RADFORD ARMY AMMUNITION PLANT

Army Cleanup Program

Installation Action Plan

March 25, 2019

CONTENTS

ACRONYMS

Acronym	Definition
AEDB-R	Army Environmental Database – Restoration
ASD	Alternate Source Demonstration
BDDT	Building Debris Disposal Trench
BLA	Bag Loading Area
CAP	Corrective Action Plan
CC	Compliance-related Cleanup
CMS	Corrective Measures Study
COC	Contaminants of Concern
CORA	Corrective Action Permit
DD	Decision Document
EE/CA	Engineering Evaluation and Cost Analysis
ENV	Environmental
EOD	Explosive Ordnance Disposal
ER,A	Environmental Restoration, Army
FS	Feasibility Study
ft	feet
FY	fiscal year
HBN	Health-based Numbers
HHRA	Human Health Risk Assessment
HQAES	Headquarters Army Environmental System
HWMU	Hazardous Waste Management Unit
IAA	Igniter Assembly Area
IAP	Installation Action Plan
IM	Interim Measure
IR	Installation Restoration
LTM	Long-Term Management
LUC	Land Use Control
MMA	Main Manufacturing Area

Acronym	Definition
MNA	Monitored Natural Attenuation
MR	Munitions Response
MRSPP	Munitions Response Site Prioritization Protocol
NBG	Northern Burning Ground
NFA	No Further Action
NRU	New River Unit
PBA	Performance-Based Acquisition
PCCP	Post-Closure Care Permit
RA	Remedial Action
RA(C)	Remedial Action (Construction)
RA(O)	Remedial Action (Operations)
RAB	Restoration Advisory Board
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RIP	Remedy-In-Place
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
RY	Rail Yard
SI	Site Inspection
SLERA	Screening- Level Ecological Risk Assessment
SSP	Site Screening Process
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TCE	Trichloroethylene
TNT	Trinitrotoluene
US	United States

Acronym	Definition
USACE	US Army Corps of Engineers
USACHPPM	US Army Center for Health Promotion and Preventive Medicine
USAEC	US Army Environmental Command
USEPA	US Environmental Protection Agency
UST	Underground Storage Tank
VDEQ	Viriginia Department of Environmental Quality
VOC	Volatile Organic Compound
WBG	Western Burning Ground
WBS	Work Breakdown Structure
WPA	Work Plan Addendum
WWII	World War II

PHASE TRANSLATION TABLE

HQAES Phase ID	CERCLA Phase	RCRA Phase	RCRA UST Phase
.01	Preliminary Assessment (PA)	RCRA Facility Assessment (RFA)	Initial Site Characterization (ISC)
.02	Site Inspection (SI)	Confirmation Sampling (CS)	Investigation (INV)
.03	Remedial Investigation/ Feasibility Study (RI/FS)	RCRA Facility Investigation/Corrective Measures Study (RFI/CMS)	Corrective Action Plan (CAP)
.04	Remedial Design (RD)	Design (DES)	Design (DES)
.05	Interim Remedial Action (IRA)	Interim Measure (IM)	Interim Remedial Action (IRA)
.06	Remedial Action Construction) (RA(C))	Corrective Measures Implementation (CMI(C))	Implementation (Construction) (IMP(C))
.07	Remedial Action (Operation) (RA(O))	Corrective Measures Implementation (Operation) (CMI(O))	Implementation (Operations) (IMP(O))
.08	Long-Term Management (LTM)	Long-Term Management (LTM)	Long-Term Management (LTM)

SITE ALIAS LIST

WBS Element	AEDB-R Reference	Site Alias
51565.1001	RAAP-001_TNT WASTE ACID NEUTRALIZATION PITS	SWMU 51
51565.1005	RAAP-005_WASTE PROPELLANT BURNING GROUND	SWMU 13
51565.1009	RAAP-009_LANDFILL NITRO AREA (S40)	SWMU 40
51565.1011	RAAP-011_RED WATER ASH BURIAL GROUND (S41)	SWMU 41
51565.1013	RAAP-013_RED WATER ASH BURIAL #2 (S49)	SWMU 49
51565.1014	RAAP-014_PROPELLANT BURNING ASH DISPOSAL	SWMU 54
51565.1018	RAAP-018_OILY WATER BURIAL AREA (S48)	SWMU 48
51565.1023	RAAP-023_SANITARY LANDFILL NO.2 (S43)	SWMU 43
51565.1024	RAAP-024_LANDFILL NO.3 (S45)	SWMU 45
51565.1038	RAAP-039_HAZARDOUS WASTE LANDFILL (HWMU16)	HWMU 16
51565.1041	RAAP-042_SURFACE IMPOUNDMENT #5 (HWMU #5)	HWMU #5
51565.1043	RAAP-044_NEW RIVER UNIT	NRU
51565.1045	RFAAP-001-R-01_ARMY RESERVE SMALL ARMS RANGE	ARSAR
51565.1049	CC 001_OLEUM PLANT ACIDIC WASTEWATER SUMP	SSA72
51565.1050	CC 002_GARBAGE INCINERATOR (BLDG 7219)	SSA77
51565.1051	CC-003_ASBESTOS DISPOSAL TRENCHES 1 AND 2	SSA 30 79
51565.1052	RFAAP-002-R-01_FORMER GUN AND MORTAR RANGE	MORTAR RANGE

RADFORD ARMY AMMUNITION PLANT

INSTALLATION RESTORATION PROGRAM SITES

RAAP-001_TNT WASTE ACID NEUTRALIZATION PITS

WBS Element: 51565.1001

Alias: SWMU 51

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 9/15/2009

RC Date: 9/15/2009

RC Reason: All Required Cleanup(s) Completed

Program: ENV Restoration, Army

Subprogram: IR

Cost-to-Complete: $0.00

Phases	Start	End
PA	10/15/1984	12/15/1984
SI	10/15/1984	12/15/1984
RI/FS	7/15/2002	1/15/2008
RD	9/15/2007	2/15/2008
IRA	- -	- -
RA(C)	9/15/2007	9/15/2009
RA(O)	- -	- -
LTM	6/15/2011	6/15/2048

Site Narrative

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

A 1992 Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) evaluated groundwater and soil samples and a corrective measure study (CMS) was recommended. The soil and groundwater concentrations of contaminants of concern (COC) exceeded health-based numbers (HBN) in the 1989 RCRA corrective action permit (CORA) and could indicate risk under an industrial worker scenario. In fiscal year (FY) 04 the soil samples for the site-screening process, a quantitative human health risk assessment (HHRA), and a screening- level ecological risk assessment (SLERA) were collected. Groundwater and soil samples were collected and analyzed for semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs) and explosives to support a quantitative HHRA. Due to the nature of the karst geology, source removal is recommended.

