2002 IAP

Radford Army Ammunition Plant

Radford, Virginia

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, major army commands (MACOMs), 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 2002 Installation Action Plan for Radford Army Ammunition Plant. The planning workshop was held on May 16 and 17, 2001:

Kathy Hayes	**IAP Support**
Jim McKenna	**Radford Army Ammunition Plant**
Jerry Redder	**Alliant Ammunition and Powder**
Pete Rissell	**HQ, Army Environmental Center**
Tony Spaar	**HQ, U.S. Army Operations Support Command**
John Tesner	**U.S. Army Corps of Engineers, Baltimore District**
Rob Thomson	**U.S. Environmental Protection Agency, Region III**
Katie Watson	**IRP Support**
Sharon Wilcox	**Virginia Department of Environmental Quality**
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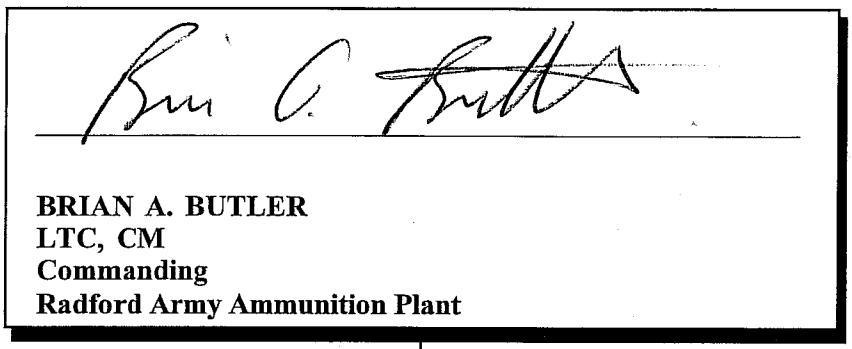
Radford Army Ammunition Plant 2002 Installation Action Plan Approval Signatures



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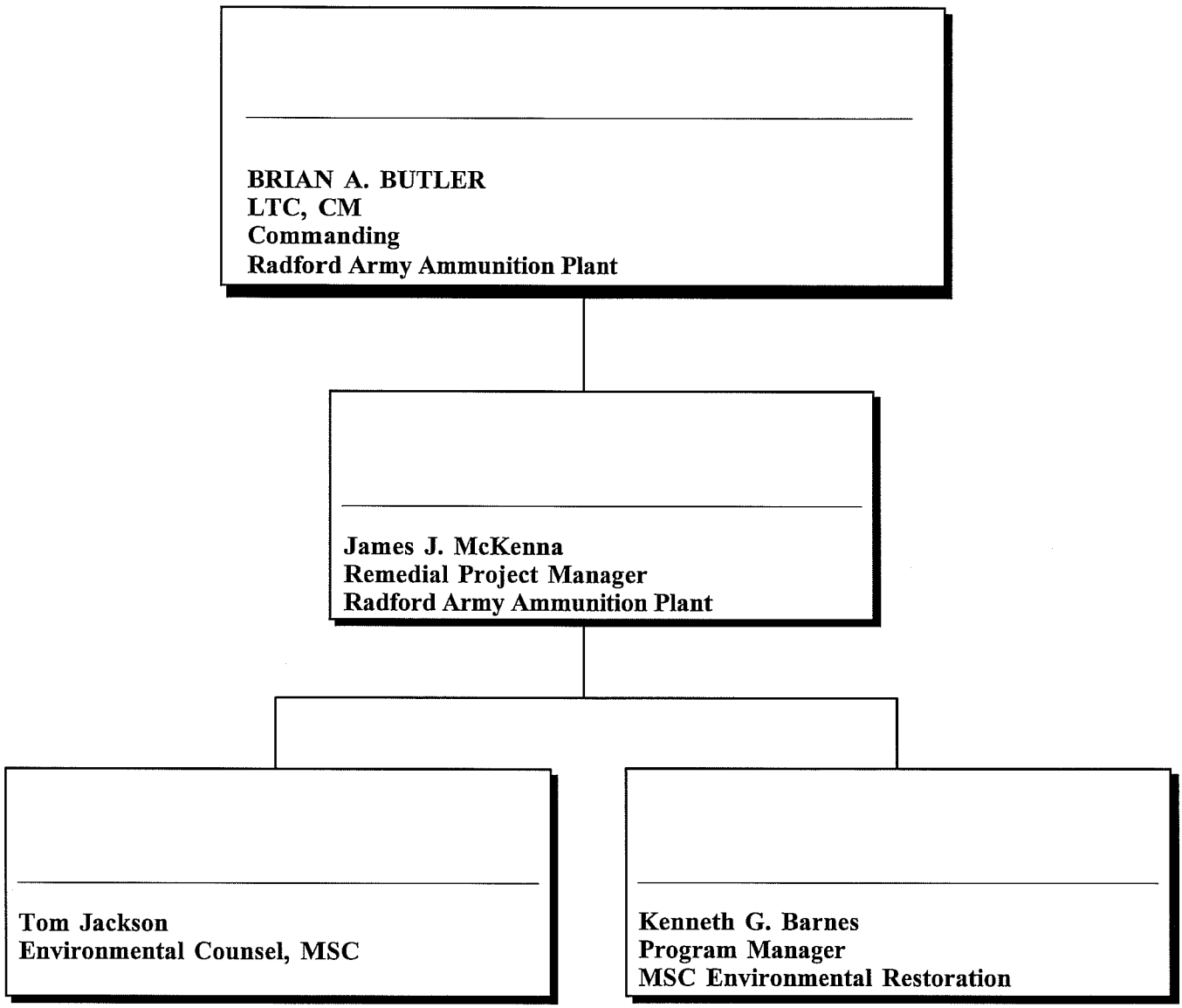
Radford Army Ammunition Plant 2002 Installation Action Plan Approval Signatures



Approval

Army Materiel Command Approval Signature for the Radford Army Ammunition Plant 2002 Installation Action Plan

JEWEL SIMMONS
ARMY MATERIEL COMMAND
Environmental Restoration Program Manager,
Office of the Deputy Chief of Staff for Engineering,
Housing, Environmental, and Installation Logistics

AMC, as well as MSCs and installations believe that it should make its environmental restoration information available openly. This 2002 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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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
ACD	Air Curtain Destructor
Acetone	a compound used in propellant manufacture
ACM	asbestos-containing material
ACO	Administrative Contracting Officer
Alliant Ammunition and Powder Company, L.L.C.	Operating Contractor for Radford Army Ammunition Plant
AMC	Army Materiel Command
AOP	ammonia oxidation process
argillaceous	containing clay or clay minerals, clayey
AST	aboveground storage tank
bgs	below ground surface
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
cryolite	potassium aluminum flouride
cy	cubic yards
DCA	1,1-dichloroethane
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
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
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)
ethyl centralite	stabilizer for nitrocellulose
FAL	Fly Ash Landfill
FLFA	Former Lead Furnace Area
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 & Abbreviations

GOCO	Government-owned, contractor-operated
GPR	ground-penetrating radar
GQA	groundwater quality assessment
HBN	health-based number
HCOC	hazardous constituent of concern
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
IAP	Installation Action Plan
ICF KE	ICF Kaiser Engineers, a contractor used by RFAAP
IDW	Investigative-Derived Waste
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
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
msl	mean sea level
MTBE	methyl tert-butylether, an oxygenate compound blended in gasoline as an octane enhancer
MSC	Major Subordinate Command
NAC	nitric acid concentration
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-nitrosodiphenyl amine	a principal stabilizer for nitrocellulose
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NQLs	nominal quantification limits
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 & 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
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
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
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
Stroubles 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
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
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 (replaced by USACHPPM)
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency (replaced by USAEC)
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank

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
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
XRF	X-ray fluorescence spectrometry

Summary

STATUS:	RCRA Corrective Action Permit (Sept 2000) - EPA and Virginia HRS of 43 (Internal Score)
TOTAL # OF DSERTS SITES:	44
ACTIVE ER,A SITES:	30
RESPONSE COMPLETE (RC) SITES:	14
DIFFERENT SITE TYPES:	Burn Areas Contaminated Buildings — Above Ground Storage Tank Landfills — Storage Areas Surface Impoundment/Lagoons — Spill Site Areas Underground Storage Tanks — Other
CONTAMINANTS OF CONCERN:	Explosives, Metals, POL, VOCs, SVOCs
MEDIA OF CONCERN:	Groundwater, Soil, Sediment, Surface Water
COMPLETED REM/IRA/RA:	• IRM at RFAAP-003, SWMU #69, 1994 ($80,000) • IRM at RFAAP-023, SWMU #43, 1997 ($105,000) • IRM at RFAAP-033, SWMU #68, 1997 ($147,702) • IRM at RFAAP-040, FLFA, 1998 ($98,673) • IRM at RFAAP-045, NRU, 1998 ($395,533) • IRM at RFAAP-014, SWMU #54, 1998 & 1999 ($1,899,900) • IRM at RFAAP-045, NRU, 1999 ($107,400)
CURRENT IRP PHASES:	RI at 1 site — RFI at 30 sites — RC at 19 sites DES at 2 sites — LTM at 1 site
PROJECTED IRP PHASES:	CMS at 13 sites — CMI at 15 sites — RD at 1 site CMO at 1 site — LTM at 13 sites — RC at 36 sites DES at 13 sites — RA(C) at 1 site
IDENTIFIED POSSIBLE REM/IRA/RA:	• Source removal at 15 sites • Air Sparging at one site — • Capping at 2 sites
FUNDING:	Prior Year Funding (FY 1990-2001): **$18,858.5 K** FY2002: ..... **$ 2,264.2 K** Future Requirements: ..... **$40,092.7 K** Total: ..... **$61,215.4 K**
DURATION:	Year of IRP Inception: **1990** Year of IRP Completion Excluding LTM: **2014** Year of IRP Completion Including LTM: **2020**

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:

Major Command: U.S. Army Materiel Command
Subcommand: U.S. Army Operations Support Command
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 (2001):

- New site discovered as a result of HWMU 5 groundwater monitoring.
- Addition of MMA-wide groundwater study in FY06-07.

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 5 miles northeast of the city of Radford, Virginia which is approximately 10 miles west of Blacksburg and 47 miles southwest of Roanoke. The New River Unit is located about 6 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, 8 miles in width at southeast end and narrowing to 2 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 standby status since the mid 1980s. The working population at RFAAP varies greatly with mission requirements.

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 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. Efforts are underway to delineate the occurrence and flow of groundwater. These efforts are complicated due to the presence of karst geology (highly fractured and channelized limestone).

