUM STORAGE AREA - AREA F
RFAAP-006

STATUS

RRSE RATING: Medium

CONTAMINANTS:
VOCs, SVOCs

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE:
RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200009

SITE DESCRIPTION

Area F is a gravel lot located in the Main Manufacturing Area southeast of Warehouse No. 2 (9387-2) approximately 50 feet long by 50 feet wide. The area was used to stage empty drums that were used throughout RFAAP before being sold. Storage of drums on this lot was discontinued in 1991 when a second lot was constructed 150 feet to the east, west of Building 4934-1.

A RCRA Verification Investigation (Dames & Moore 1992) evaluated four surface soil samples that were collected beneath stained gravel from both the former drum storage area and the new storage lot and analyzed for VOCs and SVOCs. Analytical results demonstrated that there had been no releases to surface soils.

Site-screening sampling was performed in FY04. The report was submitted in FY04.

PROPOSED PLAN

No further action is anticipated pending review of the report.

CLOSED SANITARY LANDFILL - SWMU 28
RFAAP-007

STATUS

RRSE RATING: High

CONTAMINANTS:
Metals, Explosives, VOCs, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200009

SITE DESCRIPTION

SWMU 28 is a landfill located in the southeast section of the Horseshoe Area. It replaced the sanitary landfill immediately to the south (SWMU 52), that was closed in 1984. SWMU 28 is contiguous with the Closed Hazardous Waste Landfill (HWMU 16) and is approximately 200 feet northeast of the TNT Neutralization Sludge Disposal Area (SWMU 51). SWMUs 28, 52, and HWMU 16 encompass an area of approximately 15 acres. In April 1983 Virginia Department of Health issued Permit #401 for SWMUs 28 and 52. It was permitted as a sanitary landfill to receive municipal solid, agricultural, debris, inert, and asbestos wastes. The asbestos waste was placed in a designated area, now identified as SWMU 30.

SWMU 28 was capped in 1992 in accordance with an approved RCRA subpart D closure plan. Five trenches in SWMU 28 were excavated, filled, and covered with clean soil to prevent erosion of the clay cap. A RCRA Facility Investigation (Dames & Moore 1992) was performed that included the installation and sampling of four monitoring wells. Chemicals of concern are metals, explosives, VOCs and SVOCs. Groundwater is monitored in accordance with the VDEQ approved post-closure care permit for HWMU 16 which includes SWMUs 28 and 52.

PROPOSED PLAN

Groundwater monitoring will continue, which is being addressed under RFAAP-039 (HWMU 16).

CaSO4 TREATMENT/DISPOSAL AREA - SWMU 27
RFAAP-008

STATUS

RRSE RATING: High

CONTAMINANTS: Explosives

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200009

SITE DESCRIPTION

SWMU 27, the Calcium Sulfate Landfill, is an active, unlined earthen landfill located in the southeastern section of the Horseshoe Area and is covered under Permit 353. It is located within the boundary of Fly Ash Landfill (FAL) No. 2 (Permit 353, SWMU 29) and is also contiguous with SWMU 53. The landfill was used for disposal of calcium sulfate sludge generated from the neutralization of sulfuric acid at the acidic wastewater treatment plants between 1981 and 1982. The landfill has been described as triangular-shaped and approximately 150 feet long. Since disposal operations ceased, this unit has been completely covered by FAL No. 2.

In 1980, a land disposal study was conducted, and it was determined that the site was geologically suitable for ash landfill operations. A RCRA Verification Investigation (VI) (Dames & Moore 1992) was performed that included the collection and analysis of one surface water sample and three sediment samples. Supplemental VI activities (Dames & Moore 1994) included the collection and analysis of groundwater samples.

PROPOSED PLAN

Since SWMU 27 is an active landfill under state permit No. 353, this site is not eligible for ER,A funding.

LANDFILL NITRO AREA - SWMU 40
RFAAP-009

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil, Surface Water

COMPLETED IRP PHASE: RFA, CS

CURRENT IRP PHASE: RFI (funded)

FUTURE IRP PHASE: RC

SITE DESCRIPTION

SWMU 40 was reportedly used as a sanitary landfill, approximately 1.5 acres, in the 1970s and early 1980s for the disposal of uncontaminated paper, municipal refuse, cement, and rubber tires. It is not known whether hazardous wastes or wastes containing hazardous constituents were ever disposed of in the landfill. 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 RCRA Verification Investigation (Dames & Moore 1992) attempted to install four monitoring wells, which could not be sampled as the four borings were dry. A dye-trace study was conducted in the adjacent area (Engineering-Science 1993 and 1994) to identify groundwater flow paths in the south-central section of the Main Manufacturing Area. However, it is believed that this site does not affect groundwater.

This site and SWMU 71 (RFAAP-02) are combined for the RFI. A contract to perform a RFI/CMS was procured in FY01. Field investigations were completed in FY03. Soil samples were collected to confirm previous investigative results and provide additional data to support a quantitative HHRA and SLERA. A portion (20cy) of the IDM was determined to be hazardous waste (lead) and was stabilized and disposed of in a permitted treatment storage and disposal facility. The RFI was submitted for review in FY04.

PROPOSED PLAN

No further action is anticipated pending review of the RFI report.

CaSO4 TREATMENT/DISPOSAL AREA - SWMU 8
RFAAP-010

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

SITE DESCRIPTION

SWMU 8 consists of two unlined, below-grade earthen lagoons located in the northeast section of the MMA along the south bank of 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. Sludge was dredged from the lagoons and was placed in the adjacent drying beds. Between 1982 and 1991, the dried sludge removed from the beds was disposed of in Fly Ash Landfill No. 2 (SWMU 29). In December 1998 the Eastern Lagoon was closed and replaced with a concrete tank. The closure documentation was submitted to EPA Region III and VDEQ in 1999 demonstrating no further action is required. Operations ceased at the Western Lagoon in November 1999.

A VI was performed in 1992 by Dames & Moore.

A non-ER,A funded report of results recommending no further action was submitted in FY04 and is pending regulatory approval. A non-ER,A funded construction project is underway at SWMU 8 to replace the existing lagoon.

PROPOSED PLAN

Since operations ceased in 1999, this site is not eligible for ER,A funding.

CaSO4 TREATMENT LAGOONS - SWMU 9
RFAAP-010

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

SITE DESCRIPTION

SWMU 9 consists of two unlined, below-grade earthen lagoons located in the northwest section of the MMA. 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 005. SWMU 9 ceased operations as a sludge settling lagoon in 1993. Sludge was dredged from the lagoons and was placed in the adjacent drying beds. Between 1982 and 1991, the dried sludge removed from the beds was disposed of in Fly Ash Landfill No. 2 (SWMU 29).

In 1987, a RCRA Facility Assessment was conducted by the USEPA that included a preliminary data review, evaluation, and visual site inspection.

A VI was performed in 1992 by Dames & Moore.

PROPOSED PLAN

Since operations ceased in 1993, this site is not eligible for ER,A funding.

CaSO4 DRYING BED - SWMU 35
RFAAP-010

STATUS

RRSE RATING: High

CONTAMINANTS:
Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE:
RFI (Funded)

FUTURE IRP PHASE:
DES, CMI(C)

SITE DESCRIPTION

SWMU 35 is an unlined Calcium Sulfate Drying Bed 160 feet by 80 feet with approximately 8 feet of sediment remaining in the basin. The SWMU is located along the New River in the northeast section of the Main Manufacturing Area immediately east of SWMU 10 and west of and adjacent to SWMU 8. Calcium sulfate sludge was dredged from SWMU 8 prior to 1980 and pumped into SWMU 35. RFAAP reported that sediment from SWMU 10 was also deposited in SWMU 35 during the early 1980s.

A RCRA Verification Investigation (VI) (Dames & Moore 1992) and a Supplemental VI (Dames & Moore 1994) were performed that included groundwater sampling. Explosives and metals in soil, groundwater, surface water and sediment exceeded HBNs as per the 1989 RCRA CORA permit.