Long-term management (LTM) will be performed for five years. SWMUs 28 and 52 are in the same vicinity. During the May 2006 Installation Action Plan (IAP) workshop, Department of the Army representatives understood that this site would not be remedy-in-place (RIP)/response complete (RC) by FY07. In September 2006, a performance-based acquisition (PBA) was awarded with a RIP of September 2009. In 2007 additional samples were collected in accordance with work plan addendum (WPA) 019 that was approved by the stakeholders.

In 2008 an RFI/CMS report was prepared and approved by the stakeholders that contained a recommendation for source removal (clean closure) as groundwater was not affected. A follow-on interim measure (IM) work plan was prepared and similarly approved to implement this recommendation. The IM effort was completed in 2009. Closeout documentation was submitted in accordance with the CORA. On April 1, 2010 the regulators approved the closeout report and its recommendation of no further action

(NFA) with institutional controls to prevent excavation below 15 ft. A five-year review effort started in November 2012 by the US Army Corps of Engineers (USACE) and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018.

The LTM phase is open to handle land use controls (LUC). The LUCs are to maintain the site in its current industrial and commercial state as a closed SWMU and to prevent excavation below 15 ft. Yearly inspections and periodic reviews are needed. Costs are being tracked under Radford Army Ammunition Plant (RAAP) 042 (hazardous waste management unit (HWMU) 5, 51565.1042).

RAAP-005_WASTE PROPELLANT BURNING GROUND

WBS Element: 51565.1005

Alias: SWMU 13

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 8/15/2010

RC Date: 8/15/2010

RC Reason: Study Completed, No Cleanup Required

Program: ENV Restoration, Army

Subprogram: IR

Cost-to-Complete: $0.00

Phases	Start	End
PA	10/15/1984	12/15/1984
SI	10/15/1984	12/15/1984
RI/FS	5/15/2005	8/15/2010
RD	- -	- -
IRA	- -	- -
RA(C)	8/15/2010	8/15/2010
RA(O)	- -	- -
LTM	6/15/2011	6/15/2048

Site Narrative

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

A 1992 RFI evaluated groundwater quality and potential soil contamination for explosives, VOCs, SVOCs, and heavy metals. The concentrations of COCs exceeded HBNs in the 1989 CORA and could indicate risk under an industrial worker scenario. In FY04, a site screening process (SSP) sampling was performed. The SSP effort identified off-site migration associated with activities before 1986. A final SSP report was submitted in May 2007; it contained a recommendation for further investigation that was subsequently approved on June 7, 2007 by the US Environmental Protection Agency (USEPA) and on April 13, 2007 by the Viriginia Department of Environmental Quality (VDEQ) on an earlier draft.

In FY05, in anticipation of those approvals, an RFI/CMS was procured. Also in FY05, a permit was issued by the VDEQ governing burning operations at the open burning ground. A groundwater and soil monitoring program is part of the permit. In 2008, WPA 023 was prepared and approved by the stakeholders for sampling the area from the fence to the river (i.e. outside of the active unit). In November 2008 sampling was performed in accordance with WPA 023. In July 2009 the draft RFI report was submitted. Review comments were addressed.

The SWMU 13 RFI Report Final July 2010 addressed the area outside of the permitted unit from the fence to the river, about 30 to 50 ft which is mostly a steep slope, and recommended NFA beyond implementing LUCs to prevent digging in this area. On August 26, 2010 USEPA/VDEQ approved the final RFI report. A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018.

Per the final RFI report, NFA beyond LUCs was approved by the regulatory agencies. The LUC is to prevent digging at the site, which is a narrow strip of land between the permitted unit and the river. The LTM phase is open to handle the LUC. Yearly inspections and periodic reviews are needed. Costs are being tracked under RAAP042 (HWMU 5, 51565.1042).

RAAP-009_LANDFILL NITRO AREA (S40)

WBS Element: 51565.1009

Alias: SWMU 40

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 6/15/2011

RC Date: 6/15/2011

RC Reason: Other

Program: ENV Restoration, Army

Subprogram: IR

Cost-to-Complete: $0.00

Phases	Start	End
PA	10/15/1984	12/15/1984
SI	10/15/1984	12/15/1984
RI/FS	5/15/2001	9/15/2009
RD	7/15/2010	6/15/2011
IRA	- -	- -
RA(C)	7/15/2010	6/15/2011
RA(O)	- -	- -
LTM	6/15/2011	6/15/2048

Site Narrative

In the 1970s and early-1980s, SWMU 40, which is approximately 1.5 acres, was reportedly used as a sanitary landfill to dispose of uncontaminated paper, municipal refuse, cement, and rubber tires. Whether hazardous wastes or wastes containing hazardous constituents were ever disposed of in the landfill is not known.

Between 1991 and 1992, a fenced enclosure for asbestos storage was constructed over the northeast corner of this SWMU. The unit was strictly an area fill and was covered with soil and grass. A 1992 RCRA verification investigation attempted to install four monitoring wells which could not be sampled because the four borings were dry. In 1993 and 1994 a dye-trace study was conducted in the adjacent area to identify groundwater flow paths in the south-central section of the main manufacturing area (MMA); however, this site is not believed to affect groundwater. This site and SWMU 71 (RAAP-02) are combined for the RFI.

In FY01, a contract to perform an RFI/CMS was procured and in FY03 field investigations were completed. Soil samples were collected to confirm previous investigative results and provide additional data to support a quantitative HHRA and SLERA. Twenty cubic yards (cy) of the investigative derived material was determined to be hazardous waste (lead), and was stabilized and disposed of in a permitted treatment storage and disposal facility. In FY04, the RFI was submitted to the VDEQ and the USEPA for review. In FY05 there were several comment review cycles. Stakeholders agreed that additional sampling was needed to address soil and groundwater data gaps, and in FY06 additional sampling was procured.

In 2008 a new RFI/CMS report was submitted. Regulatory comments were addressed and a final RFI/CMS report was submitted in April 2009. It was approved June 30, 2009. In June 2010, a PBA was awarded to implement the CMS recommendation. In December 2010 a work plan was submitted and was approved August 26, 2011 by the USEPA and the VDEQ. RAAP subsequently repaired the cap, installed an additional groundwater monitoring well and began LTM in accordance with the work plan. A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018. In May 2015 a remedy

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

The LTM phase is open to handle LUCs. The LUCs are to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent residential use. Yearly inspections and periodic reviews are needed. Costs are being tracked under RAAP042 (HWMU 5, 51565.1041).