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 Workplan, 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.

continues next page

PREVIOUS STUDIES, continued

1999

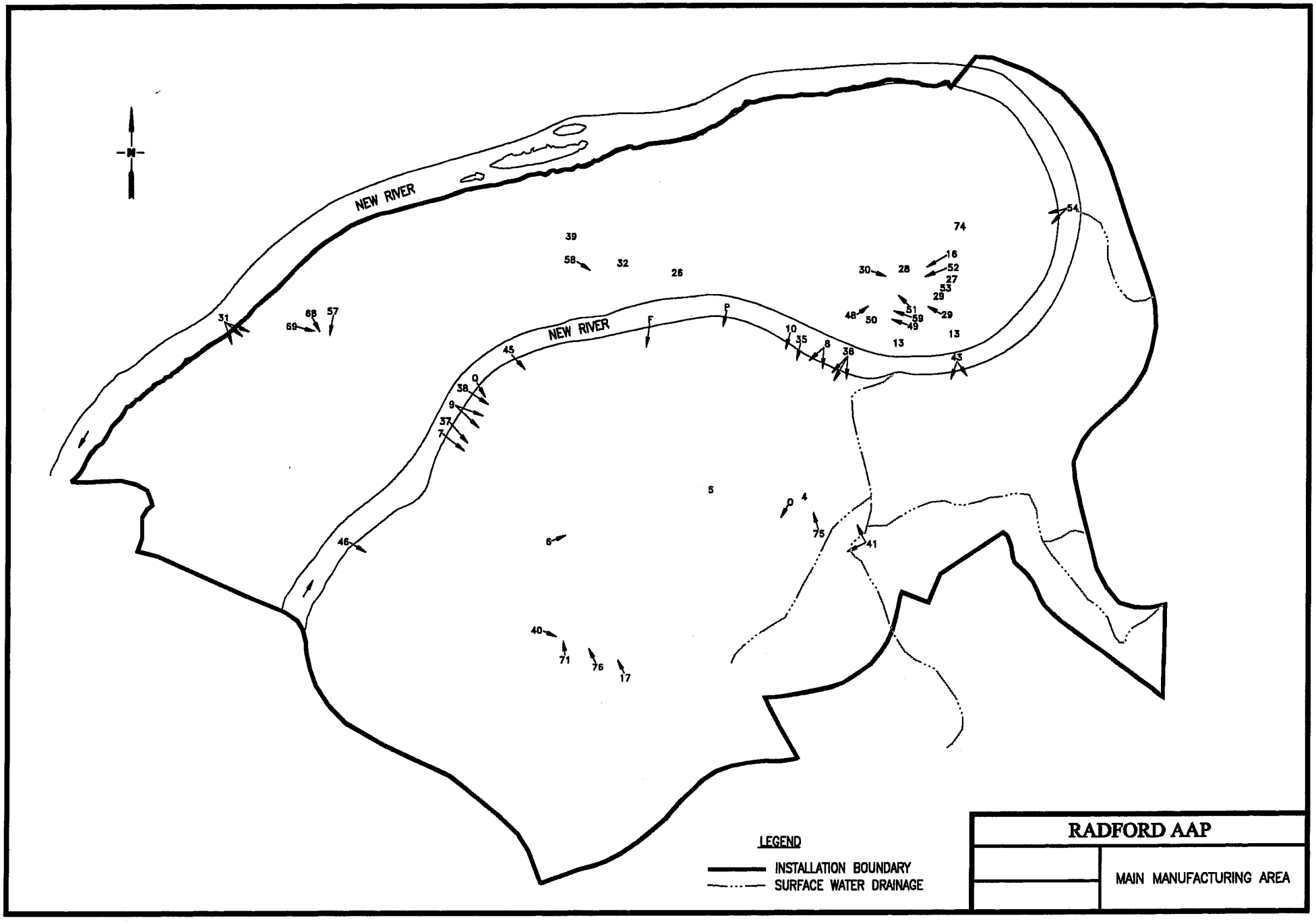
- RCRA Facility Investigation Report for SWMUs 31, 39, 48, 49, & 58, Draft, ICF Kaiser, January 1999.
- Workplan Addenda for SWMU 54 Interim Stabilization Measure, ATK, Draft Final January 1999.
- Workplan Addendum 8: RI/FS for the Northern and Western Burning Grounds (at the NRU) and RFI for Building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

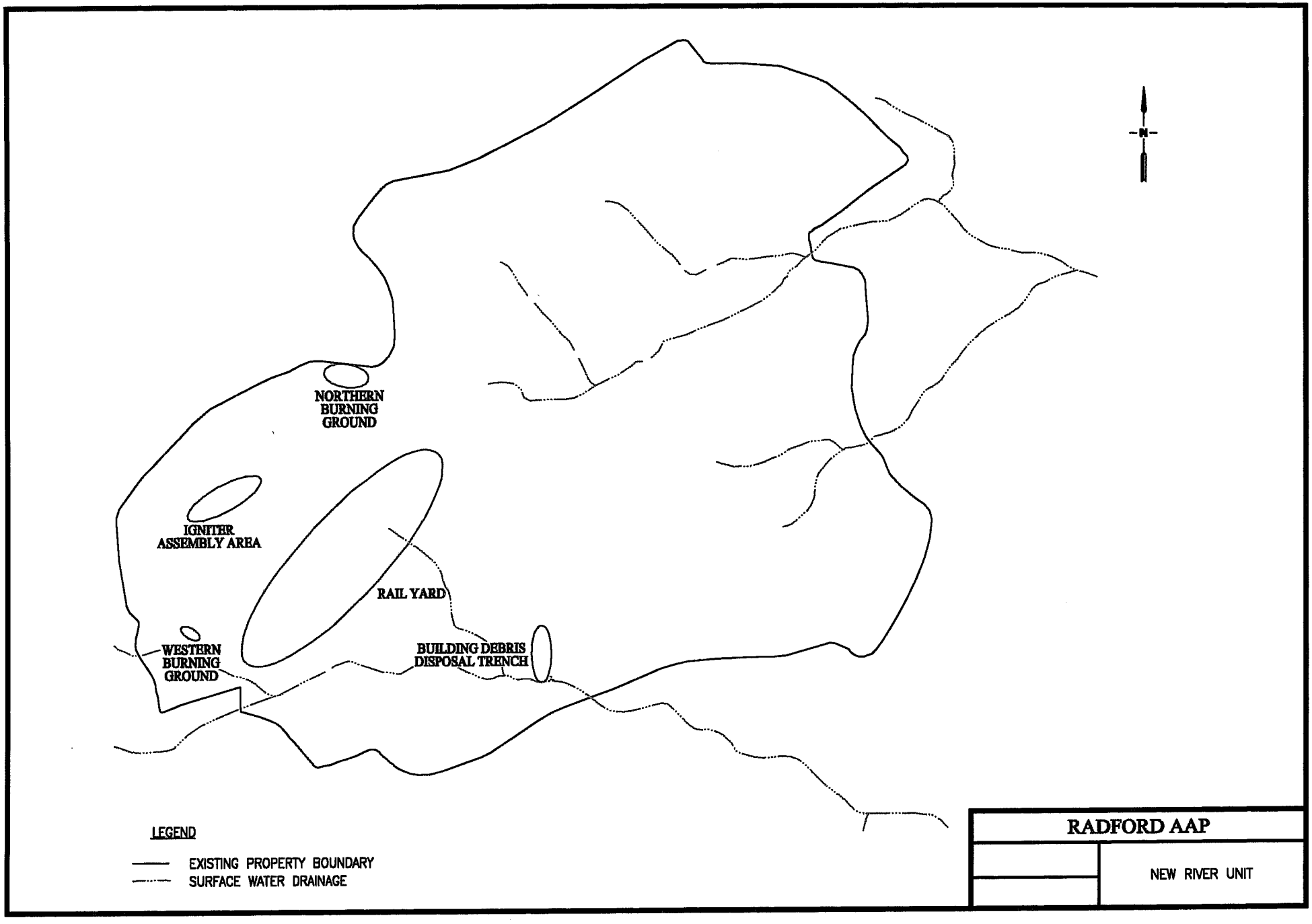
2000

- Workplan 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, July 2001.


N
NEW RIVER
NEW RIVER
LEGEND
INSTALLATION BOUNDARY
SURFACE WATER DRAINAGE
RADFORD AAP
MAIN MANUFACTURING AREA


N
NORTHERN BURNING GROUND
IGNITER ASSEMBLY AREA
RAIL YARD
WESTERN BURNING GROUND
BUILDING DEBRIS DISPOSAL TRENCH
LEGEND
EXISTING PROPERTY BOUNDARY
SURFACE WATER DRAINAGE
RADFORD AAP
NEW RIVER UNIT

TNT WASTE ACID NEUTRALIZATION PITS - SWMU 51
RFAAP-001

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 1970's. The pits were backfilled and revegetated.

A RCRA Facility Investigation (Dames & Moore 1992) evaluated groundwater and soil samples and a CMS was recommended. 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.

PROPOSED PLAN

Collect groundwater and soil samples for the site screening process and for a quantitative human health risk assessment, as applicable in accordance with the 2000 RCRA CORA. Due to the nature of the karst geology, source removal is recommended.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, Explosives, VOCs, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

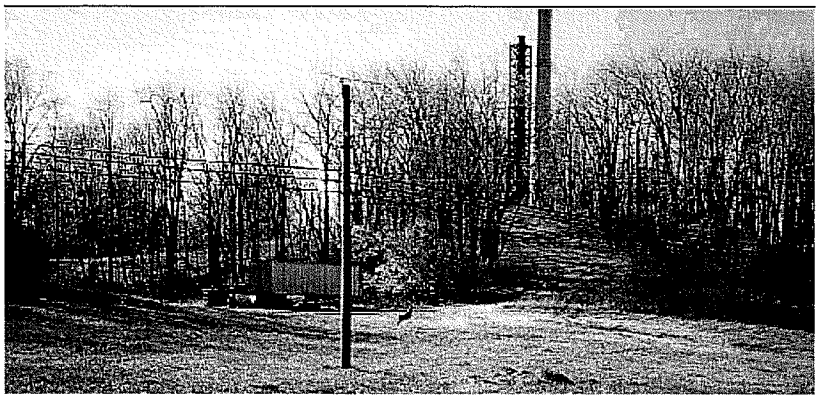
FUTURE IRP PHASE:
CMS, DES, CMI, LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RI	RD	RA(C)	LTM
2002	539			
2003				
2004		41		
2005			1148	78.6
2006				25.6
2007				17.1
2008+				34.2

PROJECTED TOTAL:
$ 1,883,500

FLASH BURN PARTS AREA - SWMU 71
RFAAP-002



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.

PROPOSED PLAN

Soil samples will be collected to confirm previous investigative results and provide additional data to support a quantitative human health risk assessment. No further action is anticipated.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, Total Petroleum Hydrocarbons

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

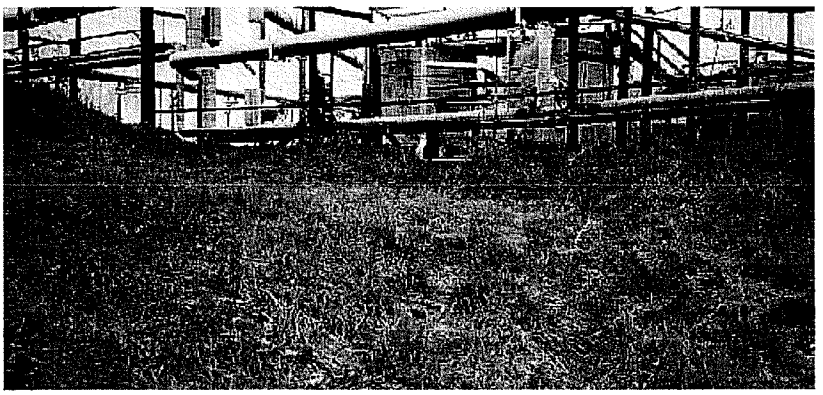
FUTURE IRP PHASE: RC

PROGRAMMED COST-TO-COMPLETE

PHASE	RI
2002	
2003	
2004	
2005	
2006	224.5
2007	
2008+	

PROJECTED TOTAL:
$ 224,500

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



STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, VOCs

MEDIA OF CONCERN:
Soil, Groundwater, Sediment

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

SITE DESCRIPTION

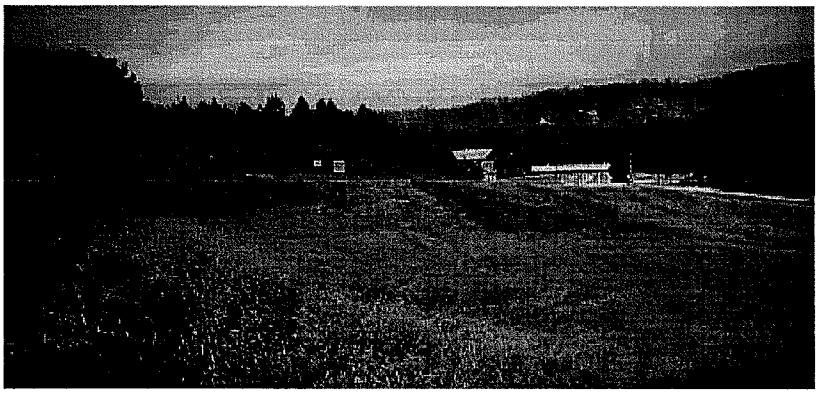
SWMU 69 was an unlined settling pond that received SWMU 68 neutralized wastewater from rocket encasement cleaning activities. Before 1974, runoff consisted of neutralized chromic acid (pH=8.6), which had been treated with sulfuric acid, sodium metabisulfate, and calcium lime. After 1974 up to the time 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.