Site-screening sampling was performed in FY04. The report was submitted in FY04.

PROPOSED PLAN

Collect samples (as part of Work Plan Addendum 19) from available media to support a RFI.

The funding reflected on this site page includes activities for the following SWMUs: 35, 37, 38, and Area A.

CaSO4 DRYING BED - SWMU 36
RFAAP-010

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

SITE DESCRIPTION

SWMU 36 consists of three separate unlined drying beds located in the northeast section of the MMA adjacent to SWMU 8. The north bed, located closest to the New River, is approximately 200 feet long, 50 feet wide, and 10 feet deep, and appears to be the original drying bed. The adjacent south bed appears to be the next oldest and is also approximately 200 feet long, 50 feet wide, and 10 feet deep. The east bed is approximately 60 feet wide by 200 feet long. The depth of this bed is unknown. Sludge was last deposited in 1999.

The RCRA Verification Investigation (VI) (Dames & Moore 1992) included the collection of one composite sludge sample from each SWMU 36 drying bed to determine whether concentrations exceeded permit levels for VOCs, SVOCs, and TCLP metals. Although VOCs and SVOCs were detected, reported results were below 1989 RCRA CORA permit levels.

A non-ER,A funded report of results recommending no further action was submitted in FY04 and is pending regulatory approval.

PROPOSED PLAN

Since operations ceased in 1999, this site is not eligible for ER,A funding.

CaSO4 DRYING BED - SWMU 37
RFAAP-010

STATUS

RRSE RATING: High

CONTAMINANTS:
Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE:
RFI (Funded)

FUTURE IRP PHASE:
DES, CMI(C)

SITE DESCRIPTION

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 RCRA Verification Investigation (VI) (Dames & Moore 1992) included the collection of one composite sludge sample to determine whether concentrations exceeded permit levels for VOCs, SVOCs, and TCLP metals. Although VOCs and SVOCs were detected, reported results were below 1989 RCRA CORA permit levels.

Site-screening sampling was performed in FY04. The report was submitted in FY04.

PROPOSED PLAN

Collect samples (as part of Work Plan Addendum 19) from available media to support a RFI.

Funding associated with this site is reflected on the site page for RFAAP-010 - SWMU-35 (page 13).

CaSO4 DRYING BED - SWMU 38
RFAAP-010

STATUS

RRSE RATING: High

CONTAMINANTS:
Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE:
RFI (Funded)

FUTURE IRP PHASE:
DES, CMI(C)

SITE DESCRIPTION

SWMU 38 is an unlined drying bed approximately 225 feet long, 40 feet wide, and 8 feet deep located in the northwest section of the Main Manufacturing Area. 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 RCRA VI (Dames & Moore 1992) 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.

Site-screening sampling was performed in FY04. The report was submitted in FY04.

PROPOSED PLAN

Collect samples (as part of Work Plan Addendum 19) from available media to support a RFI.

Funding associated with this site is reflected on the site page for RFAAP-010 - SWMU-35 (page 13).

NITROCELLULOSE RAINWATER DITCH - AREA A
RFAAP-010

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI (Funded)

FUTURE IRP PHASE: RC

SITE DESCRIPTION

Area 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 1-foot-deep soil depression that received runoff from the A-Line (Visual Inspection Field Notes 1987).

Site-screening sampling was performed in FY04. The report was submitted in FY04.

PROPOSED PLAN

No further action is anticipated pending review of the report.

RED WATER ASH BURIAL GROUND - SWMU 41
RFAAP-011

STATUS

RRSE RATING: High

CONTAMINANTS:
Metals, Explosives, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE:
RFI/CMS (Funded)

FUTURE IRP PHASE:
DES, CMI(C), LTM

SITE DESCRIPTION

SWMU 41 is located in the MMA and consists of two non-contiguous 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 the 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. The ash produced from these kilns was disposed of in SWMU 41 from 1967 to 1971.

A RCRA VI (Dames & Moore 1992) 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 site screening process, a quantitative HHRA, and a SLERA were collected in FY04 and results are pending.

PROPOSED PLAN

The RFI/CMS is anticipated in FY05. A RCRA one-acre cap is anticipated for the southern area. A NFA is anticipated for the northern area.

Groundwater will be addressed as part of the region-wide groundwater study included in RAAP-038.

ACID WASTEWATER LAGOON - SWMU 6
RFAAP-012

STATUS

RRSE RATING: Medium

CONTAMINANTS: None

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200209

SITE DESCRIPTION

The Acidic Wastewater Lagoon (SWMU 6) was an unlined surface impoundment "tear-dropped" or "triangular" in shape, approximately 80 feet long by 30 feet wide at its widest point. The lagoon received overflows and rinse waters from an acid storage tank area in the manufacturing area from 1974 to 1980. These wastewaters typically exhibited the characteristic of a corrosive liquid (D002). The acid wastewater lagoon was shut down between 1980 and 1987. The lagoon was filled with soil in 1987.

A RCRA VI (Dames & Moore 1992) collected and evaluated soil and groundwater samples for metals. SWMU 6 Sampling Results Report (May 2001) indicated several metals exceeded residential RBCs but did not exceed industrial RBCs. VOCs, SVOCs, pesticides and PCBs did not exceed residential RBCs. Further screening found that metals were not significantly above background levels.

A non ER,A funded construction project is scheduled in the area of this site.

PROPOSED PLAN

Site close-out documentation has been approved. Permit modification will finalize closeout.

RED WATER ASH BURIAL #2 - SWMU 49
RFAAP-013

STATUS

RRSE RATING: High

CONTAMINANTS:
Metals, Explosives, SVOCs, VOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE: RFI/ CMS

FUTURE IRP PHASE: RC

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 no distinction could 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 the part of the SWMU 48 lower disposal unit. SWMU 49 reportedly received 10 tons of redwater ash during its active life.

A RCRA VI (Dames & Moore 1992) and a RCRA Facility Investigation (RFI) (Parsons Engineering-Science 1996) were conducted to determine the impacts to groundwater quality and soil. A draft RFI (ICF Kaiser 1999) 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.

PROPOSED PLAN

The RFI/CMS report will be submitted in FY05. Due to their contiguous nature, RFAAP-013, -018, -025, and -028 are being managed as one unit.

No further action is anticipated and closeout documentation is included in the AEDB-R sites RFAAP-13 (SWMU-49) and RFAAP-025 (SWMU 50).

Two remedial actions (excavation, transportation and disposal) are anticipated at RFAAP-018 (SWMU 48) and RFAAP-028 (SWMU 59).

PROPELLANT BURNING ASH DISPOSAL - SWMU 54
RFAAP-014

STATUS

RRSE RATING: High

CONTAMINANTS: Perchlorate, Metals, Explosives, VOCs

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA, CS, IRA

CURRENT IRP PHASE: RFI (Funded)

FUTURE IRP PHASE: DES, CMI(C), LTM

SITE DESCRIPTION

SWMU 54 is an inactive disposal area situated on approximately 5 acres within the easternmost section of the Horseshoe Area. The SWMU was used during the 1970s for disposal of the Propellant Burning Ground (SWMU 13) ash.

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

An interim removal action (Parallax 1999) was performed to remove “hot spots” associated with lead.

A contract to perform a RFI/CMS was procured in FY01. Clean closeout will mitigate long-term monitoring and long-term operation liability. RFI sampling was conducted in FY03.

PROPOSED PLAN

Additional investigation has been proposed in Work Instructions and is pending regulatory approval. A RFI/CMS is underway. Excavation, transportation and disposal is anticipated.

FLY ASH LANDFILL #1 - SWMU 26
RFAAP-015

STATUS

RRSE RATING: Low

CONTAMINANTS: SVOCs

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200009

SITE DESCRIPTION

SWMU 26 is a closed, unlined landfill approximately 1,100 feet long by 250 feet wide originally called FAL No. 1, located in the south-central section of the Horseshoe Area.