RAAP-011_RED WATER ASH BURIAL GROUND (S41)

WBS Element: 51565.1011

Alias: SWMU 41

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 9/15/2011

RC Date: 9/15/2011

RC Reason: Other

Program: ENV Restoration, Army

Subprogram: IR

Cost-to-Complete: $0.00

Phases	Start	End
PA	10/15/1984	12/15/1984
SI	10/15/1984	12/15/1984
RI/FS	7/15/2002	9/15/2011
RD	- -	- -
IRA	- -	- -
RA(C)	3/15/2011	9/15/2011
RA(O)	- -	- -
LTM	9/15/2011	6/15/2048

Site Narrative

SWMU 41 is located in the MMA and consists of two noncontiguous disposal areas for red water ash. The northern area (41A) consisted of an unlined lagoon approximately 50 ft by 70 ft, which was backfilled. The southern area (41B) consisted of a clay-lined disposal area approximately 100 ft by 150 ft.

Prior to construction of the red water treatment plant, red water was concentrated by evaporation and burned in four rotary kilns located in the TNT manufacturing area. From 1967 to 1971 the ash produced from these kilns was disposed of in SWMU 41B. A 1992 RCRA verification investigation 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 verification investigation indicate explosives and metals in the soil and SVOCs, and metals in the groundwater above 1989 RCRA CORA permit HBNs. The soil samples for the SSP, a quantitative HHRA and a SLERA, were collected in FY04.

In September 2006 a PBA was awarded with a RIP date of September 2009. In 2007, additional samples were collected in accordance with WPA 019 that was approved by the stakeholders. In December 2009, a draft RFI report was submitted. In the process of addressing regulatory comments, a well was installed and sampled at 41A in October 2010. Data from the effort supports NFA at 41A. LUC was recommended for 41B to prevent residential use.

A revised SWMU 41 RFI, Final Document, February 2011 was submitted in February 2011 with the same recommendations and approved March 23, 2011 by the USEPA and the VDEQ. A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018.

Per the RFI report and 2010 groundwater data, NFA was obtained for SWMU 41A and LUCs were implemented at SWMU 41B. The LUCs are to maintain SWMU 41B in its current industrial/commercial state as a closed SMWU and to prevent residential use. LTM is open to handle LUCs at SWMU 41B. Yearly inspections and periodic reviews are needed. Costs are being tracked under RAAP042 (HWMU 5, 51565.1041).

RAAP-013_RED WATER ASH BURIAL #2 (S49)

WBS Element: 51565.1013

Alias: SWMU 49

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: - -

RC Date: 5/15/2014

RC Reason: Other

Program: ENV Restoration, Army

Subprogram: IR

Cost-to-Complete: $1,167,406.13

Phases	Start	End
PA	10/15/1984	12/15/1984
SI	10/15/1984	12/15/1984
RI/FS	12/15/1997	5/15/2014
RD	- -	- -
IRA	- -	- -
RA(C)	- -	- -
RA(O)	- -	- -
LTM	6/15/2014	9/15/2048

Site Narrative

SWMU 49 is approximately 75 ft by 50 ft and is located in the horseshoe area, contiguous with SWMUs 48, 50, and 59. The four SWMUs were classified together during the 1980s because a distinction could not be made between the areas by visual observation. SWMU 48 was later divided into an upper and a lower disposal area, and SWMU 49 was determined to be part of the SWMU 48 lower disposal unit. SWMU 49 reportedly received 10 tons of red water ash during its active life. A 1992 RCRA verification investigation and a 1996 RFI were conducted to determine the impacts to groundwater quality and soil. A 1999 draft RFI included the verification of previous RFI results. Metals, VOCs, and SVOCs were detected above 1989 RCRA CORA permit HBNs.

The RFI sampling was completed in FY02. In September 2006, a PBA was awarded with a RIP of September 2009 at SWMUs 49, 48, 50, and 59, which are close to each other. In 2007, additional samples were collected in accordance with WPA 019 that was approved by the stakeholders. In February 2009 a draft RFI/CMS report was submitted. Regulatory review comments are being addressed via an IM (source removal) at SWMU 48 and subsequent submittal of a revised RFI/CMS report. To that end, a SWMU 48 IM work plan was approved by USEPA and the VDEQ on July 20, 2011 with subsequent execution from July 2011 through February 2012.

An RFI/CMS report was submitted in June 2012 to USEPA and VDEQ. USEPA and VDEQ comments on the RFI/CMS were sent on November 5, 2012. After various discussions, the document was edited to incorporate responses to comments, and was resubmitted to the requlators as SWMUs 48 and 49 RFI Report, Draft Document, January 2014. NFA was recommended for soil at SWMUs 48 and 49. Monitored natural attenuation (MNA) and LTM was recommended for VOCs, primarily carbon tetrachloride and trichloroethylene (TCE) in groundwater at SWMU 49.

The USEPA and VDEQ approved the RFI on May 30, 2014; however, in August 2014 the USEPA issued a Final Decision And Response To Comments that implements land and groundwater use controls at SWMUs 48 and 49. Due to the contiguous nature of SWMU 49 (RAAP-013) and SWMU 48 (RAAP-018), SWMU 49 is tracking costs for both of these sites. A five-year review effort was started in November 2012

by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was performed in 2018.

The RFI outlines the effort needed to address this site. Due to the contiguous nature of SWMUs 49, 48, 50 and 59, local groundwater issues are to be addressed under an MNA/LTM plan for SWMU 49. Source removal was previously performed at SWMU 48, as these two sites are thought to be the likely source areas. NFA was obtained for soil at SWMU 49 and NFA for soil at SWMU 48 was attained through source removal. MNA/LTM is needed for groundwater at and in the vicinity of SWMUs 49 and 48. The LUCs are to maintain SWMU 49 in its current industrial/commercial state as a closed SWMU and to prevent residential use. Yearly inspections and periodic reviews are needed.

RAAP-014_PROPELLANT BURNING ASH DISPOSAL

WBS Element: 51565.1014

Alias: SWMU 54

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 9/15/2011

RC Date: 9/15/2011

RC Reason: Other

Program: ENV Restoration, Army

Subprogram: IR

Cost-to-Complete: $1,167,406.13

Phases	Start	End
PA	10/15/1984	12/15/1984
SI	10/15/1984	12/15/1984
RI/FS	1/15/1996	10/15/2008
RD	7/15/2009	9/15/2011
IRA	8/15/1998	1/15/2000
RA(C)	9/15/2010	9/15/2011
RA(O)	- -	- -
LTM	9/15/2011	9/15/2048

Site Narrative

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

A 1992 RCRA verification investigation, a 1996 RFI, and a 1997 supplemental RFI were conducted. Soil and groundwater samples were taken in these efforts.