PROPOSED PLAN

No further action is recommended for this SWMU.

INERT LANDFILL NO.3 - SWMU 74
RFAAP-004



STATUS

RRSE RATING: Low (3A)

CONTAMINANTS:
Metals, VOCs, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

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, and the estimated remaining life of the landfill is two to three years.

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

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.

PROPOSED PLAN

The RFI will be completed. Groundwater monitoring will continue to ensure that the COCs are not migrating beyond the burning ground boundaries. Soil contamination will be addressed as part of the Closure Plan when closure occurs. The anticipated remedy is a RCRA cap. LTM is programmed for 15 years but may extend to 30 years.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, Explosives, VOCs, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

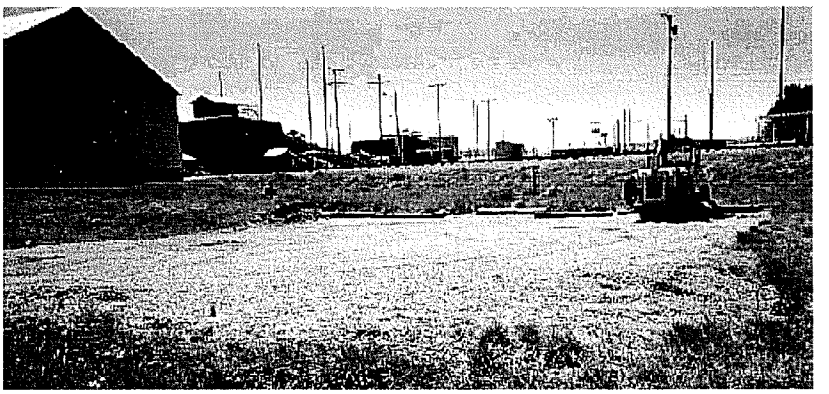
FUTURE IRP PHASE:
CMS, DES, CMI, LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RI	RD	RA(C)	LTM
2002				
2003				
2004				
2005				
2006	676.3			
2007				
2008+		172.8	5231.9	1207.1

PROJECTED TOTAL:
$ 7,288,100

FORMER DRUM STORAGE AREA - AREA F
RFAAP-006



STATUS

RRSE RATING: Medium (2A)

CONTAMINANTS:
VOCs, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

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.

PROPOSED PLAN

No further action is necessary in this area.

CLOSED SANITARY LANDFILL - SWMU 28
RFAAP-007

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, Explosives, VOCs, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

SITE DESCRIPTION

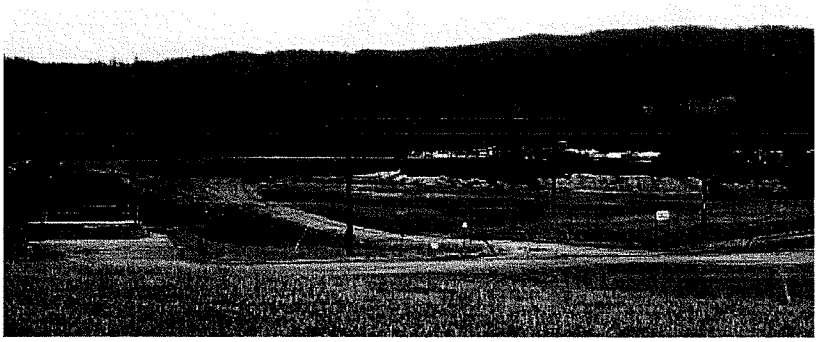
SWMU 28 is a landfill located in the southeast section of the Horseshoe Area. It replaced the sanitary landfill immediately to the south (SWMU 52), that was closed in 1984. SWMU 28 is contiguous with the Closed Hazardous Waste Landfill (HWMU 16) and is approximately 200 feet northeast of the TNT Neutralization 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 closure plan requirements for HWMU 16 which includes SWMUs 28 and 52.

PROPOSED PLAN

Any potential necessary action will be addressed under RFAAP-039 (HWMU 16).

CaSO4 TREATMENT/DISPOSAL AREA - SWMU 27
RFAAP-008



STATUS

RRSE RATING: High (1A)

CONTAMINANTS: Explosives

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

SITE DESCRIPTION

SWMU 27, the Calcium Sulfate Landfill, is a closed, 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 a closed landfill under state permit No. 353, this site is not eligible for ER,A funding.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil, Groundwater, Surface Water

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

SITE DESCRIPTION

SWMU 40 was reportedly used as a sanitary landfill 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 closed with a soil cap and grass cover. The landfill is approximately 1 acre in size.

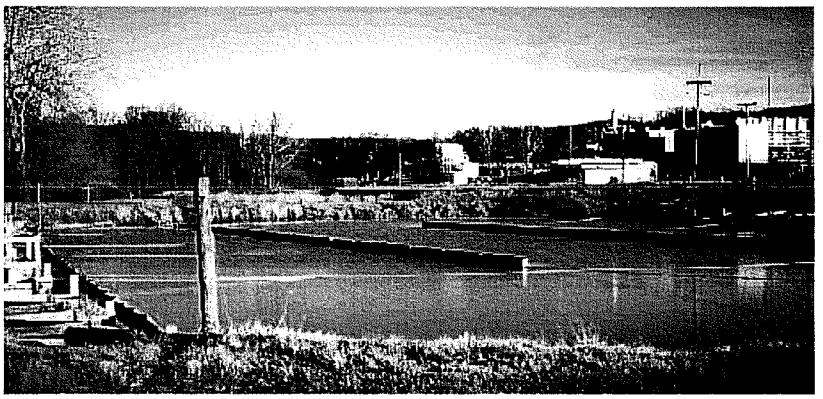
A RCRA Verification Investigation (Dames & Moore 1992) attempted to install four monitoring wells, which could not be sampled as the four borings were dry. A dye-trace study was conducted in the adjacent area (Engineering-Science 1993 and 1994) to identify groundwater flow paths in the south-central section of the Main Manufacturing Area. A RCRA Facility Investigation Study (Parsons Engineering-Science 1996) included the collection and analysis of one groundwater sample. The groundwater sample collection location is not known.

A contract to perform a RFI/CMS was procured in FY01.

PROPOSED PLAN

The RFI/CMS is underway. No further action is anticipated.

CaSO4 TREATMENT/DISPOSAL AREA - SWMU 8
RFAAP-010



STATUS

RRSE RATING: High (1A)
CONTAMINANTS: Metals
MEDIA OF CONCERN: Soil
COMPLETED IRP PHASE: RFA
CURRENT IRP PHASE: RC
FUTURE IRP PHASE: RC

SITE DESCRIPTION

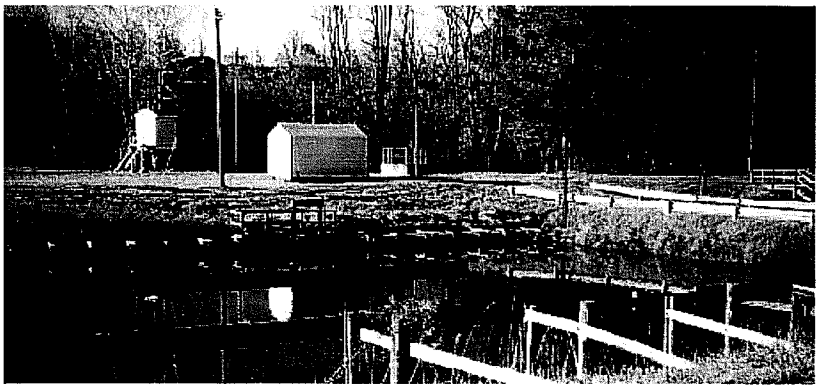
SWMU 8 consists of two unlined, below-grade earthen lagoons located in the northeast section of the MMA along the south bank of the New River. The lagoons were designed to neutralize acidic wastewater from the Acidic Wastewater Treatment Plant with hydrated lime. The supernatant is discharged to the 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.

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 (1A)

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

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 north-east 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.

PROPOSED PLAN

Collect samples from available media to support an Engineering Evaluation/Cost Analysis (EE/CA).

Approximately 1500 cy of soil will be removed, transported and disposed as hazardous waste.

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

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, Explosives

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

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE:
CMS, DES, CMI

PROGRAMMED COST-TO-COMPLETE

PHASE	RI	RD	RA(C)
2002	396		
2003			
2004		27.2	
2005			1431.2
2006			
2007			
2008+			

PROJECTED TOTAL:
$ 1,854,400

CaSO4 DRYING BED - SWMU 36
RFAAP-010

STATUS

RRSE RATING: High (1A)
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.

PROPOSED PLAN

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

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, Explosives

MEDIA OF CONCERN:
Soil, Groundwater, Surface Water

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE:
CMS, DES, CMI

SITE DESCRIPTION

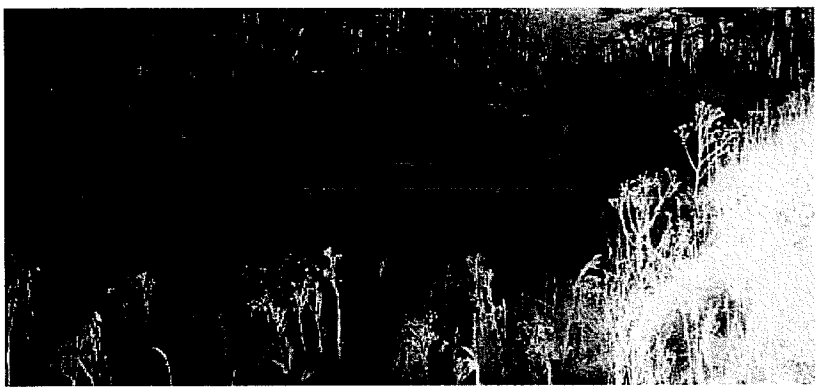
SWMU 37 is an unlined drying bed approximately 100 feet long, 80 feet wide, and 8 feet deep located in the northwest section of the MMA. The SWMU is immediately southwest of and adjacent to SWMU 9 and received calcium sulfate sludge. Beds have been inactive since the 1980s.

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.

PROPOSED PLAN

Collect samples from available media to support an EE/CA. Funding associated with this site is reflected on the site page for SWMU-35.

CaSO4 DRYING BED - SWMU 38
RFAAP-010



STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, Explosives

MEDIA OF CONCERN:
Soil, Groundwater, Surface Water

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE:
CMS, DES, CMI

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.

PROPOSED PLAN

Collect samples from available media to support a site evaluation. Funding associated with this site is reflected on the site page for SWMU-35.

NITROCELLULOSE RAINWATER DITCH - AREA A
RFAAP-010

STATUS

RRSE RATING: High (1A)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Sediment

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI

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). The nature and extent of contamination associated with Area A is not known.

PROPOSED PLAN

A historical background study will be conducted. No further action is anticipated. Funding associated with this site is reflected on the site page for SWMU-35.