Fly ash disposal at SWMU 26 began in 1971 (USATHAMA 1984). The VDEQ granted a solid waste management permit (Permit No. 399) to operate the landfill in April 1983, and it is currently monitored quarterly as a solid waste disposal unit. In addition to fly ash, unknown quantities of calcium sulfate sludge from SWMUs 36, 37, and 38 and asbestos were reportedly disposed of in the landfill (USEPA 1987).

The landfill reached capacity and was closed in 1987. A RCRA VI (Dames & Moore 1992) was performed.

PROPOSED PLAN

Since SWMU 26 is a closed fly ash landfill under state permit No. 399 (i.e. a permitted non-hazardous waste landfill), this site is not eligible for ER,A funding.

WASTEWATER PONDS FROM PROPELLANT INCINERATOR - SWMU 39
RFAAP-016

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE:
RFI/CMS (Funded)

FUTURE IRP PHASE:
DES, CMI(C), LTM

SITE DESCRIPTION

SWMU 39 consists of two unlined earthen ponds, approx. two acres total, 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 8 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 RCRA VI (Dames & Moore 1992) and a Supplemental VI (Dames & Moore 1994) installed and sampled three monitoring wells near the ponds. Metals exceeding 1989 RCRA CORA permit HBNs were detected in the soil and groundwater.

A draft RFI was submitted in 1999 (ICF Kaiser). The RFI/CMS was submitted in FY04.

PROPOSED PLAN

Pending regulatory approval, remedial action (soil excavation, transportation and disposal) will proceed according to CTC.

ACTIVATED CARBON DISPOSAL AREA - SWMU 53
RFAAP-017

STATUS

RRSE RATING: Low

CONTAMINANTS: None

MEDIA OF CONCERN: Groundwater

COMPLETED IRP PHASE: RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200009

SITE DESCRIPTION

SWMU 53 (Permit 353) is an unlined earthen landfill located in the southeastern section of the Horseshoe Area. It is located within the boundary of Fly Ash Landfill (FAL) No. 2 (SWMU 29) and is also contiguous with SWMU 27. When observed in 1986, the disposal area was described as a 500-foot-long-by-50-foot-wide plateau of an unknown height. Although the date of disposal is unknown, it is assumed that disposal occurred before October 1981 when FAL No. 2 (SWMU 29) was constructed. It was reported but not confirmed that the activated carbon disposed of at SWMU 53 was from alcohol recovery units (USEPA 1987). Since 1986, the disposal area has been completely covered by subsequent fly ash landfilling operations.

A RCRA Verification Investigation (VI) (Dames & Moore 1992) and a Supplemental VI (Dames & Moore 1994) were conducted. No explosives, VOCs or SVOCs were detected.

PROPOSED PLAN

Since SWMU 53 is an active landfill under state permit No. 353, this site is not eligible for ER,A funding.

OILY WATER BURIAL AREA - SWMU 48
RFAAP-018

STATUS

RRSE RATING: High

CONTAMINANTS:
Explosives, Metals

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE: RFI/CMS

FUTURE IRP PHASE:
DES, CMI(C), LTM

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). It is estimated that 200,000 gallons or more of oil-contaminated wastewater were disposed in unlined trenches at this unit prior to off-plant used oil recycling.

A RCRA Verification Investigation (Dames & Moore 1992) and a RCRA Facility Investigation (RFI) (Parsons Engineering-Science 1996) was 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.

A draft RFI was submitted in 1999 (ICF Kaiser). Soil data from the RFI indicated the presence of metals above 1989 RCRA CORA permit HBNs.

The RFI sampling was completed in FY02.

PROPOSED PLAN

The RFI/CMS will be submitted in FY05. Due to their contiguous nature, RFAAP-013, -018, -025, and -028 are being managed as one unit.

Two remedial actions (excavation, transportation and disposal) are anticipated at RFAAP-018 (SWMU 48) and RFAAP-028 (SWMU 59).

No further action is anticipated and closeout documentation is included in the AEDB-R sites RFAAP-13 (SWMU-49) and RFAAP-025 (SWMU 50).

INERT LANDFILL NO. 1 - SWMU 32
RFAAP-019

STATUS

RRSE RATING: Low

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200009

SITE DESCRIPTION

SWMU 32 is a closed, unlined, 8-acre landfill located in the Horseshoe Area of RFAAP. The unit reportedly began receiving plastics, excavated soil, and inert wastes in 1978 and was permitted by the Virginia Department of Health (Permit No. 400) in April 1983. The unit reached capacity and was closed sometime between July 1986 and April 1987 (USEPA 1987) with a 2-foot clay cap. One area of the landfill is covered with gravel and used for trailer parking.

A RCRA VI (Dames & Moore, 1992) was performed and recommended no further action.

PROPOSED PLAN

Since SWMU 32 is a closed landfill under state permit No. 400, this site is not eligible for ER,A funding.

FLY ASH LANDFILL #2 - SWMU 29
RFAAP-020

STATUS

RRSE RATING: Low

CONTAMINANTS:
Explosives, Metals

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200009

SITE DESCRIPTION

SWMU 29 was constructed in 1981 and was originally listed as an active, unlined earthen landfill located in the southeast section of the Horseshoe Area. The SWMU is approximately 200 feet east of the Closed Sanitary Landfill (SWMU 25). The 10-acre unit was permitted by the Virginia Department of Health in May 1982 (Permit No. 353) as an industrial waste landfill designated to receive fly ash, calcium sulfate sludge, and sludge from water treatment plants. Permit No. 353 covers SWMU-27, -29,
and -53.

A Land Disposal Study conducted in 1980 concluded that the site was geologically suitable for ash landfill operations. A RCRA VI (Dames & Moore 1992) collected surface water and sediment samples. Supplemental VI activities (Dames & Moore 1994) were undertaken to evaluate groundwater characteristics.

PROPOSED PLAN

Since SWMU 29 is an active landfill under state permit No. 353, this site is not eligible for ER,A funding.

PROPELLANT BURIAL - SWMU 46
RFAAP-021

STATUS

RRSE RATING: Low

CONTAMINANTS:
Metals, Explosives

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE:
RFI (Funded)

FUTURE IRP PHASE: RC

SITE DESCRIPTION

The reported location of SWMU 46 is a small depression with no outward drainage. Approximately one ton of propellants and propellant-contaminated soil were reportedly disposed of at this location because of a railroad derailment in the 1950s (USATHAMA 1976). The actual size of the Waste Propellant Disposal Area is not known. During a March 1990 facility visit, a broken-off sign identifying “BURIED EXPLOSIVE WASTE” was found in a low area between the railroad tracks and the driveway leading to Building 456.

A RCRA VI (Dames & Moore 1992) collected one surface water and one sediment sample and no contaminants of concern were detected against HBNs.

In 1997, USACHPPM conducted further studies by collecting five subsurface (five to nine feet) soil samples. Samples were analyzed for SVOCs, explosives, total metals and nitrite/nitrates. No exceedences were detected. Direct-push groundwater sampling was attempted but groundwater was not encountered.

Site-screening sampling was performed in FY04. The report was submitted in FY04.

PROPOSED PLAN

No further action is anticipated pending review of the report.

POND BY BLDGS 4931 AND 4928 - SWMU 57
RFAAP-022

STATUS

RRSE RATING: Low

CONTAMINANTS: Metals

MEDIA OF CONCERN: Sediment

COMPLETED IRP PHASE: RFA, CS

CURRENT IRP PHASE: None

FUTURE IRP PHASE: RFI

SITE DESCRIPTION

SWMU 57 is designated as an acid settling pond that supported the NIKE program and is located in the western section of the Horseshoe Area. SWMU 57 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 (RFAAP-045), where subsequent investigations found metal concentrations above action levels.