Soil data indicates the presence of metals and VOCs and explosives exceeding the 1989 RCRA CORA permit HBNs. A 1999 interim removal action was performed to remove hot spots associated with lead. A contract to perform an RFI/CMS was procured in FY01. Clean closeout will mitigate LTM and long-term operation liability. From FY03 through FY06 RFI sampling was conducted. More sampling was needed per the March 29, 2006 to March 30, 2006 meeting of RAAP, US Army Environmental Command (USAEC), USACE, US Army Center for Health Promotion and Preventive Medicine (USACHPPM), VDEQ and USEPA.

In FY06 additional sampling was procured, and the field effort was completed in fall 2007. The SWMU 54 RFI/CMS Report, Final September 2008 was prepared and approved by the USEPA and the VDEQ on Oct. 16, 2008. The report recommended source removal (clean closure) to prevent further leaching to groundwater and allow for continued MNA. In 2010 the source removal effort was physically complete. In 2011 the source closeout report and MNA work plan were submitted. On April 11, 2011 the MNA work plan was approved by the USEPA and the VDEQ. On July 11, 2011 the source closeout report, aka interim measures completion report, was approved by USEPA and the VDEQ.

The MNA/ LTM and LUC effort continues. A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018.

The RFI/CMS report approved by the regulatory agencies contained a recommendation for source removal (clean closure) to prevent further leaching to the groundwater and allow for MNA with LTM. In

2009 and 2014, an initial and follow-on PBAs were awarded to implement this remedy. Yearly inspections and periodic reviews are needed.

RAAP-018_OILY WATER BURIAL AREA (S48)

WBS Element: 51565.1018

Alias: SWMU 48

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 1/15/2012

RC Date: 1/15/2012

RC Reason: All Required Cleanup(s) Completed

Program: ENV Restoration, Army

Subprogram: IR

Cost-to-Complete: $0.00

Phases	Start	End
PA	9/15/1984	10/15/1984
SI	10/15/1984	12/15/1984
RI/FS	12/15/1997	3/15/2011
RD	- -	- -
IRA	- -	- -
RA(C)	3/15/2011	1/15/2012
RA(O)	- -	- -
LTM	1/15/2012	6/15/2048

Site Narrative

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

A 1992 RCRA verification investigation and a 1996 RFI were conducted to evaluate potential groundwater contamination. Four monitoring wells were installed and sampled. Soil data from the verification investigation indicated the presence of metals and explosives above 1989 RCRA CORA permit HBNs. Groundwater data from the verification investigation indicated the presence of chlorinated solvents and metals above 1989 RCRA CORA permit HBNs.

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

In February 2009 a draft RFI/CMS report was submitted. Regulatory review comments are being addressed via an IM (source removal) at SWMU 48, and subsequent submittal of a revised RFI/CMS report. To that end, a SWMU 48 IM work plan was approved by USEPA and the VDEQ on July 20, 2011 with subsequent execution from July 2011 through February 2012. RFI/CMS report was submitted in June 2012 to USEPA and VDEQ. Later, this effort was combined into the SWMU 48 and 49 RFI report, which recommended NFA for the soil at SWMU 48, and MNA/LTM for the groundwater in the vicinity of SWMUs 48 and 49.

The USEPA and VDEQ approved the RFI on May 30, 2014. A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018.

The RFI outlines the effort needed for this site. Due to the contiguous nature of SMWUs 49, 48, 50, and 59, local groundwater issues are to be addressed under a MNA/LTM plan for SWMU 49. Source removal was previously performed at SWMU 48, as these two sites are thought to be the likely source areas. NFA for soil was attained at SWMU 49, and NFA for soil at SWMU 48 was attained through source removal. MNA/LTM is needed for groundwater at and in the vicinity of SWMUs 49 and 48. The LUCs are to maintain SWMU 49 in its current industrial/commercial state as a closed SWMU, and to prevent residential use. Yearly inspections and periodic reviews are needed. Costs are being tracked under RAAP042 (HWMU 5, 51565.1041).

RAAP-023_SANITARY LANDFILL NO.2 (S43)

WBS Element: 51565.1023

Alias: SWMU 43

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 1/15/2011

RC Date: 1/15/2011

RC Reason: Study Completed, No Cleanup Required

Program: ENV Restoration, Army

Subprogram: IR

Cost-to-Complete: $0.00

Phases	Start	End
PA	9/15/1984	10/15/1984
SI	10/15/1984	12/15/1984
RI/FS	10/15/2006	1/15/2011
RD	- -	- -
IRA	- -	- -
RA(C)	1/15/2011	1/15/2011
RA(O)	- -	- -
LTM	6/15/2011	6/15/2048

Site Narrative

SWMU 43 is a closed, unlined sanitary landfill of approximately two acres, located immediately adjacent to the New River in the northeast section of the RAAP MMA. It operated from 1958 to 1969. The exact boundaries of the unit have not been determined because of the unavailability of a site plan or documents.

The site was regraded in accordance with a verification investigation recommendation. A 1992 RCRA verification investigation installed six groundwater monitoring wells. Groundwater and surface water data indicates the presence of metals and VOCs, which did not exceed 1989 RCRA CORA permit HBNs. In September 2006, a PBA contract was awarded to produce an RFI/CMS by September 2009. The SWMU 43 RFI Report Final Document January 2011 was submitted and recommended NFA beyond LUCs. The regulators approved this report on Jan. 28, 2011. A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018.

Per the final RFI report, NFA beyond LUCs was approved by the regulatory agencies. The LTM phase is open to handle LUCs. The LUCs are to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent residential use. Yearly inspections and periodic reviews are needed. Costs are being tracked under RAAP042 (HWMU 5, 51565.1041).

RAAP-024_LANDFILL NO.3 (S45)

WBS Element: 51565.1024

Alias: SWMU 45

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 3/15/2010

RC Date: 3/15/2010

RC Reason: Study Completed, No Cleanup Required

Program: ENV Restoration, Army

Subprogram: IR

Cost-to-Complete: $0.00

Phases	Start	End
PA	10/15/1984	12/15/1984
SI	10/15/1984	12/15/1984
RI/FS	3/15/2005	3/15/2010
RD	- -	- -
IRA	- -	- -
RA(C)	3/15/2010	3/15/2010
RA(O)	- -	- -
LTM	6/15/2011	6/15/2048

Site Narrative

SWMU 45 is an inactive sanitary landfill of approximately 5 acres, located in the north-central section of the MMA. It operated between 1957 and 1961. The unit was never operated as a permitted landfill. Paper and municipal refuse were the only materials reportedly disposed of in SWMU 45. Evidence of burning has been observed in the area.

A 1992 RCRA verification investigation included monitoring well installation, a geophysical survey, and a baseline HHRA. An SSP was procured in FY05. In late FY06, stakeholders agreed to the procurement of a geophysical delineation and groundwater assessment. In 2007 additional samples were collected in accordance with WPA 022 that was approved by the stakeholders. In 2009 a draft SSP which recommended NFA was submitted and regulatory comments were addressed. The SWMU 45 SSP Report Final January 2010 was submitted which recommended NFA beyond LUCs. LUC would be to maintain the site in its current commercial/industrial state as a closed SWMU and to prevent residential use.