RED WATER ASH BURIAL GROUND - SWMU 41
RFAAP-011

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.

PROPOSED PLAN

A RFI will be performed. A one-acre cap is anticipated.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, Explosives, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

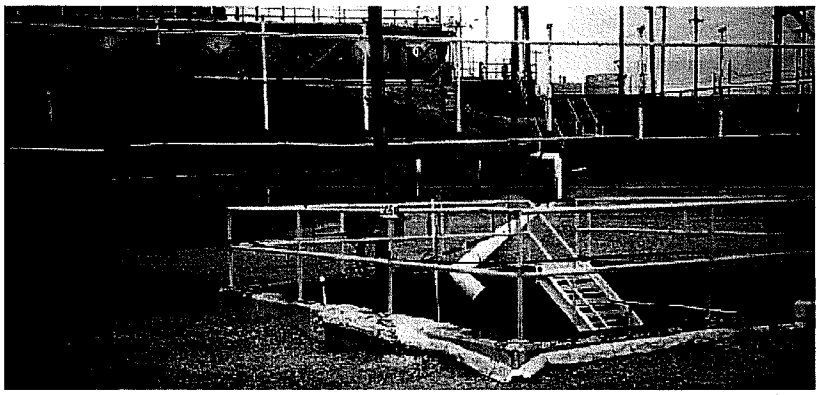
FUTURE IRP PHASE:
CMS, DES, CMI, LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RI	RD	RA(C)	LTM
2002	504.9			
2003				
2004		66.4		
2005				
2006			664.2	42.9
2007				77.7
2008+				678.4

PROJECTED TOTAL:
$ 2,034,500

ACID WASTEWATER LAGOON - SWMU 6
RFAAP-012



STATUS

RRSE RATING: Medium (2A)

CONTAMINANTS: Explosives, Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

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.

A construction project is scheduled in the area of this site.

PROPOSED PLAN

Site close-out documentation will be prepared pending finalization of the facility-wide background study and construction project.

RED WATER ASH BURIAL - SWMU 49
RFAAP-013

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.

PROPOSED PLAN

Closure documentation for SWMU-49 only will be prepared under this DSERTS site. Current investigation and remediation work is being conducted under RFAAP-013, -018, -025, and -028. Due to their contiguous nature, these sites are being investigated as one unit. However, two remedial actions are anticipated at RFAAP-018 and -028.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, Explosives, SVOCs, VOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

PROGRAMMED COST-TO-COMPLETE

PHASE	RI
2002	
2003	
2004	
2005	
2006	
2007	
2008+	78.6

PROJECTED TOTAL:
$ 78,600

PROPELLANT BURNING ASH DISPOSAL AREA - SWMU 54
RFAAP-014

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 VI was performed in 1992 by Dames & Moore. A contract to perform a RFI/CMS was procured in FY01.

PROPOSED PLAN

A RFI/CMS is underway. Soil excavation, transportation and disposal is anticipated.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, Explosives, VOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE:
CMS, DES, CMI, LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RD	RA(C)	LTM
2002	49.7		
2003			
2004		1243.8	25.3
2005			44.5
2006			11.1
2007			11.1
2008+			11.1

PROJECTED TOTAL:
$ 1,396,600

FLY ASH LANDFILL - SWMU 26
RFAAP-015

STATUS

RRSE RATING: Low (3A)

CONTAMINANTS: SVOCs

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

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

SITE DESCRIPTION

SWMU 39 consists of two unlined earthen ponds 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 6 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) which 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). A contract for additional RFI/CMS efforts was procured in FY01.

PROPOSED PLAN

A RFI/CMS is underway. Soil excavation, transportation and disposal is anticipated.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI

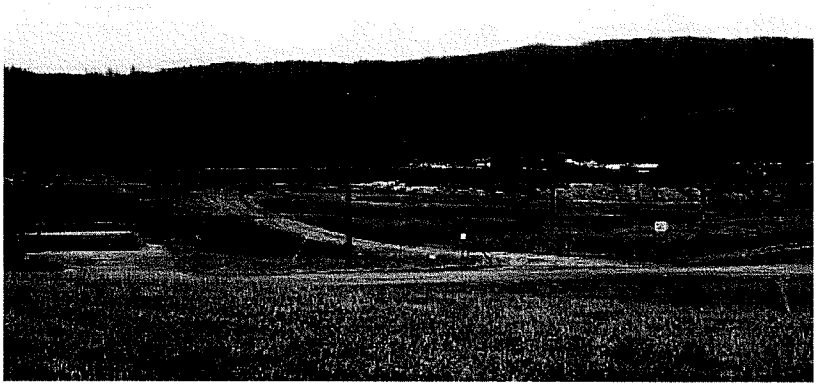
FUTURE IRP PHASE: CMS, DES, CMI, LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RD	RA(C)	LTM
2002			
2003			
2004			
2005	46.2		
2006		1855	54.2
2007			84.8
2008+			31.8

PROJECTED TOTAL: $ 2,072,000

ACTIVATED CARBON DISPOSAL AREA - SWMU 53
RFAAP-017



STATUS

RRSE RATING: Low (3A)

CONTAMINANTS: None

MEDIA OF CONCERN: Groundwater

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

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

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. A contract for additional RFI/CMS efforts was procured in FY01.

PROPOSED PLAN

A RFI/CMS is underway. Groundwater is being addressed by the Horseshoe Area-wide study. Soil excavation, transportation and disposal is anticipated.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Explosives, Metals

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE:
CMS, DES, CMI, LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RD	RA(C)	LTM
2002			
2003			
2004			
2005	209.2		
2006			
2007		5242.7	54.7
2008+			124.9

PROJECTED TOTAL:
$ 5,631,500

INERT LANDFILL NO. 1 - SWMU 32
RFAAP-019

STATUS

RRSE RATING: Low (3A)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

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 - SWMU 29
RFAAP-020

STATUS

RRSE RATING: Low (3A)

CONTAMINANTS:
Explosives, Metals

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

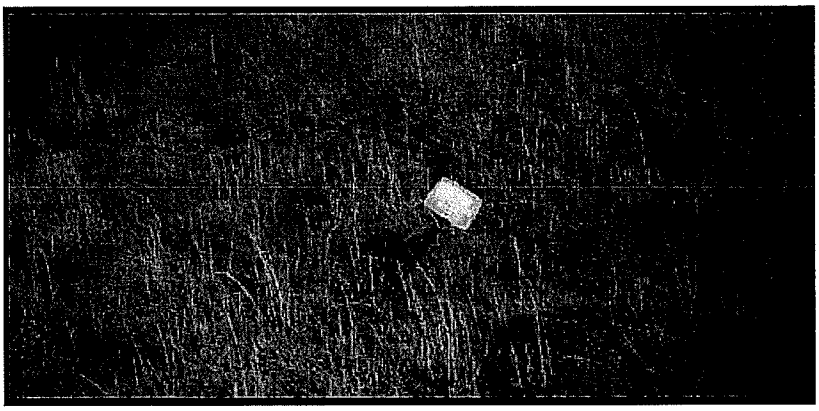
SITE DESCRIPTION

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.



SITE DESCRIPTION

The reported location of SWMU 46 is a small depression with no outward drainage. Approximately 1 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 two soil samples for metals and explosives. No contamination was detected.

In 1997, USACHPPM conducted further studies by collecting five subsurface (5-9 ft) soil samples. Samples were analyzed for SVOCs, explosives, total metals and nitrite/nitrates. No exceedences were detected. Groundwater samples were attempted but no water was available.

PROPOSED PLAN

Closure documentation will be prepared. Based on previous investigation results, no further action is recommended at this time.

STATUS

RRSE RATING: Low (3A)

CONTAMINANTS:
Metals, Explosives

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

PROGRAMMED COST-TO-COMPLETE

PHASE	RI
2002	
2003	38.7
2004	
2005	
2006	
2007	
2008+	

PROJECTED TOTAL:
$ 38,700

POND BY BLDGS 4931 AND 4932 - SWMU 57
RFAAP-022

SITE DESCRIPTION

SWMU 57 is designated as an acid settling pond in RFAAP facility drawings 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 reportedly connected to a maintenance shop (Building 4931) by an underground pipe.

A RCRA VI (Dames & Moore 1992) collected one surface water and one sediment sample. No contamination was detected.

PROPOSED PLAN

Closure documentation will be prepared.

STATUS

RRSE RATING: Low (3A)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Sediment

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI

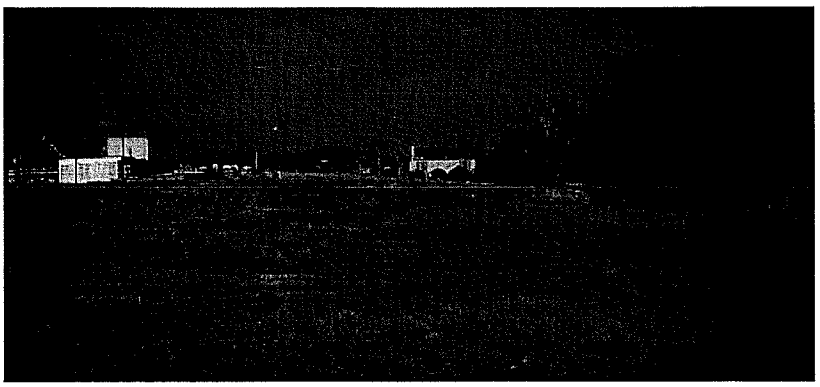
FUTURE IRP PHASE: RC

PROGRAMMED COST-TO-COMPLETE

PHASE	RI
2002	
2003	38.7
2004	
2005	
2006	
2007	
2008+	

PROJECTED TOTAL: $ 38,700

SANITARY LANDFILL NO. 2 - SWMU 43
RFAAP-023



SITE DESCRIPTION

SWMU 43 is a closed, unlined sanitary landfill 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/CMS is planned. No further action is anticipated.

STATUS

RRSE RATING: Low (3A)

CONTAMINANTS:
Metals, VOCs

MEDIA OF CONCERN:
Groundwater, Soil, Surface Water

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

PROGRAMMED COST-TO-COMPLETE

PHASE	RI
2002	
2003	
2004	
2005	
2006	
2007	
2008+	199.1

PROJECTED TOTAL:
$ 199,100

LANDFILL NO. 3 - SWMU 45
RFAAP-024

SITE DESCRIPTION

SWMU 45 is an inactive sanitary landfill 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/CMS is planned. No further action is anticipated.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS: SVOCs

MEDIA OF CONCERN: Groundwater

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

PROGRAMMED COST-TO-COMPLETE

PHASE	RI
2002	
2003	
2004	255.5
2005	
2006	
2007	
2008+	

PROJECTED TOTAL: $ 255,500

CaSO4 TREATMENT/DISPOSAL AREA - SWMU 50
RFAAP-025

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.

PROPOSED PLAN

Closure documentation for SWMU-50 only will be prepared under this DSERTS site. Current investigation and remediation work is being conducted under RFAAP-013, -018, -025, and -028. Due to their contiguous nature, these sites are being investigated as one unit. However, two remedial actions are anticipated at RFAAP-018 and -028.