A RCRA VI (Dames & Moore 1992) collected one surface water and one sediment sample and no contaminants of concern 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. Metal concentrations found did not screen out in accordance with the approved site screening process. Therefore, further sampling and assessment is required.

PROPOSED PLAN

A RFI will be performed, no further action is anticipated. Close-out documentation will be prepared.

SANITARY LANDFILL NO. 2 - SWMU 43
RFAAP-023

STATUS

RRSE RATING: Low

CONTAMINANTS:
Metals, VOCs

MEDIA OF CONCERN:
Groundwater, Soil, Surface Water

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RFI

SITE DESCRIPTION

SWMU 43 is a closed, unlined sanitary landfill, approximately two acres, located immediately adjacent to the New River in the northeast section of the RFAAP MMA that 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. Site was regraded in accordance with VI recommendation. A RCRA VI (Dames & Moore 1992) 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.

PROPOSED PLAN

A RFI will be conducted to fill data gaps and evaluate data in accordance with the 2000 RCRA CORA permit. No further action is anticipated.

LANDFILL NO. 3 - SWMU 45
RFAAP-024

STATUS

RRSE RATING: High

CONTAMINANTS: SVOCs

MEDIA OF CONCERN: Groundwater

COMPLETED IRP PHASE: RFA, CS

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RFI

SITE DESCRIPTION

SWMU 45 is an inactive sanitary landfill, approximately 5 acres, located in the north-central section of the MMA that 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 RCRA VI (Dames & Moore 1992) included monitoring well installation, a geophysical survey, and a baseline human health risk assessment.

PROPOSED PLAN

A RFI will be conducted to fill data gaps and evaluate data in accordance with the 2000 RCRA CORA permit. No further action is anticipated.

CaSO4 TREATMENT/DISPOSAL AREA - SWMU 50
RFAAP-025

STATUS

RRSE RATING: Low

CONTAMINANTS:
Metals, Explosives, SVOCs, VOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE:
RFI/CMS

FUTURE IRP PHASE: RFI

SITE DESCRIPTION

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

A RCRA VI (Dames & Moore 1992) collected two subsurface soil samples. Metals, VOCs and SVOCs were detected above 1989 RCRA CORA permit HBNs.

The RFI sampling was completed in FY02.

PROPOSED PLAN

The RFI/CMS will be submitted in FY05. Due to their contiguous nature, RFAAP-013, -018, -025, and -028 are being managed as one unit.

No further action is anticipated and close-out documentation is included in the AEDB-R sites RFAAP-13 (SWMU-49) and RFAAP-025 (SWMU 50).

Two remedial actions (excavation, transportation and disposal) are anticipated at RFAAP-018 (SWMU 48) and RFAAP-028 (SWMU 59).

COAL ASH SETTLING LAGOONS - SWMU 31
RFAAP-026

STATUS

RRSE RATING: High

CONTAMINANTS:
Metals, SVOCs

MEDIA OF CONCERN:
Soil, Surface Water

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE:
RFI (Funded)

FUTURE IRP PHASE: RC

SITE DESCRIPTION

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

A RCRA VI (Dames & Moore 1992) and a RFI (Parsons Engineering-Science 1996) collected sludge, groundwater, and subsurface soil samples to determine the migration of metals from the lagoons. A draft RFI was submitted in 1999 (ICF Kaiser). A contract for additional RFI/CMS efforts was procured in FY01. The RFI fieldwork was completed in Summer 2002. The RFI effort is described in Work Plan Addendum 9.

PROPOSED PLAN

The RFI report will be submitted in FY05. No further action is anticipated. Close-out documentation will be prepared.

RUBBLE PILE - SWMU 58
RFAAP-027

STATUS

RRSE RATING: Medium

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, CS

CURRENT IRP PHASE: RFI (Funded)

FUTURE IRP PHASE: RC

SITE DESCRIPTION

SWMU 58 is a rubble pile located in the south-central portion of the Horseshoe Area. The rubble pile is approximately 50 feet high and roughly triangular in shape, with each side approximately 300 feet long. The SWMU was reportedly used as a disposal site in 1979. Prior to construction clearing activities, pine trees and surface debris were pushed into a pile and then covered with dirt and fill material. It is believed that no other materials were disposed of at SWMU 58.

A RCRA VI (Dames & Moore 1992) and a RFI (ICF Kaiser 1999) was initiated to evaluate potential subsurface soil contamination. Analytical results indicate the presence of metals in exceedence of 1989 RCRA CORA permit HBNs.

The RFI was submitted in FY03.

PROPOSED PLAN

No further action is anticipated. Close-out documentation will be prepared pending regulatory approval of the RFI report.

BOTTOM ASH PILE - SWMU 59
RFAAP-028

STATUS

RRSE RATING: Low

CONTAMINANTS:
Metals, VOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE:
RFI/CMS

FUTURE IRP PHASE: RFI, DES, CMI(C), LTM

SITE DESCRIPTION

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

A RCRA VI (Dames & Moore 1992) collected soil samples. Soil data indicates metals in exceedence of 1989 RCRA CORA permit HBNs. Groundwater data indicates VOCs in exceedence of 1989 RCRA CORA permit HBNs.

The RFI sampling was completed in FY02.

PROPOSED PLAN

The RFI/CMS will be submitted in FY05. Due to their contiguous nature, RFAAP-013, -018, -025, and -028 are being managed as one unit.

Two remedial actions (excavation, transportation and disposal) are anticipated at RFAAP-018 (SWMU 48) and RFAAP-028 (SWMU 59).

No further action is anticipated and close-out documentation is included in the AEDB-R sites RFAAP-13 (SWMU-49) and RFAAP-025 (SWMU 50).

CLOSED SANITARY LANDFILL - SWMU 52
RFAAP-029

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200009

SITE DESCRIPTION

SWMUs 52 and 28 are closed sanitary landfill (Permit 401) in the southeastern section of the Horseshoe Area contiguous to and immediately south of the closed RFAAP Hazardous Waste Landfill (HWMU 16). The SWMU reportedly contains three trenches, each approximately 35 feet wide by 500 feet long by 14 feet deep. SWMU 52 was first used in 1976 and was closed in 1984. The landfill was used primarily for the disposal of municipal refuse, though asbestos (in double plastic bags) was also disposed of in this area (USACE 1981).

A RFI (Dames & Moore 1992) installed four monitoring wells near SWMUs 28 and 52. Because of the proximate nature of SWMUs 28 and 52 and the similar disposal methods used at each SWMU, one combined study area was delineated for the RFI. Explosives, metals, VOCs and SVOCs have been detected in wells located at HWMU-16. The contamination is not attributed to SWMUs 28 and 52. Groundwater is monitored in accordance with the VDEQ approved post-closure care permit for HWMU 16 which includes SWMUs 28 and 52.

PROPOSED PLAN

Groundwater monitoring will continue, which is being addressed under RFAAP-039 (HWMU 16).

AIR CURTAIN DESTRUCTOR & OPEN BURNING GROUND - SWMU 17
RFAAP-030

STATUS

RRSE RATING: High

CONTAMINANTS:
Metals, VOCs, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater, Surface Water

COMPLETED IRP PHASE:
RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200009

SITE DESCRIPTION

SWMU 17 is located in the south-central part of the MMA and is used for burning wastes potentially contaminated with explosives or propellants. The SWMU is subdivided into five separate areas (A through E) based on history and operations. SWMU 17A, the Stage and Burn Area, is used to stage large metallic and combustible items contaminated with propellants and explosives. Decontaminated scrap metal is removed and sold for recycling. A drainage pad was installed to collect all stormwater runoff and to prevent run-on. The storm water is collected and sent to the WWTP.

SWMU 17B is the Air Curtain Destructor (ACD) Staging Area. SWMU 17C, the Air Curtain Destructor (ACD), is where contaminated wastes small enough to feed into the burn chamber are burned. This SWMU was permitted by VDEQ Permit By Rule #179. In order to comply with the commercial industrial solid waste incinerator MACT, the unit will close Oct 2004. SWMU 17D, the Ash Staging Area, is used for accumulating and storing ACD ash and scrap metal prior to disposal. SWMU 17E, the Runoff Drainage Basin is an unlined settling basin that receives surface water runoff from the ACD and Ash Staging Area.