This report was approved by the USEPA and VDEQ on March 29, 2010. A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018.

The LTM phase is open to handle LUCs. The LUCs are to maintain the site in its current industrial/commercial state as a closed SWMU, and to prevent residential use. Yearly inspections and periodic reviews are needed. Costs are being tracked under RAAP042 (HWMU 5, 51565.1041).

RAAP-039_HAZARDOUS WASTE LANDFILL (HWMU16)

WBS Element: 51565.1038

Alias: HWMU 16

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: - -

RC Date: 10/15/2002

RC Reason: Other

Program: ENV Restoration, Army

Subprogram: IR

Cost-to-Complete: $3,742,752.00

Phases	Start	End
PA	10/15/1984	12/15/1984
SI	10/15/1984	12/15/1984
RI/FS	10/15/2000	10/15/2002
RD	- -	- -
IRA	- -	- -
RA(C)	- -	- -
RA(O)	- -	- -
LTM	10/15/2002	3/15/2048

Site Narrative

HWMU 16 covers about two acres and is located in the horseshoe area of the plant between RAAP-007 (SWMU 28, Permit 401) and RAAP-029 (SWMU 52, Permit 401). The site is a landfill, closed in the early-1980s, which was used for lab chemicals and incinerator residue and as a burning ground. Groundwater data indicates the presence of elevated concentrations of explosives and chlorinated solvents. There are indications that the groundwater contamination at HWMU 16 is migrating to the areas of SWMU 28 and 52.

In October 2002, a post-closure care permit (PCCP) requiring LTM and LUCs was issued by the VDEQ, and then reissued in July 2014 with LTM and LUCs. On May 29, 2007 the RAAP submitted a Class 1 minor modification request for LTM reduction to the VDEQ, which was approved on June 14, 2007. A five-year review effort was started in November 2012 by the USACE, and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018.

LTM is planned for 30 years since the post-closure requirement is for 30 years or site closeout. Wells will be sampled as required in the post-closure permit. Yearly inspections and periodic reviews are needed. Costs for LUC annual inspections and periodic reviews are being tracked under RAAP042 (HWMU 5, 51565.1041).

RAAP-042_SURFACE IMPOUNDMENT #5 (HWMU #5)

WBS Element: 51565.1041

Alias: HWMU #5

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: - -

RC Date: 10/15/2002

RC Reason: Other

Program: ENV Restoration, Army

Subprogram: IR

Cost-to-Complete: $4,451,360.22

Phases	Start	End
PA	10/15/1984	12/15/1984
SI	10/15/1984	12/15/1984
RI/FS	10/15/2000	10/15/2002
RD	- -	- -
IRA	- -	- -
RA(C)	- -	- -
RA(O)	- -	- -
LTM	10/15/2002	3/15/2048

Site Narrative

HWMU 5 is located in the middle of the MMA. It was a surface impoundment used for acidic wastewaters. Sludge was removed, but contaminated soil below the sludge layer was left in place. The lagoon was filled and capped. The presence of residual waste precludes clean closure. Groundwater monitoring has been performed for the past 15 years. Dinitrotoluene and TCE were detected in groundwater. TCE exceeded groundwater protection standards. In FY04 an alternate source demonstration (ASD) report for TCE was resubmitted to VDEQ. In the fall of 2002, an investigative effort was completed for HWMUs 5 and 7. The subsequent draft "Field Investigation Report and Risk Assessment for HWMUs 5 and 7 (DAA 2003)" was submitted to the VDEQ. This report was to facilitate elimination LTM.

In October 2002 a PCCP, LTM and LUCs, were issued by the VDEQ and then reissued in July 2014 with LTM and LUCs. In 2007, several documents were submitted to the VDEQ to reduce or eliminate LTM; one of the documents was an ASD for TCE, later formalized in a multisite permit modification request. The VDEQ review comments indicated that the ASD could not be approved with the current data because the TCE source was not identified. Soil data did not show TCE within and below HWMU 5, so there was merit in pursuing an ASD.

A new site, RAAP-047 was created to address TCE issues in the vicinity and to prepare and resubmit the HWMU 5 ASD. In February 2008, a PBA was awarded to achieve a HWMU 5 ASD by March 2009. Two sampling events occurred during May and July 2008 in accordance with WPA 025 that was approved by the stakeholders. Over the summer of 2008 several stakeholder discussions of the preliminary data and assessments occurred. It was concluded that an ASD could not be approved for TCE at HWMU 5; therefore, the process to modify the PCCP for HWMU 5 was begun to incorporate a corrective action plan (CAP).

In December 2008 a draft CAP was prepared and put in public notice that proposed MNA/LTM as the cleanup remedy; however, the data and assessments did indicate that NFA was appropriate for RAAP-047. On Nov. 5, 2009 VDEQ approved the HMWU 5 CAP for MNA/LTM. A five-year review effort was

started in November 2012 by the USACE, and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018.

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

This site covers LTM costs for sites RAAP-001 (SWMU 51, HQAES Site ID 51565.1001), RAAP-005 (SWMU 13, HQAES Site ID 51565.1005), RAAP-009 (SWMU 40, HQAES Site ID 51565.1009), RAAP-011 (SWMU 41, HQAES Site ID 51565.1011), RAAP-013 (SWMU 49, HQAES Site ID 51565.1013), RAAP-014 (SWMU 54, HQAES Site ID 51565.1014), RAAP-018 (SWMU 48, HQAES Site ID 51565.1018), RAAP-023 (SWMU 43, HQAES Site ID 51565.1023), RAAP-024 (SWMU 45, HQAES Site ID 51565.1024), RAAP-039 (HWMU 16, HQAES Site ID 51565.1041), RAAP-044 (New River Unit (NRU), HQAES Site ID 51565.1043), CC 001 (SSA72, HQAES Site ID 51565.1049), CC 002 (SSA77, HQAES Site ID 51565.1050), and CC 003 (SSA 30 79, HQAES Site ID 51565.1051).

This site also covers periodic review costs for site RFAAP-002-R-01 (Former Gun and Mortar Range, HQAES Site ID 51565.1052).