STATUS

RRSE RATING: Low (3A)

CONTAMINANTS:
Metals, Explosives, SVOCs, VOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

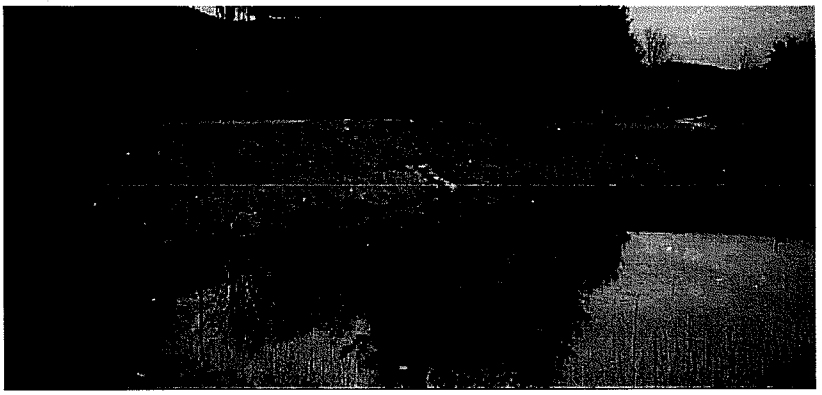
FUTURE IRP PHASE: RC

PROGRAMMED COST-TO-COMPLETE

PHASE	RI
2002	
2003	
2004	
2005	
2006	
2007	
2008+	78.6

PROJECTED TOTAL:
$ 78,600

COAL ASH SETTLING LAGOONS - SWMU 31
RFAAP-026



STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater, Surface Water

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

SITE DESCRIPTION

SWMU 31 consists of three unlined settling lagoons 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.

PROPOSED PLAN

A RFI/CMS is underway.

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.

PROPOSED PLAN

A RFI/CMS is planned. No further action is anticipated.

STATUS

RRSE RATING: Medium (2A)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

PROGRAMMED COST-TO-COMPLETE

PHASE	RI
2002	
2003	
2004	
2005	204.5
2006	
2007	
2008+	

PROJECTED TOTAL: $ 204,500

BOTTOM ASH PILE - SWMU 59
RFAAP-028

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.

PROPOSED PLAN

A RFI/CMS is underway. Groundwater is being addressed by the Horseshoe Area-wide study. Soil excavation, transportation and disposal is anticipated.

STATUS

RRSE RATING: Low (3A)

CONTAMINANTS:
Metals, VOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

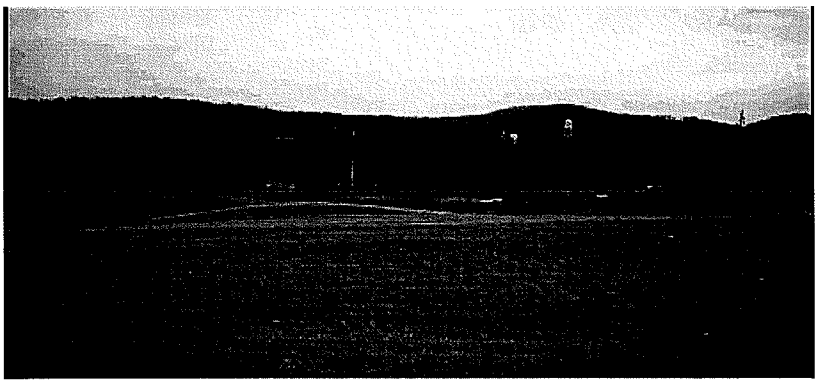
FUTURE IRP PHASE:
CMS, DES, CMI, LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RI	RD	RA(C)	LTM
2002				
2003	573.4			
2004				
2005				
2006				
2007		86		
2008+			3453.3	139.2

PROJECTED TOTAL:
$ 4,251,900

CLOSED SANITARY LANDFILL - SWMU 52
RFAAP-029



STATUS

RRSE RATING: High (1A)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

SITE DESCRIPTION

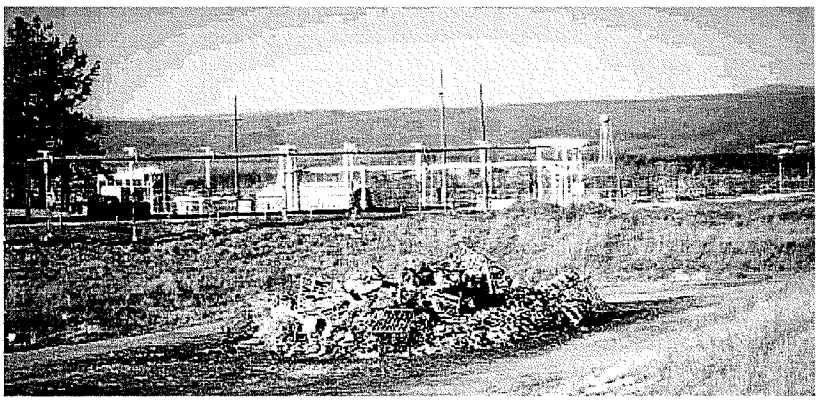
SWMUs 52 and 28 are closed sanitary landfill (Permit 401) in the southeastern section of the Horseshoe Area contiguous to and immediately south of the closed RFAAP Hazardous Waste Landfill (HWMU 16). The SWMU reportedly contains three trenches, each approximately 35 feet wide by 500 feet long by 14 feet 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.

PROPOSED PLAN

Actions to be addressed under RFAAP-039 (HWMU-16).

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



STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, VOCs, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater, Surface Water

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

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. 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. 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

SITE DESCRIPTION

Area Q is an abandoned lagoon located in the northwest section of the MMA. 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.

A RCRA VI (Dames & Moore in 1992) collected one composite sludge sample.

PROPOSED PLAN

A RFI/CMS is planned. No further action is anticipated.

STATUS

RRSE RATING: Low (3A)

CONTAMINANTS:
SVOCs, TCLP Metals

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

PROGRAMMED COST-TO-COMPLETE

PHASE	RI
2002	
2003	
2004	
2005	
2006	
2007	
2008+	230

PROJECTED TOTAL:
$ 230,000

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 (3A)
CONTAMINANTS: N/A
MEDIA OF CONCERN: N/A
COMPLETED IRP PHASE: RFA
CURRENT IRP PHASE: RC
FUTURE IRP PHASE: RC

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 (3A)
CONTAMINANTS: N/A
MEDIA OF CONCERN: N/A
COMPLETED IRP PHASE: RFA
CURRENT IRP PHASE: RC
FUTURE IRP PHASE: RC

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.

PROPOSED PLAN

Confirmation of impacted soil removal will be required. No remediation is anticipated.

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.

STATUS

RRSE RATING: Low (3A)

CONTAMINANTS: N/A

MEDIA OF CONCERN: N/A

COMPLETED IRP PHASE: RFA

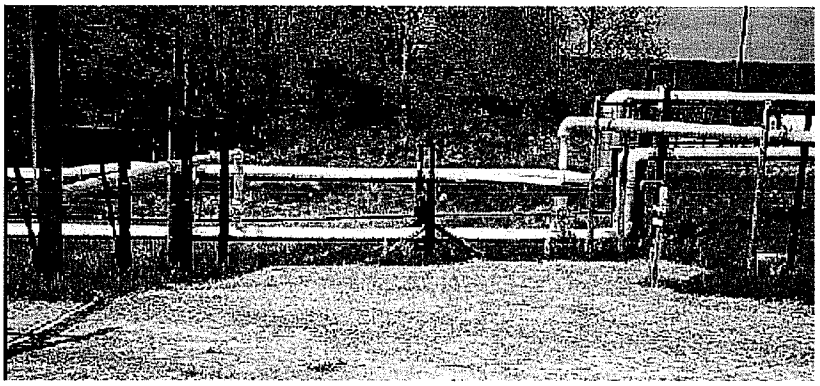
CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

PROPOSED PLAN

Confirmation of impacted soil removal will be required. No remediation is anticipated.

CHROMIC ACID TREATMENT TANKS - SWMU 68
RFAAP-033



STATUS

RRSE RATING: High (1A)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil

COMPLETED IRP PHASE: RFA, IRA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

PROGRAMMED COST-TO-COMPLETE

PHASE	RI
2002	8
2003	
2004	
2005	
2006	
2007	
2008+	

PROJECTED TOTAL:
$ 8,000

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.

PROPOSED PLAN

Site screening/closure documentation will be prepared.

SEWAGE LINES
RFAAP-035

SITE DESCRIPTION

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

PROPOSED PLAN

The sewer line investigation is ongoing. It was fully funded in FY99.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, Explosives

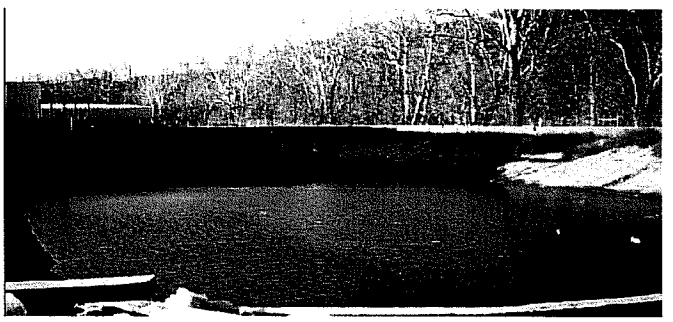
MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

BIOPLANT BASIN - SWMU 10
RFAAP-036



STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Metals, Explosives, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RC

FUTURE IRP PHASE: RC

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.

PROPOSED PLAN

The Bioplant Basin has received clean closure for soils. Waiting for groundwater clean closure from VDEQ.

BATTERY STORAGE AREA - AREA P
RFAAP-037

SITE DESCRIPTION

The Spent Battery Storage Area (Area P) consists of an open lot several acres in size that is 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 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.

STATUS

RRSE RATING: Low (3A)

CONTAMINANTS:
Explosives, Metals

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

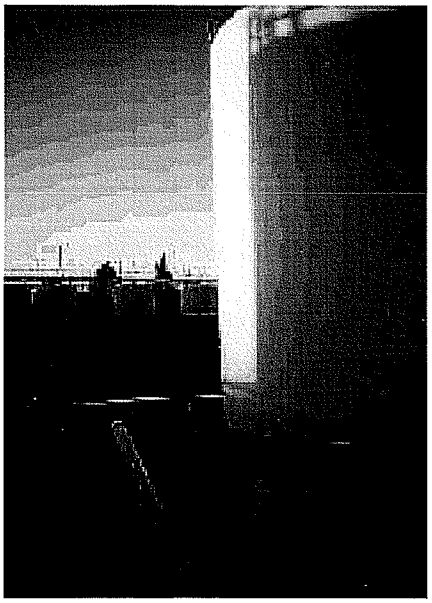
CURRENT IRP PHASE: RFI

FUTURE IRP PHASE:
CMS, DES, CMI

PROGRAMMED COST-TO-COMPLETE

PHASE	RI	RD	RA(C)
2002			
2003			
2004			
2005			
2006	435.1		
2007		7.0	
2008+			159.8

PROJECTED TOTAL:
$ 601,900



SITE DESCRIPTION

Area O consists of one 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.

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 and will include a MMA-wide groundwater study. A remedial action is anticipated.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
VOCs, SVOCs

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE:
CMS, DES, CMI, CMO, LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RI	RD	RA(C)	LTM
2002				
2003				
2004	209.8			
2005		68.0		
2006	1248.5		1034.1	
2007	149.2			20.2
2008+				212.5

PROJECTED TOTAL:
$ 2,942,300

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). The site is a closed landfill 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.

LTM and a post-closure permit are required by VDEQ.