The RFI (Dames & Moore 1992) collected surface and subsurface soil, surface water, and sediment samples in the five component areas of the unit. A dye-trace study (Engineering-Science 1994) identified a direct conduit between 17A and the New River, evidenced by the recovery of dye within a 24-hour period of injection.

PROPOSED PLAN

Since this is an active site, it is not ER,A eligible.

CaSO4 TREATMENT/DISPOSAL AREA - AREA Q
RFAAP-031

STATUS

RRSE RATING: Low

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, CS

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

SITE DESCRIPTION

Area Q is an abandoned lagoon located in the northwest section of the MMA. This site is less than a quarter of an acre. Area Q is immediately northwest and adjacent to SWMU 38 and was reported to be used as a sludge drying bed when SWMU 38 reached capacity. Sludge was pumped from SWMU 38 to Area Q via pipes that ran through a depression in the berm surrounding the drying bed.

Site-screening sampling was performed in FY04. The report was submitted in FY04.

PROPOSED PLAN

A RFI is planned. No further action is anticipated. Close-out documentation will be prepared.

MOBILE USED OIL TANKS - SWMU 61
RFAAP-032

SITE DESCRIPTION

A number of oil/water separators and waste storage tanks located throughout RFAAP are used for the collection of used oil generated primarily from machinery and vehicle engines. Oil from these locations was collected in the Mobile Used Oil Tanks (SWMU 61) for either shipment offsite or reuse. Leaks and spills of used oil during handling and collection are managed in accordance with the RFAAP Spill Control and Countermeasures Plan and the Installation Spill Contingency Plan (SPCC/ISCP).

STATUS

RRSE RATING: Low
CONTAMINANTS: N/A
MEDIA OF CONCERN: N/A
COMPLETED IRP PHASE: RFA
CURRENT IRP PHASE: RC
FUTURE IRP PHASE: RC
RC DATE: 200305

PROPOSED PLAN

Since these are active tanks, this site is not ER,A eligible. No further action is recommended for SWMU 61 under IRP.

USED OIL STORAGE TANK (INERT GAS PLANT) - SWMU 75
RFAAP-032

SITE DESCRIPTION

This Underground Storage Tank (UST) was located in the MMA, 20 feet west of the Inert Gas Compressor Building A-421. It was removed as part of the UST removal program in April 1985. The UST was reportedly a single-walled tank with a capacity of 600 to 700 gallons. It was used to store used oil and hydraulic fluids that are generated in the inert gas plant compressor house. The contents of the UST were periodically pumped out into 55-gallon drums for the use as fuel at the Hazardous Waste Incinerator (USEPA 1987). Drips and spills around the tanks access ports that occurred when filling the tank were cleaned up before employees left the job site (Procedure 4-27-120; Section 29.1.1). Contaminated soil was removed from the premises and was properly disposed of. Spills from overfilling would have been treated as an emergency, and procedures described in the Emergency Response Plan (Procedure 4-14-44; Section 29.1.2) were followed.

STATUS

RRSE RATING: Low
CONTAMINANTS: N/A
MEDIA OF CONCERN: N/A
COMPLETED IRP PHASE: RFA
CURRENT IRP PHASE: RC
FUTURE IRP PHASE: RC
RC DATE: 200305

The RFAAP UST Removal Program in 1985 removed the waste oil UST. A RCRA Facility Assessment conducted by the USEPA in 1987 included a visual site inspection and preliminary evaluation. Discolored soil was observed around the tank access port.

A site-screening effort was procured for SWMUs 75 & 76 (RFAAP-32). WPA 16 contained VDEQ closure documentation for SWMUs 75 and 76 as USTs. WPA 16 has been approved.

PROPOSED PLAN

USEPA to provide acknowledgment letter of the VDEQ closure.
The permit modification will finalize closeout.

OIL TANKS - SWMU 76
RFAAP-032

SITE DESCRIPTION

SWMU 76 consists of two used oil USTs that were located within the Stage and Burn Area (SWMU 17A) in the south-central part of the MMA. The capacities of the two tanks were 5,500 gallons and 2,640 gallons, respectively. Used oil from machinery and vehicle engines throughout RFAAP was collected in the Mobile Used Oil Tanks (SWMU 61) and then stored in the SWMU 76 tanks. The used oil was then sold to an off-post firm for reclamation or used to fuel fires in the Contaminated Waste Stage and Burn Area (SWMU 17A).

A release of approximately 250 gallons of oily waste water and sludge occurred in 1991 during the removal of the 5,500-gallon UST. Impacted materials were analyzed to determine proper disposal procedures (Hercules 1991). Approximately 13 cubic yards of dirt/absorbed material were removed from the area and disposed of offsite as a hazardous waste because of lead and chromium concentrations. The SWMU 76 UST closure report concluded that the USTs no longer presented an environmental concern or threat.

A site-screening effort was procured for SWMUs 75 & 76 (RFAAP-32). WPA 16 contained VDEQ closure documentation for SWMUs 75 and 76 as USTs. WPA 16 has been approved.

STATUS

RRSE RATING: Low

CONTAMINANTS: N/A

MEDIA OF CONCERN: N/A

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200305

PROPOSED PLAN

USEPA to provide acknowledgment letter of the VDEQ closure. The permit modification will finalize closeout.

CHROMIC ACID TREATMENT TANKS - SWMU 68
RFAAP-033

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, CS

CURRENT IRP PHASE: RFI (Funded)

FUTURE IRP PHASE: RC

SITE DESCRIPTION

SWMU 68 is located 100 feet northwest of SWMU 57 where the plateau of the Horseshoe Area begins sloping towards the New River. The unit previously contained two 4,000-gallon aboveground tanks, which were used to neutralize wastewater generated from the cleaning of rocket encasements (USEPA 1987). Neutralized wastewater was subsequently discharged to the finishing pond, previously located at SWMU 69.

A RCRA VI (Dames & Moore 1992) detected metals in surface soil samples above the 1989 RCRA CORA permit HBNs. A RFI (ICF Kaiser 1998) was conducted to evaluate potential subsurface contamination and included upgradient surface and subsurface soil samples to establish SWMU-specific background metals concentrations. The results of confirmation samples demonstrated that previous SWMU process-related activities had not adversely impacted subsurface conditions and associated contamination sources had been removed.

Site-screening sampling was performed in FY04. The report was submitted in FY04.

PROPOSED PLAN

No further action is anticipated pending review of the report.

SEWAGE LINES
RFAAP-035

SITE DESCRIPTION

An investigation of the Acid and Industrial Sewers was required by the RCRA permit. The video investigation of the Acid Sewers is complete and the report was submitted to the EPA. The Industrial Sewer investigation is ongoing.

PROPOSED PLAN

The sewer lines are active and are not ER,A eligible.

STATUS

RRSE RATING: High

CONTAMINANTS:
Metals, Explosives

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 200205

BIOPLANT BASIN - SWMU 10
RFAAP-036

STATUS

RRSE RATING: High

CONTAMINANTS:
Metals, Explosives, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS, RFI

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

RC DATE: 199812

SITE DESCRIPTION

SWMU 10 is located in the north-central part of the MMA and consists of the biological plant equalization basin, which was constructed over a former NC lagoon. The biological treatment system was built between 1978 and 1979 and became operational in 1980. The system had been used to treat wastewater from propellant manufacturing, pretreated wastewater from NG manufacturing and alcohol rectification, and waste associated with ethyl ether recovery (USEPA 1987).

Groundwater in the SWMU 10 vicinity was characterized during the RCRA VI (Dames & Moore 1992) and supplemental VI (Dames & Moore 1994).