RAAP-044_NEW RIVER UNIT

WBS Element: 51565.1043

Alias: NRU

Regulatory Driver: CERCLA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 9/15/2011

RC Date: 9/15/2011

RC Reason: All Required Cleanup(s) Completed

Program: ENV Restoration, Army

Subprogram: IR

Cost-to-Complete: $0.00

Phases	Start	End
PA	5/15/1997	8/15/1997
SI	12/15/1997	6/15/1998
RI/FS	6/15/1998	9/15/2010
RD	9/15/2010	9/15/2010
IRA	- -	- -
RA(C)	9/15/2010	9/15/2011
RA(O)	- -	- -
LTM	9/15/2011	6/15/2048

Site Narrative

The New River Unit (NRU) is located approximately six miles west of the RAAP MMA and consists of approximately 2,813 acres. Between 1940 and 1945 the NRU was used to load propellants and igniter charges, and to manufacture igniter charge bags. Between 1943 and 1945 operations were expanded to include an additional bag-loading line, rolled powder operations, flash-reducer loading lines, and black powder drying facilities. Production ended after World War II (WWII), and the plant was officially designated as part of the RAAP installation.

Since 1947, approximately 1,000 acres in the western section of the plant have been sold or transferred for other uses. There is conductive flooring in several buildings. The material is made of barium, copper, asbestos, and lead. It is exposed to the elements and is leaching to surrounding soil. A remedial investigation (RI) sampling effort included the collection of surface soil, sludge, and water samples. Metals have been detected in excess of the 1989 RCRA CORA permit HBNs; however, this site is not subject to any RCRA CORA permit.

Six areas within the NRU are being investigated: Bag Loading Area (BLA), Igniter Assembly Area (IAA), Northern Burning Ground (NBG), Western Burning Ground (WBG), Rail Yard (RY), Building Debris Disposal Trench (BDDT).

In FY02 the RI fieldwork was completed. In FY04 effort from the work instructions was performed. In an email dated Feb. 16, 2007, the USAEC confirmed that the BLA and IAA are eligible for Environmental Restoration, Army (ER,A) funding.

In FY06, the USAEC decided to implement a PBA at the NRU. In February 2008, a PBA was awarded to achieve RC by August 2010. In 2008 draft WPA 027 was submitted to the VDEQ. The VDEQ is the sole regulatory review agency and provided comments but formal approval has not occurred. Sampling was performed in accordance with WPA 027 during summer 2008. In 2009 an engineering evaluation and cost analysis (EE/CA) removal action was completed at the NBG and NFA was achieved.

In November 2009 a draft RI/FS document was submitted for the remaining five areas and groundwater. On July 30, 2010 the final RI report was approved. On Oct. 22, 2010 the final feasability study (FS) report was approved. A public comment period on the proposed plan was held from September 26 through October 26, 2010. A public meeting was held on October 19, 2010. Public comments are to be addressed during the preparation of the final decision document (DD). The proposed plan was approved December 13, 2010. In November 2010 a final remedial action (RA) work plan was submitted. RA started at that time and was completed in May 2011.

VDEQ approved the IAA and BLA work plan on December 9, 2011 and the WBG work plan on April 27, 2011. The results of the effort was that NFA was achieved at the WBG and the RY and LUCs are to be implemented at IAA, BLA, and BDDT to maintain them in their current industrial/commercial as closed sites and to prevent residential use. The final DD for RAAP NRU, November 2011, reflects that the above was signed by the USAEC in April 11, 2013. VDEQ concurred July 24, 2013. A five-year review effort was started in 2017 by the USACE. The report was completed in 2018.

The LTM phase is open to handle LUCs. The LUCs (IAA, BLA, BDDT) are to maintain the site in its current industrial/commercial state as a closed site and to prevent residential use. Yearly inspections and periodic reviews are needed. Costs are being tracked under RAAP042 (HWMU 5, 51565.1041).

CC 001_OLEUM PLANT ACIDIC WASTEWATER SUMP)

WBS Element: 51565.1049

Alias: SSA72

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 1/15/2011

RC Date: 1/15/2011

RC Reason: All Required Cleanup(s) Completed

Program: ENV Restoration, Army

Subprogram: CR

Cost-to-Complete: $0.00

Phases	Start	End
PA	1/15/1986	12/15/1987
SI	- -	- -
RI/FS	1/15/2009	1/15/2011
RD	- -	- -
IRA	- -	- -
RA(C)	1/15/2011	1/15/2011
RA(O)	- -	- -
LTM	6/15/2011	6/15/2048

Site Narrative

SSA72 was identified during the 1987 USEPA RCRA Facility Assessment (RFA), and was subsequently put into the 2000 CORA permit. It is a sump in the Oleum Plant Area that received acidic wastewater. An SSP effort was conducted in accordance with the CORA. The Final SSP Report for SSAs 18, 72, 30, 79, 60, and 77, December 2010, was submitted that recommended NFA with LUC. The LUC is to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent future residential use. The regulators approved this report on January 28, 2011.

A five-year review effort was started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018.

The LTM phase is open to handle LUCs. The LUCs are to maintain the site in its current industrial/commercial state as a closed site and to prevent residential use. Yearly inspections and periodic reviews are needed. Costs are being tracked under RAAP042 (HWMU 5, 51565.1041).

CC 002_GARBAGE INCINERATOR (BLDG 7219)

WBS Element: 51565.1050

Alias: SSA77

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 1/15/2011

RC Date: 1/15/2011

RC Reason: All Required Cleanup(s) Completed

Program: ENV Restoration, Army

Subprogram: CR

Cost-to-Complete: $0.00

Phases	Start	End
PA	1/15/1986	12/15/1987
SI	- -	- -
RI/FS	1/15/2009	1/15/2011
RD	- -	- -
IRA	- -	- -
RA(C)	1/15/2011	1/15/2011
RA(O)	- -	- -
LTM	6/15/2011	6/15/2048

Site Narrative

SSA77 was identified during the 1987 USEPA RFA, and was subsequently put into the 2000 CORA permit. It is an old garbage incinerator that operated from the 1940s until 1974.

An SSP effort was conducted in accordance with the CORA. The Final SSP Report for SSAs 18, 72, 30, 79, 60, and 77, December 2010, was submitted that recommended NFA with LUC. The LUC is to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent future residential use.

The regulators approved this report on January 28, 2011. A five-year review effort started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018.

The LTM phase is open to handle the LUCs. The LUCs are to maintain the site in its current industrial/commercial state as a closed site and to prevent residential use. Yearly inspections and periodic reviews are needed. Costs are being tracked under RAAP042 (HWMU 5, 51565.1041).

CC-003_ASBESTOS DISPOSAL TRENCHES 1 AND 2)

WBS Element: 51565.1051

Alias: SSA 30 79

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 1/15/2011

RC Date: 1/15/2011

RC Reason: All Required Cleanup(s) Completed

Program: ENV Restoration, Army

Subprogram: CR

Cost-to-Complete: $0.00

Phases	Start	End
PA	1/15/1986	12/15/1987
SI	- -	- -
RI/FS	1/15/2009	1/15/2011
RD	- -	- -
IRA	- -	- -
RA(C)	1/15/2011	1/15/2011
RA(O)	- -	- -
LTM	6/15/2011	6/15/2048

Site Narrative

SSAs 30 and 79 were identified during the 1987 USEPA RFA, and was subsequently put into the 2000 CORA permit. Asbestos Disposal Trenches 1 and 2 were used for disposal of asbestos containing material.