PROPOSED PLAN

A RFI will be performed to delineate a larger area of concern, encompassing the areas of SWMU-28 and 52.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS:
Explosives, VOCs

MEDIA OF CONCERN:
Groundwater

COMPLETED IRP PHASE:
RFA

CURRENT IRP PHASE: RFI

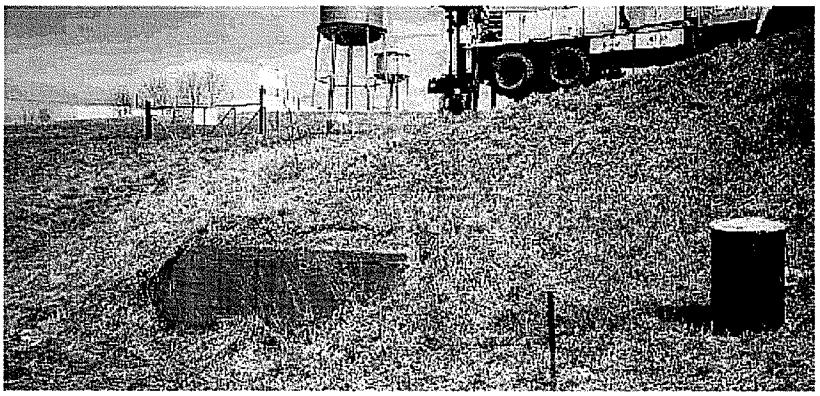
FUTURE IRP PHASE:
RC with LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RI	LTM
2002	122.0	
2003	122.0	
2004	729.1	
2005		122.0
2006		122.0
2007		122.0
2008+		2154.0

PROJECTED TOTAL:
$ 3,493,100

FORMER LEAD FURNACE AREA
RFAAP-040



STATUS

RRSE RATING: High (1A)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: RC

PROGRAMMED COST-TO-COMPLETE

PHASE	RI
2002	78.6
2003	
2004	
2005	
2006	
2007	
2008+	

PROJECTED TOTAL: $ 78,600

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 USTHAMA 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.

PROPOSED PLAN

A RFI report and closure documentation will be prepared. No further action is anticipated for the Former Lead Furnace Area.

SITE DESCRIPTION

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

The source removed 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.

PROPOSED PLAN

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

STATUS

RRSE RATING: High (1B)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RC with LTM

FUTURE IRP PHASE: RC with LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RI
2002	122
2003	122
2004	122
2005	122
2006	
2007	
2008+	

PROJECTED TOTAL:
$ 488,000

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.

PROPOSED PLAN

This site is incorporated into the facility VDEQ RCRA operating permit, effective in December 2001. Monitoring is required until soil and groundwater clean-closure is demonstrated.

Clean-closure for soils will be pursued as part of the basis for eliminating LTM. Excavation, transportation, and disposal of impacted soil is anticipated.

STATUS

RRSE RATING: High (1B)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: DES

FUTURE IRP PHASE: CMI, LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RD	RA(C)	LTM
2002	222		
2003	139.4		
2004		246.4	122
2005			122
2006			
2007			
2008+			

PROJECTED TOTAL: $ 851,800

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.

PROPOSED PLAN

This site is incorporated into the facility VDEQ RCRA operating permit, effective in December 2001. Monitoring is required until soil and groundwater clean-closure is demonstrated.

Clean-closure for soils will be pursued as part of the basis for eliminating LTM. Excavation, transportation, and disposal of impacted soil is anticipated.

STATUS

RRSE RATING: High (1B)

CONTAMINANTS:
Heavy Metals

MEDIA OF CONCERN:
Soil, Groundwater

COMPLETED IRP PHASE:
RFA

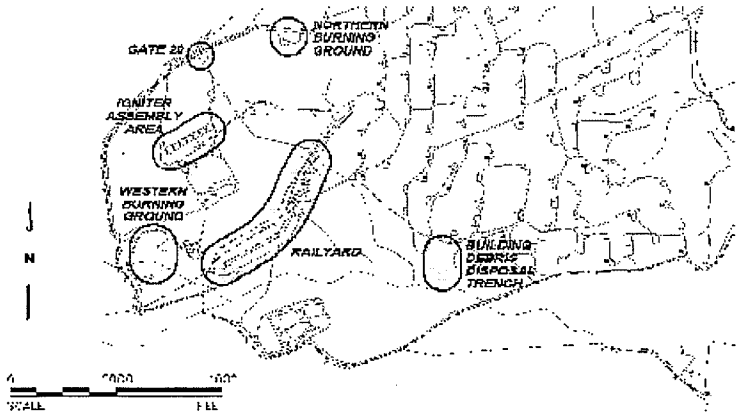
CURRENT IRP PHASE: DES

FUTURE IRP PHASE:
CMI, LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RD	RA(C)	LTM
2002	222		
2003	139.4		
2004		246.4	122
2005			122
2006			
2007			
2008+			

PROJECTED TOTAL:
$ 851,800



STATUS

RRSE RATING: High (1B)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: PA/SI

CURRENT IRP PHASE: RI

FUTURE IRP PHASE: RD, RA(C)

PROGRAMMED COST-TO-COMPLETE

PHASE	RD	RA(C)
2002		
2003		
2004		
2005	132.1	573.0
2006		380.0
2007		3117.4
2008+		

PROJECTED TOTAL: $ 4,202,500

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.

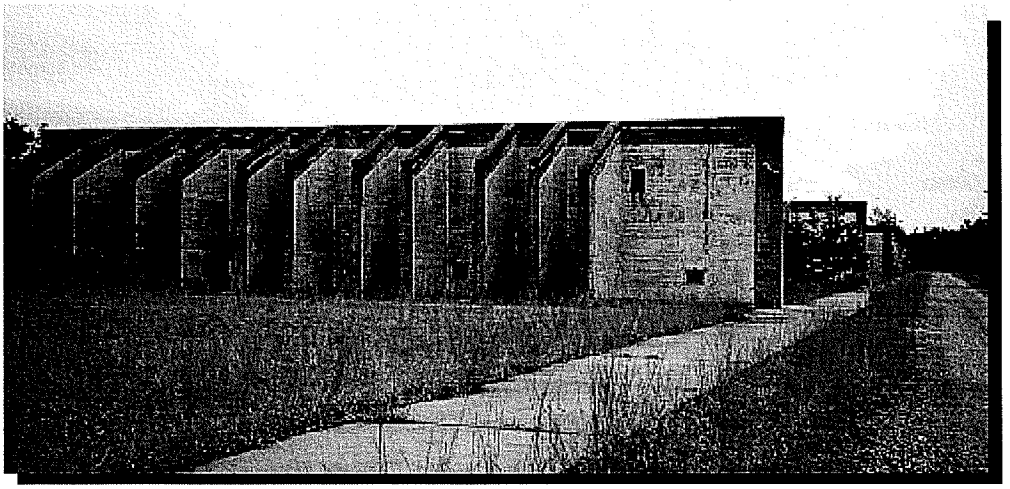
A Remedial Investigation sampling effort included the collection of surface soil, sludge, and water samples. Metals have been detected in exceedence of the 1989 RCRA CORA permit HBNs; however this site is not subject to any RCRA CORA permit. Five areas within the New River Unit are being investigated: the Igniter Assembly Area (IAA), Northern Burning Grounds (NBG), Western Burning Grounds (WBG), Rail Yard (RY), and the Building Debris Disposal Trench (BDDT). Of the five sites, three require additional work. A contract for additional RFI/CMS efforts was procured in FY01.

PROPOSED PLAN

Continue RI effort after completing the inorganic background study effort. Excavation, transportation, and disposal of impacted soil 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.

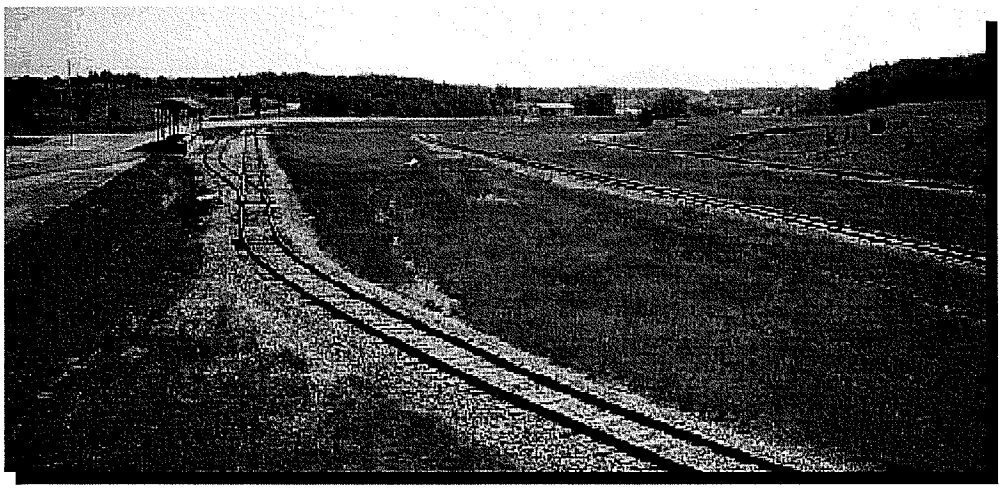
Building Debris Disposal Trench



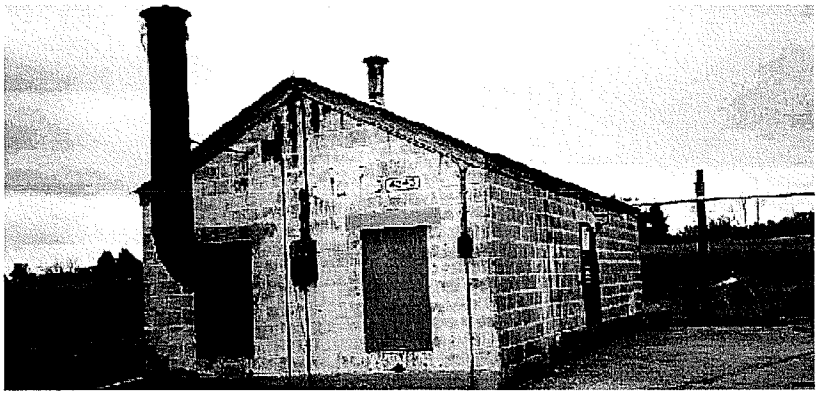
Igniter Assembly Area

Northern Burning Ground

Western Burning Ground



Rail Yard



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. A RFI was conducted to evaluate potential contamination releases associated with former cadmium plating activities.

PROPOSED PLAN

RFI activities will continue. Excavation, transportation, and disposal of impacted soil is anticipated. LTM is anticipated.

STATUS

RRSE RATING: High (1A)

CONTAMINANTS: Metals

MEDIA OF CONCERN: Soil, Groundwater

COMPLETED IRP PHASE: RFA

CURRENT IRP PHASE: RFI

FUTURE IRP PHASE: CMS, DES, CMI, LTM

PROGRAMMED COST-TO-COMPLETE

PHASE	RI	RD	RA(C)	LTM
2002				
2003	384.7			
2004		32.6		
2005			545.6	31.3
2006				53.7
2007				10.1
2008+				20.2

PROJECTED TOTAL: $ 1,078,200

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 DSERTS sites.