The VDEQ certified that clean closure for soils had been attained for the equalization basin. Groundwater is still being monitored by the operating contractor under a post-closure care permit that was issued in Oct 2002.

PROPOSED PLAN

This is not an ER,A eligible site.

BATTERY STORAGE AREA - AREA P
RFAAP-037

STATUS

RRSE RATING: Low

CONTAMINANTS:
Explosives, Metals

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE:
None

FUTURE IRP PHASE:
RFI, DES, CMI(C)

SITE DESCRIPTION

The Spent Battery Storage Area (Area P) consists of an open lot several acres in size that was used for the storage of 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 RCRA VI (Dames & Moore 1992) 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 exceedence of 1989 RCRA CORA permit HBNs.

PROPOSED PLAN

A RFI/CMS will be performed. Excavation, transportation and disposal of impacted soil is anticipated.

UNDERGROUND FUEL OIL SPILL - AREA O
RFAAP-038

SITE DESCRIPTION

Area O consists of one inactive 269,000-gallon fuel oil AST that is 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 was conducted by 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.

STATUS

RRSE RATING: High

CONTAMINANTS:
VOCs, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS

CURRENT IRP PHASE:
RFI/CMS

FUTURE IRP PHASE:
RFI, DES, CMI(C), LTM

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

PROPOSED PLAN

A RFI will be performed at Area O. The anticipated remedial action is source removal for soil and groundwater air-sparging system.

HAZARDOUS WASTE LANDFILL - HWMU 16
RFAAP-039

SITE DESCRIPTION

HWMU 16 is located in the Horseshoe Area of the plant between RFAAP-007 (SWMU 28, Permit 401) and RFAAP-029 (SWMU 52, Permit 401) and covers ~two acres. The site is a closed landfill (early 1980s) 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.

A post-closure care permit requiring LTM was issued by VDEQ in Oct 2002.

STATUS

RRSE RATING: High

CONTAMINANTS:
Explosives, VOCs

MEDIA OF CONCERN:
Groundwater

COMPLETED IRP PHASE:
RFA, CS, RFI

CURRENT IRP PHASE:
RIP (200210) with LTM

FUTURE IRP PHASE:
RIP (200210) with LTM

PROPOSED PLAN

Continue long term monitoring. The requirements for the permit will be re-negotiated in the future.

FORMER LEAD FURNACE AREA
RFAAP-040

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, CS

CURRENT IRP PHASE: RFI (Funded)

FUTURE IRP PHASE: RC

SITE DESCRIPTION

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

The former Lead Furnace Area was added to the Dames and Moore VI of 1992 by USATHAMA after the discovery of solid lead slag 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 and included the sampling/removal of lead “hot spots” and the collection and analysis of subsurface soil samples.

RFI sampling was completed in FY02.

PROPOSED PLAN

Complete the RFI. No further action is anticipated for the Former Lead Furnace Area.

SURFACE IMPOUNDMENT #4 - HWMU 4
RFAAP-041

SITE DESCRIPTION

HWMU 4 is located in the eastern area of the MMA. It was a lined surface impoundment and was used an equalization basin for acidic wastewaters.

The source was removed (the impoundment and associated soils) in 1988 in accordance with an VDEQ approved closure plan.

The site was clean-closed for soil by the VDEQ in 1997. Long-term groundwater monitoring and a post closure permit is required by the VDEQ. The clean closure report was submitted in March 21, 2000.

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS, RFI, CMI(C)

CURRENT IRP PHASE:
RIP (198801) with LTM

FUTURE IRP PHASE:
RIP (198801) with LTM

PROPOSED PLAN

This site is incorporated into the facility VDEQ RCRA operating permit, effective in December 2001. LTM will continue until groundwater clean-closure report is approved.

SURFACE IMPOUNDMENT #5 - HWMU 5
RFAAP-042

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. DNT and TCE was recently detected. TCE exceeded Groundwater Protection Standards (GPS). Alternate source demonstration report for TCE was resubmitted to VDEQ in FY04.

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 VDEQ. This report is to facilitate elimination of LTM. A post-closure care permit requiring LTM was issued by VDEQ in Oct 2002.

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS, RFI

CURRENT IRP PHASE:
RIP (200210) with LTM

FUTURE IRP PHASE:
RIP (200210) with LTM

PROPOSED PLAN

Monitoring is required by the post closure care permit. Clean-closure is being pursued as part of the basis for eliminating LTM.

SURFACE IMPOUNDMENT #7 - HWMU 7
RFAAP-043

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. VDEQ issued a post-closure permit in 2001, which requires LTM.

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 VDEQ. This report is to facilitate elimination of LTM. A post-closure care permit requiring LTM was issued by VDEQ in Oct 2002.

STATUS

RRSE RATING: High

CONTAMINANTS:
Heavy Metals

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA, CS

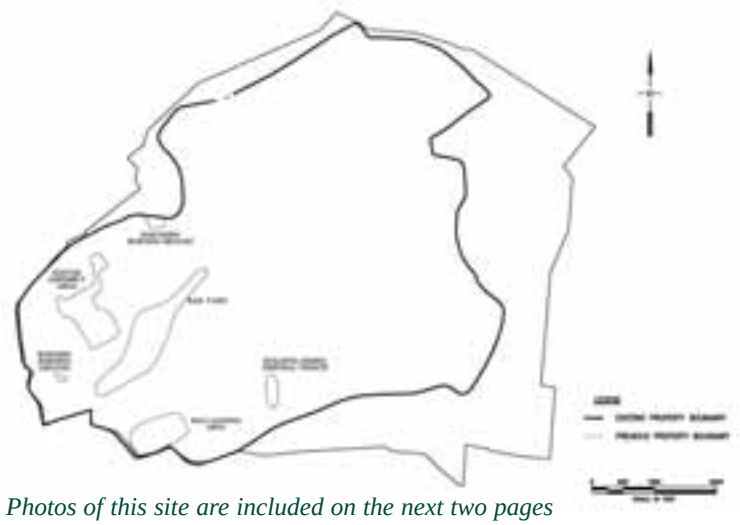
CURRENT IRP PHASE:
RIP (200210) with LTM

FUTURE IRP PHASE:
RIP (200210) with LTM

PROPOSED PLAN

Monitoring is required by the post closure care permit. Clean-closure is being pursued as part of the basis for eliminating LTM.

NEW RIVER UNIT
RFAAP-044



Photos of this site are included on the next two pages
A larger map is located on page 6 of the Installation Information Section

STATUS

RRSE RATING: High

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: PA/SI

CURRENT IRP PHASE: RI

FUTURE IRP PHASE: RI, RD, RA(C)

SITE DESCRIPTION

The New River Unit (NRU) is located approximately 6 miles west of the RFAAP MMA and consists of approximately 2,813 acres. Between 1940 and 1945, the NRU was used for the loading of propellants and igniter charges and the manufacturing of 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 blackpowder drying facilities. Production ended after World War II, and the plant was officially designated as part of the RFAAP 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 comprised 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 exceedence of the 1989 RCRA CORA permit HBNs; however this site is not subject to any RCRA CORA permit. Six areas within the New River Unit 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). The RI fieldwork was completed in FY02.

PROPOSED PLAN

Additional investigation has been proposed in Work Instructions and is pending regulatory approval. A RI/FS is underway. Excavation, transportation and disposal is anticipated.

A decision regarding a groundwater investigation will be made once the vertical extent of soil contamination is determined. The need for LTM is not anticipated.

Site Description photos continues on next page

Building Debris Disposal Trench

Igniter Assembly Area

Bag Loading Area

Site Description photos continues on next page

Northern Burning Ground

Western Burning Ground

Rail Yard

FORMER CADMIUM PLATING FACILITY (BUILDING 4343)
RFAAP-045

STATUS

RRSE RATING: High

CONTAMINANTS: Cadmium

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI /CMS (Funded)

FUTURE IRP PHASE: DES, CMI(C), RC

SITE DESCRIPTION

Building 4343 is located within the Pilot B Area of the Rocket Manufacturing Area, which is situated within the Horseshoe Area.