An SSP effort was conducted in accordance with the CORA. The Final SSP Report for SSAs 18, 72, 30, 79, 60, and 77, December 2010, was submitted that recommended NFA with LUC. The LUC is to maintain the site in its current industrial/commercial state as a closed SWMU and to prevent future residential use.

The regulators approved this report on Jan. 28, 2011. A five-year review effort started in November 2012 by the USACE and a site visit was conducted in May 2013. The report was completed in March 2014. A similar effort was conducted in 2018.

The LTM phase is open to handle the LUCs. The LUCS are to maintain the site in its current industrial/commercial state as a closed site and to prevent future residential use. Yearly inspections and periodic reviews are needed. Costs are being tracked under RAAP042 (HWMU 5, 51565.1041).

RADFORD ARMY AMMUNITION PLANT

MILITARY MUNITIONS RESPONSE PROGRAM SITES

RFAAP-001-R-01_ARMY RESERVE SMALL ARMS RANGE

WBS Element: 51565.1045

Alias: ARSAR

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: 1/15/2014

RC Date: 1/15/2014

RC Reason: All Required Cleanup(s) Completed

Program: ENV Restoration, Army

Subprogram: MR

Cost-to-Complete: $0.00

Phases	Start	End
PA	2/15/2002	5/15/2003
SI	3/15/2007	5/15/2009
RI/FS	9/15/2009	1/15/2014
RD	9/30/2009	1/15/2014
IRA	- -	- -
RA(C)	9/15/2009	1/15/2014
RA(O)	- -	- -
LTM	1/15/2014	6/15/2048

Site Narrative

The closed Army Reserve Small Arms Range occupied approximately 7.6 acres which was used for small arms training from about 1941 to 1967. This closed range is located along the southeastern boundary of RAAP. A berm (approximately 200 ft long by 10 ft high) is still present and indicates that the direction of fire was southeast. The berm is adjacent to a stream which forms the installation boundary. This range most likely contained between 10 and 15 stations. The Radford ordnance works historic investigation states that 155,375 rounds of ammunition were "expended in the pistol range by the RAAP police department from October 1941 to October 1945." From 1946 to 1967 the local rifle club also may have used the range. The former small arms range is not within the secure limited manufacturing area, but public access is restricted.

The range is currently a grass field surrounded by an unlocked fence. It was once used as a baseball field, and until the late 1960s, it was accessible to the public. In 2009, a PBA was awarded to complete the RFI/CMS and contained options for future effort as needed. In June 2010 a draft work plan for a combined IM and RFI/CMS was submitted. A final work plan was submitted on April 1, 2011, and was approved by USEPA and the VDEQ on April 11, 2011. The IM effort was completed, and consisted of source removal. The RFI/IM report was submitted in February 2012 to USEPA and VDEQ. The report, Army Reserve Small Arms Range RFI/IM Completion Report, Final Document, November 2013 was revised to address their comments, and was resubmitted in early December 2013. It was approved by USEPA and VDEQ on Janusary 14, 2014. It recommended LUCs for the southeast hillside portion of the site. A five-year review effort was started in 2017 by the USACE. The report was completed in 2018.

The final RFI/IM Completion Report approved by the regulatory agencies recommended LUC for the southeast hillside portion of the site to prevent residential use. Yearly inspections and periodic reviews are needed. Costs are being tracked under RAAP042 (HWMU 5, 51565.1041).

RFAAP-002-R-01_FORMER GUN AND MORTAR RAN

WBS Element: 51565.1052

Alias: Mortar Range

Regulatory Driver: RCRA

RRSE: Not assigned

MRSPP: Not assigned

RIP Date: - -

RC Date: 9/15/2023

RC Reason: Not assigned

Program: ENV Restoration, Army

Subprogram: MR

Cost-to-Complete: $387,886.60

Phases	Start	End
PA	5/15/2013	5/15/2013
SI	9/15/2013	9/15/2018
RI/FS	9/15/2018	9/15/2023
RD	- -	- -
IRA	- -	- -
RA(C)	- -	- -
RA(O)	- -	- -
LTM	9/15/2023	9/15/2048

Site Narrative

The site is made up of two adjacent areas the "Gun Range Area" (28 acres) and "Trench Mortar Range Area" (85 acres) that were apparently operational during WWII. The site is within and perhaps underneath the Nitroglycerin 2 and Automated Multi-Base Area. Only the Nitroglycerin 2 area is active; the Automated Multi-Base Area was built and never went into production and is being scrapped. Currently procedure when mortar rounds are found through excavation or wash out is to call Explosive Ordnance Detachment (EOD).

In April 2012, a 4.2- inch white phosphorus and 60mm high explosive rounds were detonated by the 18th EOD from Fort Bragg. There were sporadic, undocumented finds over the years of inert rounds. A site inspection (SI) effort was awarded in 2014 and completed in 2018.

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

SITE CLOSEOUT SUMMARY

Site WBS	Site Name	Site Closeout Date
51565.1002	RAAP-002_FLASH BURN PARTS AREA (S71)	9/30/2009
51565.1003	RAAP-003_POND BY CR ACID TREATMENT TANKS	10/15/2007
51565.1004	RAAP-004_INERT LANDFILL NO3 (S74)	9/30/2000
51565.1006	RAAP-006_FORMER DRUM STORAGE AREA 9387-2	9/30/2000
51565.1007	RAAP-007_CLOSED SANITARY LANDFILL (S28)	9/30/2000
51565.1008	RAAP-008_CASO4 TREATMENT/DISPOSAL AREA (	9/30/2000
51565.1010	RAAP-010_CASO4 TRMT/DISP (8,9,35,36,37,3	11/30/2010
51565.1012	RAAP-012_ACID WASTEWATER LAGOON(S6)	9/30/2002
51565.1015	RAAP-015_FLY ASH LANDFILL #1 (S26)	9/30/2000
51565.1016	RAAP-016_WASTEWATER PONDS FROM PROP INCI	9/30/2009
51565.1017	RAAP-017_ ACTIVATED CARBON DISPOSAL AREA	9/30/2000
51565.1019	RAAP-019_INERT LANDFILL NO.1 (S32)	9/30/2000
51565.1020	RAAP-020_FLY ASH LANDFILL #2 (S29)	9/30/2000
51565.1021	RAAP-021_PROPELLANT BURIAL (S46)	10/31/2007
51565.1022	RAAP-022_POND BY BLDGS 4931 & 4928 (S57)	9/30/2011
51565.1025	RAAP-025_CASO4 TREATMENT/DISPOSAL AREA (	9/30/2009
51565.1026	RAAP-026_COAL ASH SETTLING LAGOONS (S31)	9/30/2009
51565.1027	RAAP-027_RUBBLE PILE(S58)	12/31/2004
51565.1028	RAAP-028_BOTTOM ASH PILE(S59)	9/30/2009
51565.1029	RAAP-029_CLOSED SANITARY LANDFILL (S52)	9/30/2000
51565.1030	RAAP-030_AIR CURTAIN DESTRUCTOR & OPEN B	9/30/2000
51565.1031	RAAP-031_AREA A NITROCELLULOSE RAINWTR D	9/30/2009
51565.1032	RAAP-032_MOBILE USED OIL TANKS (S61,75,7	5/31/2003
51565.1033	RAAP-033_CHROMIC ACID TREATMENT TANKS (S	10/31/2007
51565.1034	RAAP-035_SEWAGE LINES	5/31/2002
51565.1035	RAAP-036_BIOPLANT BASIN (S10)	12/31/1998
51565.1036	RAAP-037_BATTERY STORAGE AREA (P)	11/30/2010