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
- Monitor groundwater at HWMUs 4, 5, 7 and 16

PROJECTED MILESTONES

2002
- Start RFI at SWMUs 35, 37, 38, Area A, 41, 51
- Start Site Screening once the Site Screening Process document is approved
- Monitor groundwater at HWMUs 4, 5, 7 and 16
- Start clean closure process at HWMUs 5 and 7

2003-2014
- 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-015
RFAAP-017
RFAAP-019
RFAAP-020
RFAAP-029 with LTM
RFAAP-030
RFAAP-032
RFAAP-033
RFAAP-036
RFAAP-041 with LTM

Schedule

Radford Army Ammunition Plant Installation Action Plan Schedule

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

CURRENT PHASE FUTURE PHASE

DSERTS #	SITE NAME	PHASE	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008+
RAAP-001	TNT Waste Acid Neutralization Pits	RI	■						
		RD			■				
		RA(C)				■			
		LTM				■	■	■	■
RAAP-002	Flash Burn Parts Area	RI					■		
RAAP-005	Waste Propellant Burning Ground	RI					■		
		RD							■
		RA(C)							■
		LTM							■
RAAP-010	CaSO4 Treatment Disposal Area	RI	■						
		RD			■				
		RA(C)				■			
RAAP-011	Red Water Ash Burial Ground	RI	■						
		RD			■				
		RA(C)					■		
		LTM					■	■	■
RAAP-013	Red Water Ash Burial 2	RI							■
RAAP-014	Propellant Burning Ash Disposal Area	RD	■						
		RA(C)			■				
		LTM			■	■	■	■	■
RAAP-016	Wastewater Ponds from Propellant Incinerator	RD				■			
		RA(C)					■		
		LTM					■	■	■
RAAP-018	Oily Water Burial Area	RD				■			
		RA(C)						■	
		LTM						■	■
RAAP-021	Propellant Burial	RI		■					

Radford Army Ammunition Plant Installation Action Plan Schedule

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

CURRENT PHASE | FUTURE PHASE

DSERTS #	SITE NAME	PHASE	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008+
RAAP-022	Pond By Building	RI		■					
RAAP-023	Sanitary Landfill	RI							■
RAAP-024	Landfill No. 3	RI			■				
RAAP-025	CaSO4 Treatment Disposal Area	RI							■
RAAP-027	Rubble Pile	RI				■			
RAAP-028	Bottom Ash Pile	RI		■					
		RD						■	
		RA(C)							■
		LTM							■
RAAP-031	CaSO4 Treatment Disposal Area	RI							■
RAAP-033	Chromic Acid Treatment Tanks	RI	■						
RAAP-037	Battery Storage Area	RI					■		
		RD						■	
		RA(C)							■
RAAP-038	Underground Fuel Oil Spill	RI			■		■	■	
		RD				■			
		RA(C)					■		
		LTM						■	■
RAAP-039	Hazardous Waste Landfill	RI	■	■	■				
		LTM				■	■	■	■
RAAP-040	Former Lead Furnace Area	RI	■						
RAAP-041	Surface Impoundment #4	LTM	■	■	■	■			
RAAP-042	Surface Impoundment #5	RD	■	■					
		RA(C)			■				
		LTM			■	■			

Radford Army Ammunition Plant Installation Action Plan Schedule

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

CURRENT PHASE FUTURE PHASE

DSERTS #	SITE NAME	PHASE	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008+
RAAP-043	Surface Impoundment #7	RD	■	■					
		RA(C)			■				
		LTM			■	■			
RAAP-044	New River Plant	RD				■			
		RA(C)				■	■	■	
RAAP-045	Building 4343	RI		■					
		RD			■				
		RA(C)				■			
		LTM				■	■	■	■

DSERTS PHASE SUMMARY REPORT

DEFENSE SITE ENVIRONMENTAL RESTORATION TRACKING SYSTEM

Site, 4. Installation Phase Summary Report 9/24/01

Installation: RADFORD AAP
Programs: BRAC I, BRAC II, BRAC III, BRAC IV, IRP

Subprograms: Compliance, Restoration, UXO
Installation count for Programs: 1

NPL Options: Delisted, No, Proposed, Yes

Installations count for Programs and NPL: 1
Site count for Programs and NPL: 44

Phase / Status / Sites

PA					SI			
C	U	F	RC		C	U	F	RC
44	0	0	1		42	0	0	0
RI / FS					**RD**			
C	U	F	RC		C	U	F	
13	21	8	11		0	2	12	
RA(C)					**RA(O)**			
C	U	F	RC		C	U	F	RC
1	0	14	1		0	0	0	0

LTM

C	U	F	N
0	1	12	30

Remedy / Status / Sites (Actions)

IRA								
	C			U			F	
1	(1)		0	(0)			0	(0)
FRA								
C				U			F	
1	(1)		0	(0)			14	(15)

RIP Total: 0

RC Total: 13

Reporting Period End Date: 09/30/2001

Schedule

Radford Army Ammunition Plant DSERTS IAP Report

DEFENSE SITE ENVIRONMENTAL RESTORATION TRACKING SYSTEM

Site, 9. RISK INSTALLATION ACTION PLAN REPORT 09/24/2001

Installation: RADFORD AAP
Major Command: AMC

SubCommand: OSC
Program Options: IRP, BRAC I, BRAC II, BRAC III, BRAC IV

Subprogram Options: Compliance, Restoration, UXO

Site	RRSE	Media Evaluated	Phase (s) Completed	Phase (s) Underway	Phase (s) Future	#IRA Completed	#IRA Underway	#IRA Future	LTM Status	RIP Date	RC Date
RAAP-001	1A	GW	PA		RAC				F		200509
			SI		RD						
					RI						
RAAP-002	1A	SL	PA		RI				N		200709
			SI								
RAAP-003	1A	SH	PA	RI					N		200410
		SL	SI								
		WH									
RAAP-004	3A	GW	PA						N		200009
			RI								
			SI								
RAAP-005	1A	GW	PA		RAC				F		200909
		SH	SI		RD						
		SL			RI						
RAAP-006	2A	SL	PA						N		200009
			RI								
			SI								
RAAP-007	1A	GW	PA						N		200009
			RI								
			SI								
RAAP-008	1A	GW	PA						N		200009
		SH	RI								
		WH	SI								
RAAP-009	1A	GW	PA	RI					N		200308
		SL	SI								

Radford Army Ammunition Plant DSERTS IAP Report, *continued*

Site	RRSE	Media Evaluated	Phase (s) Completed	Phase (s) Underway	Phase (s) Future	#IRA Completed	#IRA Underway	#IRA Future	LTM Status	RIP Date	RC Date
RAAP-010	1A	SH	PA	RI	RAC						200609
			SI		RD						
RAAP-011	1A	GW	PA		RAC				F		200609
		SL	SI		RD						
		WH			RI						
RAAP-012	2A	GW	PA	RI					N		200309
		SL	SI								
RAAP-013	1A	GW	PA	RI					N		200809
		SL	SI								
RAAP-014	1A	GW	PA	RI	RAC	1			F		200409
		SH	SI		RD						
		SL									
RAAP-015	3A	GW	PA						N		200009
			RI								
			SI								
RAAP-016	1A	GW	PA	RI	RAC				F		200609
		SH	SI		RD						
		SL									
RAAP-017	3A	SH	PA						N		200009
			RI								
			SI								
RAAP-018	1A	GW	PA	RI	RAC				F		200709
		SL	SI		RD						
RAAP-019	3A	GW	PA						N		200009
			RI								
			SI								
RAAP-020	3A	SH	PA						N		200009
			RI								
			SI								
RAAP-021	3A	SL	PA	RI					N		200409
			SI								
RAAP-022	3A	SH	PA	RI					N		200409
		WH	SI								
RAAP-023	3A	SL	PA		RI				N		200809
			SI								

Radford Army Ammunition Plant DSERTS IAP Report, *continued*

Site	RRSE	Media Evaluated	Phase (s) Completed	Phase (s) Underway	Phase (s) Future	#IRA Completed	#IRA Underway	#IRA Future	LTM Status	RIP Date	RC Date
RAAP-024	1A	GW	PA		RI				N		200512
			SI								
RAAP-025	3A	SL	PA	RI					N		200809
			SI								
RAAP-026	1A	GW	PA	RI					N		200303
		SL	SI								
RAAP-027	2A	SL	PA	RI					N		200612
			SI								
RAAP-028	3A	SL	PA	RI	RAC				F		200809
			SI		RD						
RAAP-029	1A	GW	PA						N		200009
			RI								
			SI								
RAAP-030	1A	GW	PA						N		200009
		SH	RI								
		SL	SI								
		WH									
RAAP-031	3A	SL	PA	RI					N		200809
			SI								
RAAP-032	3A	SL	PA						N		200009
RAAP-033	1A	SL	PA	RI					N		200512
			SI								
RAAP-035	1A	SL	PA	RI					N		200512
			SI								
RAAP-036	1A	GW	PA						N		199812
		SH	RI								
		SL	SI								
		WH									
RAAP-037	3A	SL	PA		RAC				N		200809
			SI		RD						
					RI						
RAAP-038	1A	GW	PA		RAC				F		200709
			SI		RD						
					RI						
RAAP-039	1A	GW	PA	RI					F		200409
		SL	SI								

Radford Army Ammunition Plant DSERTS IAP Report, *continued*

Site	RRSE	Media Evaluated	Phase (s) Completed	Phase (s) Underway	Phase (s) Future	#IRA Completed	#IRA Underway	#IRA Future	LTM Status	RIP Date	RC Date
RAAP-040	1A	SL	PA	RI					N		200509
			SI								
RAAP-041	1B	GW	PA						U		198801
			RAC								
			RI								
			SI								
RAAP-042	1A	GW	PA	RD	RAC				F		200409
			RI								
			SI								
RAAP-043	1A	GW	PA	RD	RAC				F		200409
			SI								
RAAP-044	1B	SEF	PA	RI	RAC				N		200709
		SH	SI		RD						
		SL									
RAAP-045	1A	GW	PA	RI	RAC				F		200509
		SL			RD						

RRSE - Relative Risk Site Evaluation; Risk Category - 1=High, 2=Medium, 3=Low;

Legal Agreement - A = with agreement, B = without agreement; C = Complete, U = Underway, F = Future, N = Not Applicable

Reporting Period End Date: 09/30/2001

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-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: capping when operations cease
- 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	270.7 K	
	Installation Support	29.2 K	**317.3 K**
	Underground Storage Tanks (RFAAP)	17.4 K	
FY 91	VI/RFI Fieldwork and Report, Phase I	1,570.9 K	**1,607.2 K**
	Installation Support	36.3 K	
FY 92	VI/RFI Plans, Fieldwork, Report, Phase II	1,355.0 K	**1,372.3 K**
	Split Samples	17.3 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	1,550.0 K	
	Conduct VIs at SWMUs	1,300.0 K	**2,850.0 K**
FY 96	Acid Sewer Investigation	752.0 K	
	CMS at SWMU 54	263.0 K	
	Phase II VI/RFI (included S68 IRA)	330.0 K	**1,445.0 K**
	IRA at SWMU 43	100.0 K	
FY 97	Monitoring	558.0 K	
	RD on SWMUs 28/52	15.0 K	**573.0 K**
FY 98	RI/FS (SWMUs 17, 31, 39, 48, 49, 58 & NRU)	1,804.2 K	
	LTM	160.0 K	
	IRA (SWMU 54)	1,899.9 K	**3,889.1 K**
	RD	25.0 K	

PRIOR YEAR FUNDS (1999-2001)

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	**2,497.5 K**
	LTM (HWMUs 4, 5, 7, 16)	429.5 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	**1,124.5 K**
	LTM (HWMUs 4, 5, 7, 16)	278.8 K	
FY01	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	**2,898.6 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	

TOTAL FUNDING 1976-2001: 18,858.5 K

Radford Army Ammunition Plant - Programmed Cost-to-Complete Restoration Work Chart
($ in Thousands)