In 1956, the building was converted from a Fire Water Pump House to support Nike igniter grain cadmium plating operations. Conversion activities included the installation of a drying cabinet, cadmium plating baths, an exterior lead catch tank (which was discharged to the ground), and an exhaust system. The pump and pump engine were removed and floor sumps were filled to level.

Surface soil evaluation was performed (Alliant Techsystem 1996) and found cadmium exceeded regulatory limits for TCLP analysis.

The Final RFI/CMS was submitted in FY04 and is pending regulatory review.

PROPOSED PLAN

Excavation, transportation, and disposal of impacted soil is anticipated. Close-out documentation will be prepared.

MAIN MANUFACTURING AREA GROUNDWATER STUDY RFAAP-046

SITE DESCRIPTION

This site was created during the 1 July 2004 Program Review meeting at USAEC to address MMA groundwater GIS support at Radford AAP as a separate site. Previously the program funding and requirements were included in RFAAP-038. Now the MMA groundwater requirements and funding have been moved from RFAAP-038 to RFAAP-046. Note the MMA includes the Horseshoe Area.

The initial GIS procurement was completed in FY02. The GIS has and will continue to capture IR data, support ERIS, and facilitate project and program decision making.

STATUS

RRSE RATING: High

CONTAMINANTS: Explosives, VOCs, Metals

MEDIA OF CONCERN: Groundwater

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI/ CMS

FUTURE IRP PHASE: LTM

PROPOSED PLAN

The Horseshoe Area Groundwater Current Conditions Report will be issued in FY05. An expansion of the Groundwater Current Conditions Study will include the rest of the MMA. Support for the GIS will continue. While the groundwater studies are ongoing the remedy is programmed as natural attenuation. Future study may modify or change the programmed remedy.

Site Screening Areas

There are approximately 51 areas discussed in the RCRA Facility Assessment which were incorporated into the new RCRA Corrective Action Permit issued in Fall, 2000. Although it is not likely that these areas impact human or ecological health, they will be screened for potential releases to the environment. At least half of the areas are currently in active use.

It is possible that some further remedial investigation and subsequent action at a small number of these areas may be required in the future. Should this occur and they meet all other ER,A eligibility requirements, the areas will be designated as new AEDB-R sites.

In FY03 a desktop audit was performed for each Site Screening Area (SSA). In FY04 a sampling effort was procured for SSA-72 Oleum Plant. These efforts were not ER,A funded.

MILITARY MUNITION RULE SITES AT RADFORD ARMY AMMUNITION PLANT

Site ID	Site Type	Site Description	RRSE	PA	SI	RI	RD	RAC	RAO	LTM	IRA(C)	IRA(U)	RIP Date	RC Date
RFAAP-001-R-01	Small Arms Range	Army Reserve Small Arms Range		C		F	F	F			0	0		201709

Schedule

PAST MILESTONES

1990
- Verification Investigation Initiation

1992
- Verification Investigation Completion

1994
- Interim Remedial Action RFAAP-003 (SWMU 69)
- RCRA Facility Investigation Initiation

1995
- Started Interim Remedial Design
  RFAAP-007 (SWMU 28)
  RFAAP-23 (SWMU 43)
  RFAAP-029 (SWMU 52)

1997
- Completed RCRA Facility Investigation
- Completed IRA at SWMU 43
- Completed IRA at SWMU 68
- Completed New River and Tributaries Study

1998
- Completed Master Work Plan
- Completed Site Management Plan
- Started RFI/CMS for SWMU 39
- Started IRM at SWMU 54

1999
- Completed IRM at SWMU 54
- Started and completed RI/RFI sampling at NRU & Bldg 4343

2000
- Started and completed sampling for Inorganic Background Study

2001
- Started and completed sampling at SWMU 6
- Started Site Screening Process document
- Started RFI/CMS at SWMUs 40/71 and 54
- Started treatability study at NRU
- Started RFI data gap work at SWMUs 39, 48, 49, 50, 59, FLFA, Bldg. 4343, NRU
- Monitored groundwater at HWMUs 4, 5, 7 and 16

PAST MILESTONES, continued

2002
- Started RFI at SWMUs 35, 37, 38, 41, 51
- Started Site Screening SWMUs 13, 37, 38, 46, 57, 68, 69, 75, 76, Areas A and F
- Monitored groundwater at HWMUs 4, 5, 7 and 16

2003
- Started RFI at SWMUs 31, 39, 48, 49, 50, 58, 59, Bldg 4343, Former Lead Furnace Area, 40/71, 54
- Started RI at NRU
- Procured equipment for web based GIS system
- Monitored groundwater at HWMUs 4, 5, 7 and 16
- Procured additional Site Screening effort for SWMUs 46 and 57.
- Procured CMS/FS for SWMUs 48, 49, 50, 39, Former Lead Furnace Area, Building 4343 and New River Unit.
- Procured annual GW monitoring and IRP support.

2004
- Performed annual GW monitoring and IRP support.
- Prepared and submitted various Work Plans, RFI/RI and CMS/FS reports. See Contamination Assessment Previous Studies section for a specific listing.

Schedule

PROJECTED MILESTONES

2005-2014

• Start and complete follow-up investigations, studies and actions for the remaining sites.

NO FURTHER ACTION SITES

The following sites currently require no further action (excluding LTM) under the ER,A program:

RFAAP-003
RFAAP-004
RFAAP-006
RFAAP-007
RFAAP-008
RFAAP-012
RFAAP-015
RFAAP-017
RFAAP-019
RFAAP-020
RFAAP-021
RFAAP-026
RFAAP-029
RFAAP-030
RFAAP-032
RFAAP-033
RFAAP-035
RFAAP-036
RFAAP-039 with LTM
RFAAP-040
RFAAP-041 with LTM
RFAAP-042 with LTM
RFAAP-043 with LTM

Schedule

Radford Army Ammunition Plant Installation Action Plan Schedule

(Based on Cost-to-Complete current funding constraints)

CURRENT PHASE FUTURE PHASE

AEDB-R#	Site Name	RRSE	Phase	FY05	FY06	FY07	FY08	FY09	FY10	FY11+
RAAP-001	TNT Waste Acid Neutralization Pits	High	RD							
			RA(C)							
			LTM							
RAAP-002	Flash Burn Parts Area	High	RI							
RAAP-005	Waste Propellant Burning Ground	High	RI							
			RD							
			RA(C)							
RAAP-010	CaSO4 Treatment Disposal Area	High	RD							
			RA(C)							
RAAP-011	Red Water Ash Burial Ground	High	RD							
			RA(C)							
			LTM							
RAAP-013	Red Water Ash Burial 2	High	RI							
RAAP-014	Propellant Burning Ash Disposal Area	High	RD							
			RA(C)							
			LTM							
RAAP-016	Wastewater Ponds from Propellant Incinerator	High	RD							
			RA(C)							
			LTM							
RAAP-018	Oily Water Burial Area	High	RI							
			RD							
			RA(C)							
			LTM							

IAP Schedule continues next page

Schedule

Radford Army Ammunition Plant Installation Action Plan Schedule, *continued*

CURRENT PHASE FUTURE PHASE

AEDB-R#	Site Name	RRSE	Phase	FY05	FY06	FY07	FY08	FY09	FY10	FY11+
RAAP-022	Pond by Bldgs 4931 & 4928	Low	RI							
RAAP-023	Sanitary Landfill	Low	RI							
RAAP-024	Landfill No. 3	High	RI							
RAAP-025	CaSO4 Treatment Disposal Area	Low	RI							
RAAP-028	Bottom Ash Pile	Low	RI							
			RD							
			RA(C)							
			LTM							
RAAP-031	CaSO4 Treatment Disposal Area	Low	RI							
RAAP-037	Battery Storage Area	Low	RI							
			RD							
			RA(C)							
RAAP-038	Underground Fuel Oil Spill	High	RI							
			RD							
			RA(C)							
			LTM							
RAAP-039	Hazardous Waste Landfill	High	LTM							
RAAP-041	Surface Impoundment #4	High	LTM							
RAAP-042	Surface Impoundment #5	High	LTM							
RAAP-043	Surface Impoundment #7	High	LTM							
RAAP-044	New River Unit	High	RI							
			RD							
			RA(C)							
RAAP-045	Building 4344	High	RA(C)							
RAAP-046	Main Manufacturing Area Groundwater Study	High	RI							
			LTM							