Site WBS	Site Name	Site Closeout Date
51565.1037	RAAP-038_UNDERGROUND FUEL OIL SPILL (O)	4/30/2009
51565.1039	RAAP-040_FORMER LEAD FURNACE AREA	9/30/2009
51565.1040	RAAP-041_SURFACE IMPOUNDMENT #4 (HWM	1/31/1988
51565.1042	RAAP-043_SURFACE IMPOUNDMENT #7 (HWMU #7	10/31/2002
51565.1044	RAAP-045_FORMERCADMIUM PLATING FACILTY(B	9/30/2007
51565.1046	RFAAP-046_MMA GROUNDWATER STUDY	3/31/2007
51565.1047	PBC @ Radford_PBC site	12/31/2012
51565.1048	RAAP-047_TCE Plume at BLDGS 1549,1041&10	9/30/2009

COMMUNITY INVOLVEMENT

Technical Review Committee (TRC) Establishment Date:	NA
Community Involvement Plan (Date Published):	1/15/2004
Restoration Advisory Board (RAB) Establishment Date:	7/15/1998
RAB Adjournment Date:	NA
RAB Adjournment Reason:	NA
Additional Community Involvement:	Community Involvement Plan was reviewed in 2011.
Administrative Record is located at:	Christiansburg Library as CDs and online at www.radfordaapirp.org
Information Repository is located at:	Christiansburg Library as CDs and online at www.radfordaapirp.org
Current Technical Assistance for Public Participation (TAPP):	NA
TAPP Title:	NA
Potential TAPP:	NA

FIVE-YEAR / PERIODIC REVIEW SUMMARY

Review Summary Table

Status	Start	End
COMPLETE	2/7/2013	3/31/2014
PLANNED	11/8/2017	12/31/2018

ROD/DDs associated with the last Five-Year/Periodic Review

Associated ROD/DD Name	Site WBS	Site Name
SWMU 51 (RAAP-001) RFI/CMS REPORT	51565.1001	RAAP-001_TNT WASTE ACID NEUTRALIZATION P
SWMU 13 RFI REPORT FINAL	51565.1005	RAAP-005_WASTE PROPELLANT BURNING GROUND
RAAP-09 (SWMU 40 & 71)	51565.1009	RAAP-009_LANDFILL NITRO AREA (S40)
SWMU 41 RFI FINAL	51565.1011	RAAP-011_RED WATER ASH BURIAL GROUND (S4
SWMU 49 RFI REPORT FINAL	51565.1013	RAAP-013_RED WATER ASH BURIAL #2 (S49)
SWMU 54 (RAAP014) INTERIM ACTION	51565.1014	RAAP-014_PROPELLANT BURNING ASH DISPOSAL
SWMU 43 RFI	51565.1023	RAAP-023_SANITARY LANDFILL NO.2 (S43)
SWMU 45 SSP REPORT FINAL	51565.1024	RAAP-024_LANDFILL NO.3 (S45)
POST CLOSURE PERMIT FOR HWMUS 5, 7, 16	51565.1038	RAAP-039_HAZARDOUS WASTE LANDFILL (HWMU1
POST CLOSURE PERMIT FOR HWMUS 5, 7, 16	51565.1041	RAAP-042_SURFACE IMPOUNDMENT #5 (HWMU #5
ACTION MEMORANDUM NBG SOIL REMOVAL	51565.1043	RAAP-044_NEW RIVER UNIT
FINAL DEC DOC FOR RAAP-044	51565.1043	RAAP-044_NEW RIVER UNIT
NRU PROPOSED PLAN FINAL	51565.1043	RAAP-044_NEW RIVER UNIT
SSP REPORT SSAS 18, 72, 30, 79, 60, & 77	51565.1049	CC 001_OLEUM PLANT ACIDIC WASTEWATER SUM

Associated ROD/DD Name	Site WBS	Site Name
SSP REPORT SSAS 18, 72, 30, 79, 60, & 77	51565.1050	CC 002_GARBAGE INCINERATOR (BLDG 7219)
SSP REPORT SSAS 18, 72, 30, 79, 60, & 77	51565.1051	CC-003_ASBESTOS DISPOSAL TRENCHES 1 AND

Results, Actions & Plans

Results	Actions	Plans
Signs need to be installed at CC001, CC002, CC003, RAAP005, and RAAP024.	A contract has been awarded to install signs.	Action was complete on August 5, 2016.

LAND USE CONTROLS (LUC) SUMMARY

LUC Title	Site
ACTION MEMORANDUM NBG SOIL REMOVAL	51565.1043
FINAL DEC DOC FOR RAAP-044	51565.1043
NRU PROPOSED PLAN FINAL	51565.1043
POST CLOSURE PERMIT FOR HWMUS 5, 7, 16	51565.1038
POST CLOSURE PERMIT FOR HWMUS 5, 7, 16	51565.1041
RAAP-09 (SWMU 40 & 71)	51565.1009
SSP REPORT SSAS 18, 72, 30, 79, 60, & 77	51565.1049
SSP REPORT SSAS 18, 72, 30, 79, 60, & 77	51565.1050
SSP REPORT SSAS 18, 72, 30, 79, 60, & 77	51565.1051
SWMU 13 RFI REPORT FINAL	51565.1005
SWMU 41 RFI FINAL	51565.1011
SWMU 43 RFI	51565.1023
SWMU 45 SSP REPORT FINAL	51565.1024
SWMU 49 RFI REPORT FINAL	51565.1013
SWMU 51 (RAAP-001) RFI/CMS REPORT	51565.1001
SWMU 54 (RAAP014) INTERIM ACTION	51565.1014