DSERTS #	SITE DESCRIPTION	RRSE	PHASE	2002	2003	2004	2005	2006	2007	2008+	SITE TOTAL	DESCRIPTION OF WORK
RAAP-001	TNT Waste Acid Neutralization Pits	High	RI	539								RFI: High Complexity, 1-5 acres. Approx 900 c.y. of contaminated soil will be excavated from the site and transported to Pinewood, S.C. for disposal. Distance to off-site facility is 250 miles each way. The waste is assumed to be HW and will require stabilization. Disposal fee is assumed to be $250.00/cy and state tax/fee is $39.00/cy. 45 samples will be taken for monitoring and disposal analysis from the excavated soil. Three wells will be installed in addition to the existing 3 wells at the site. Wells will be sampled quarterly in year one and sampled annually, thereafter, for a total of five years.
			RD			41						
			RA(C)				1148					
			LTM				78.6	25.6	17.1	34.2	1883.5	
RAAP-002	Flash Burn Parts Area	High	RI					224.5			224.5	RFI: Moderate Complexity, 1-5 acres. An RFI is proposed to verify NFA.
RAAP-005	Waste Propellant Burning Ground	High	RI					676.3				RFI: Low Complexity, 20 acres. This 20.0 acre site will be geo-synthetically capped to prevent infiltration into the groundwater. O & M will be performed at the site for 15 years. Three wells will be installed in addition to the existing 3 well at the site. Long Term Monitoring is planned for 15 years at this site. Wells will be sampled quarterly in year one and sampled once a year thereafter. It will be evaluated every five years and estimated to stop after a third and final 5 year review.
			RD							172.8		
			RA(C)							5231.9		
			LTM							1207.1	7288.1	
RAAP-010	CaSO4 Treatment Disposal Area	High	RI	396.0								RFI: Moderate Complexity, 1-5 acres. SWMU 35, 37, 38, and Area A will be investigated together. Approx 1,500 cy of soil will be excavated from the site. It is assumed that the excavated soil is contaminated and will be transported to Pinewood, S.C. for disposal. Distance to off-site facility is 250 miles each way. The waste is assumed to be HW and will require stabilization. Disposal fee is assumed to be $250.00/cy and state tax/fee is $39.00/cy.
			RD			27.2						
			RA(C)				1431.2				1854.4	
RAAP-011	Red Water Ash Burial Ground	High	RI	504.9								RFI: High Complexity, 1-5 acres. This 1.0 acre site will be geo-synthetically capped to prevent infiltration into the groundwater. O & M will be performed at the site for 15 years. Three wells will be installed in addition to the existing 1 well. Long Term Monitoring is planned for 15 years at this site. Wells will be sampled quarterly in year one and sampled once a year thereafter. It will be evaluated every five years and estimated to stop after a third and final 5 year review.
			RD			66.4						
			RA(C)					664.2				
			LTM					42.9	77.7	678.4	2034.5	
RAAP-013	Red Water Ash Burial 2	High	RI							78.6	78.6	RFI: High Complexity, 1-5 acres. See comments for RAAP 18.

Radford Army Ammunition Plant - Programmed Cost-to-Complete Restoration Work Chart, *continued*
($ in Thousands)

DSERTS #	SITE DESCRIPTION	RRSE	PHASE	2002	2003	2004	2005	2006	2007	2008+	SITE TOTAL	DESCRIPTION OF WORK
RAAP-014	Propellant Burning Ash Disposal Area	High	RD	49.7								Approx 1675 c.y. of contaminated soil will be excavated from the site and transported to Pinewood, S.C. for disposal. Distance to off-site facility is 250 miles each way. The waste is assumed to be HW and will require stabilization. Disposal fee is assumed to be $250.00/cy and state tax/fee is $39.00/cy. 12 samples will be taken for monitoring and disposal analysis from the excavated soil. Wells will be installed at this site. Long Term Monitoring is planned for 5 years at this site. The wells will be sampled quarterly in year one and sampled once a year, thereafter.
			RA(C)			1243.8						
			LTM			25.3	44.5	11.1	11.1	11.1	1396.6	
RAAP-016	Wastewater Ponds from Propellant Incinerator	High	RD				46.2					Approx 7,400 c.y. of soil will be excavated from the site. It is assumed that 1800 c.y. of the excavated soil is contaminated and will be transported to Pinewood, S.C. for disposal. Dist. to off-site facility is 250 miles each way. The waste is assumed to be HW and require stabilization. Disp. fee is assumed to be $250.00/cy and state tax/fee is $39.00/cy. 96 samples will be taken for monit. and disp. analysis from the excavated soil. Two wells will be installed in addition to the existing 6 wells at the site. LTM is planned for 5 years at this site. Wells will be sampled quarterly in year one and sampled once a year thereafter.
			RA(C)					1855.0				
			LTM					54.2	84.8	31.8	2072.0	
RAAP-018	Oily Water Burial Area	High	RD				209.2					Approx 23,703 cy of soil will be excavated from the site. It is assumed that 5000 of the excavated soil is contaminated and will be transported to Pinewood, S.C. for disposal. Dist. to off-site facility is 250 miles each way. The waste is assumed to be HW and require stabilization. Disp. fee is assumed to be $250.00/cy and state tax/fee is $39.00/cy. 180 samples will be taken for monit. and disp. analysis from the excavated soil. Two wells will be installed in addition to the existing 6 wells at the site. LTM is planned for 5 years at this site. Wells will be sampled quarterly in year one and sampled once a year thereafter.
			RA(C)						5242.7			
			LTM						54.7	124.9	5631.5	
RAAP-021	Propellant Burial	Low	RI		38.7						38.7	NFA is recommended at this time. However, funding is allocated to resolve any outstanding issues at the site.
RAAP-022	Pond By Building	Low	RI		38.7						38.7	NFA is recommended at this time. However, funding is allocated to resolve any outstanding issues at the site.
RAAP-023	Sanitary Landfill	Low	RI							199.1	199.1	NFA is recommended at this time. However, funding is allocated to resolve any outstanding issues at the site.
RAAP-024	Landfill No. 3	High	RI			255.5					255.5	A RFI is proposed to verify NFA. RFI: Low complexity, 1-5 acres.
RAAP-025	CaSO4 Treatment Disposal Area	Low	RI							78.6	78.6	SWMU 50 is addressed in conjunction with SWMU 48. However, funding is allocated for closure report. See comments for RAAP-018.

Radford Army Ammunition Plant - Programmed Cost-to-Complete Restoration Work Chart, *continued*
($ in Thousands)

DSERTS #	SITE DESCRIPTION	RRSE	PHASE	2002	2003	2004	2005	2006	2007	2008+	SITE TOTAL	DESCRIPTION OF WORK
RAAP-027	Rubble Pile	Med	RI				204.5				204.5	RFI: Low complexity, 1-5 acres. A RFI is proposed for this ~1 acre Rubble Pile to verify NFA.
RAAP-028	Bottom Ash Pile	Low	RI		573.4							RFI: High Complexity, 1-5 acres. Approx 3,703 c.y. of contaminated soil will be excavated from the site and transported to Pinewood, S.C. for disposal. Distance to off-site facility is 250 miles each way. The waste is assumed to be HW and will require stabilization. Disposal fee is assumed to be $250.00/cy and state tax/fee is $39.00/cy. 185 samples will be taken for monitoring and disposal analysis from the excavated soil. Three wells will be installed in addition to the existing 3 wells at the site. LTM is planned for 5 years at this site. Wells will be sampled quarterly in year one and sampled once a year thereafter.
			RD						86.0			
			RA(C)							3453.3		
			LTM							139.2	4251.9	
RAAP-031	CaSO4 Treatment Disposal Area	Low	RI							230	230.0	RFI: Moderate Complexity, 1-5 acres. A RFI is proposed to verify NFA.
RAAP-033	Chromic Acid Treatment Tanks	High	RI	8							8.0	Site Screening/Closure documentation
RAAP-037	Battery Storage Area	Low	RI					435.1				RFI: Low complexity, 1-5 acres. Approx 100 c.y. of soil will be excavated from the site and transported to Pinewood, S.C. for disposal. Distance to off-site facility is 250 miles each way. The waste is assumed to be HW and will require stabilization. Disposal fee is $250.00/cy and state tax/fee is $39.00/cy.
			RD						7.0			
			RA(C)							159.8	601.9	
RAAP-038	Underground Fuel Oil Spill	High	RI			209.8		1248.5	149.2			RFI: High Complexity, 1-5 acres. Includes MMA groundwater study. Approx 500 c.y. of contaminated soil will require transportion to Pinewood, S.C. for disposal. Distance to off-site facility is 250 miles each way. The waste will require stabilization. Disposal fee is $250.00/cy and state tax/fee is $39.00/cy. Air Sparging method will be used to remove petroleum contaminated product from the groundwater. It is estimated that the surface area of contamination is 65,500 SF. Two wells will be installed in addition to the existing well at the site. Wells will be sampled quarterly in year one and sampled once a year thereafter. It will be evaluated every five years and estimated to stop in 2020.
			RD				68.0					
			RA(C)					1034.1				
			LTM						20.2	212.5	2942.3	
RAAP-039	Hazardous Waste Landfill	High	RI	122.0	122.0	729.1						Proposed effort is to provide periodic GW monitoring for the first 3 years and perform a RFI in the 4th year. LTM is planned for 10 years at this site. Wells will be sampled quarterly for 10 yrs. and semi-annually, thereafter. RAAP-039,-041,-042, and -043 will be included in a new VDEQ permit to be issued in Jan 2002.
			LTM				122.0	122.0	122.0	2154.0	3493.1	

Radford Army Ammunition Plant - Programmed Cost-to-Complete Restoration Work Chart, *continued*
($ in Thousands)

DSERTS #	SITE DESCRIPTION	RRSE	PHASE	2002	2003	2004	2005	2006	2007	2008+	SITE TOTAL	DESCRIPTION OF WORK
RAAP-040	Former Lead Furnace Area	High	RI	78.6							78.6	NFA is recommended at this time. However, funding is allocated to resolve any outstanding issues at the site.
RAAP-041	Surface Impoundment #4	High	LTM	122	122.0	122.0	122				488.0	Long Term Monitoring is planned for 5 years at this site. Wells will be sampled quarterly. RFAAP has submitted formal request to discontinue monitoring as of Sept. 2000. No response from VADEQ.
RAAP-042	Surface Impoundment #5	High	RD	222.0	139.4							Proposed effort is to provide for clean closure of this site through the site screening process. Additional RAC effort is to provided to remove approx 100 c.y. of soil and dispose as hazardous waste. LTM is anticipated for 5 additional years once source removal has been achieved.
			RA(C)			246.4						
			LTM			122.0	122.0				851.8	
RAAP-043	Surface Impoundment #7	High	RD	222.0	139.4							Proposed effort is to provide for clean closure of this site through the site screening process. Additional RAC effort is to provided to remove approx 100 c.y. of soil and dispose as hazardous waste. LTM is anticipated for 5 additional years once source removal has been achieved.
			RA(C)			246.4						
			LTM			122.0	122.0				851.8	
RAAP-044	New River Plant	High	RD				132.1					Approx 9,100 c.y. of soil will be excavated. It is estimated that 2,700 c.y. of the excavated soil is contaminated and will require transportation to Pinewood, S.C. for disposal. Distance to off-site facility is 250 miles each way. The waste is assumed to be HW and will require stabilization. Disposal fee is assumed to be $250.00/cy and state tax/fee is $39.00/cy. 136 samples will be taken for monitoring and disposal analysis from the excavated soil.
			RA(C)				573.0	380.0	3117.4		4202.5	
RAAP-045	Building 4343	High	RI		384.7							RFI: High Complexity, 1-5 acres. Approx 450 c.y. of contaminated soil will be excavated and transported to Pinewood, S.C. for disposal. Distance to off-site facility is 250 miles each way. The waste is assumed to be hazardous waste and will require stabilization. Disposal fee is $250.00/cy and state tax/fee is $39.00/cy. 22 samples will be taken for monitoring and disposal analysis from the excavated soil. Three wells will be installed in addition to the existing 3 wells at the site. LTM is planned for 5 years at this site. Wells will be sampled quarterly in year one and sampled once a year thereafter.
			RD			32.6						
			RA(C)				545.6					
			LTM				31.3	53.7	10.1	20.2	1078.2	
			Totals	**2264.2**	**1558.3**	**3489.5**	**5000.2**	**6827.2**	**9000.0**	**14217.5**	**42356.9**	

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 bi-monthly 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.