Remediation Activities

COMPLETED REM/IRA/RA:

- RFAAP-003, SWMU 69: interim remedial measure (IRM) Excavated and properly disposed of soils in pond with high concentrations of metals from plating operation.
- RFAAP-014, SWMU 54: Relocated security fence to enclose the site. Excavated and properly disposed of soils with high concentrations of lead.
- RFAAP-023, SWMU 43: IRM Re-graded the site to prevent ponding of storm water and to improve site drainage.
- RFAAP-033, SWMU 68: IRM Excavated and properly disposed of soils similar to those at RFAAP-003, SWMU 69.
- RFAAP-040, FLFA: IRM Excavated and properly disposed of soils with high concentrations of lead.
- RFAAP-044, NRU: IRM Excavated and properly disposed of soils and debris at the Building Debris Disposal Trench.
- RFAAP-044, NRU: IRM Excavated and properly disposed of soils with high concentrations of lead at the Western Burning Ground.

CURRENT REM/IRA/RA:

- None underway. These will be identified in ongoing study efforts.

FUTURE REM/IRA/RA:

Potential Accelerated Actions:

- RFAAP-001, SWMU 51: source removal
- RFAAP-005, SWMU 13: source removal
- RFAAP-010, SWMUs 35,37,38 & Area A: source removal
- RFAAP-011, SWMU 41: capping
- RFAAP-014, SWMU 54: source removal
- RFAAP-016, SWMU 39: source removal
- RFAAP-018, 013, 025, SWMUs 48, 49, 50: source removal
- RFAAP-028, SWMU 59: source removal
- RFAAP-038, AREA O: air sparging and source removal
- RFAAP-042, 043, HWMUs 5, 7: source removal
- RFAAP-044, NRU: source removal
- RFAAP-045, Bldg 4343: source removal

PRIOR YEAR FUNDS (1976-1998)

Past, present, and projected funding for Installation Restoration Program activities has been broken down by fiscal year.

Year	Site Information	Expenditures	FY Total
FY 76	Installation Assessment	50.0 K	**50.0 K**
FY 84	Installation Reassessment	50.0 K	**50.0 K**
FY 90	VI/RFI Work Plans Installation Support Underground Storage Tanks (RFAAP)	270.7 K 29.2 K 17.4 K	**317.3 K**
FY 91	VI/RFI Fieldwork and Report, Phase I Installation Support	1,570.9 K 36.3 K	**1,607.2 K**
FY 92	VI/RFI Plans, Fieldwork, Report, Phase II Split Samples	1,355.0 K 17.3 K	**1,372.3 K**
FY 93	Installation Support (unit 69 RA)	184.0 K	**184.0 K**
FY 94		0 K	**0 K**
FY 95	Conduct RFIs at SWMUs Conduct VIs at SWMUs	1,550.0 K 1,300.0 K	**2,850.0 K**
FY 96	Acid Sewer Investigation CMS at SWMU 54 Phase II VI/RFI (included S68 IRA) IRA at SWMU 43	752.0 K 263.0 K 330.0 K 100.0 K	**1,445.0 K**
FY 97	Monitoring RD on SWMUs 28/52	558.0 K 15.0 K	**573.0 K**
FY 98	RI/FS (SWMUs 17, 31, 39, 48, 49, 58 & NRU) LTM IRA (SWMU 54) RD	1,804.2 K 160.0 K 1,899.9 K 25.0 K	**3,889.1 K**

Prior Year Funds continues next page

Costs

PRIOR YEAR FUNDS (1999-2004)

Year	Site Information	Expenditures	FY Total
FY 99	RFI/CMS (NRU & Bldg 4343)	792.0 K	
	RI/FS (Sewer Lines)	360.7 K	
	RFI/CMS (SWMU 48)	915.3 K	
	LTM (HWMUs 4, 5, 7, 16)	429.5 K	**2,497.5 K**
FY 00	RI/FS Background Study (SWMUs 54, 48, 39, 31)	413.2 K	
	IRA (SWMU 54)	305.4 K	
	RI/FS (NRU)	127.1 K	
	LTM (HWMUs 4, 5, 7, 16)	278.8 K	**1,124.5 K**
FY 01	RFI/CMS (SWMU 40/71)	554.3 K	
	RFI/CMS (SWMU 54)	643.0 K	
	RFI/CMS (GOCO IRP Support)	42.5 K	
	RI/FS (NRU)	249.3 K	
	LTM (HWMUs 4, 5, 7, 16	335.8 K	
	RFI/CMS (SWMUs 31, 39, 48, NRU)	1043.7 K	
	RFI/CMS (SWMU 31, GIS)	30.0 K	**2,898.6 K**
FY 02	RI/FS SWMUs 69, 46, 57, 68, 41	379.7 K	
	RI/FS SWMUs 31, 39, 48, 49, 50, 58, 59, FLFA, Bldg 4343 (WPA 12 mod)	1,152.8 K	
	LTM HWMUs 4,5,7, 16 & IRP support	525.1 K	
	RI/FS SWMUs 41 & FLFA (GIS support)	14.5 K	
	RI/FS SWMUs 9, 35, 37, 38, A	662.4 K	
	RI/FS SWMU 41	496.7 K	
	RI/FS SWMU 51	426.8 K	
	RI/FS NRU (Treatability Study)	9.9 K	
	RI/FS - GIS - plant-wide	175.0 K	**3,842.9 K**
FY 03	RI/FS SWMU 59	573.0 K	
	LTM HWMUs 4, 5, 7, 16 & IRP support	501.2 K	
	RI/FS SWMUs 46 & 57	78.0 K	
	RI/FS Bldg 4343	386.0 K	
	RI/FS SWMUs 40 & 54	39.3 K	**1,577.5 K**
FY 04	RI/FS SWMUs 39, 48, 58 & Area O, COE Support	70.0 K	
	RI/FS SWMU 54	251.0 K	
	RI/FS SWMUs 51, 59 & NRU	1229.0 K	
	RI/FS SWMUs 35, 37, 38, 40, 41 & Area A	231.0 K	
	LTM HWMUs 4, 5, 7, 16 & ATK Support	356.3 K	**2,137.3 K**

TOTAL FUNDING 1976-2004: $ 26,416,200

Community Involvement

RESTORATION ADVISORY BOARD (RAB) STATUS

The surrounding community for Radford AAP included the counties of Montgomery (Pop. 73,913), Pulaski (Pop. 34,496), Floyd (Pop. 12,005), Giles (Pop. 16,366) and the City of Radford (Pop. 15,940).

In February 1995 and January 1998 we conducted surveys to determine if enough community interest existed to sustain a Restoration Advisory Board. A Community Relations Plan was finalized in September 1995.

February 1995 and January 1998, RFAAP with the assistance of the US Army Environmental Center conducted community interviews with residents of the surrounding counties and city, and placed two newspaper advertisements soliciting community members to volunteer for RAB positions. In June 1998, RFAAP held a public meeting to share information about the RFAAP cleanup program and about forming a RAB. August 1998, RFAAP held first RAB-style meeting in which the Community Co-chair person was selected. In September 1999, an information repository was established at the Montgomery Floyd Regional Library, Christiansburg Branch consistent with RAB recommendation.

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

RFAAP is committed to involving the public in the restoration program and will do all we can to make it a success.