

FY2013

VOLUNTEER ARMY AMMUNITION PLANT

Installation Action Plan

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Statement of Purpose

The purpose of the Installation Action Plan (IAP) is to outline the total multiyear cleanup program for an installation. The plan identifies environmental cleanup requirements at each site or area of concern (AOC), and proposes a comprehensive, installation-wide approach, along with the costs and schedules associated with conducting investigations and taking the necessary remedial actions (RA).

In an effort to coordinate planning information between the restoration manager, the US Army Environmental Command (USAEC), the Volunteer Army Ammunition Plant (VAAP), the Base Realignment and Closure (BRAC) Division, the executing agencies, regulatory agencies, and the public, an IAP was completed. The IAP is used to track requirements, schedules, and tentative budgets for all major Army installation cleanup programs.

All site-specific funding and schedule information has been prepared according to projected overall Army funding levels and is, therefore, subject to change.

Acronyms

ACM	Asbestos Containing Material
AEDB-R	Army Environmental Database - Restoration
AOC	Area of Concern
BRAC	Base Realignment and Closure
CAD	Computer-Aided Design
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFI	CF Industries Inc.
CLIN	Contract Line Item Number
CMI	Corrective Measures Implementation
CMI(C)	Corrective Measures Implementation (Construction)
CMI(O)	Corrective Measures Implementation (Operation)
CMS	Corrective Measures Study
CS	Confirmatory Sampling
CY	Calendar Year
cy	cubic yard
DCAA	Defense Contract Audit Agency
DD	Decision Document
DEC	Data Evaluation Criteria
DES	Design
DOT	Department of Transportation
DPT	Direct-Push Technology
ER,A	Environmental Restoration, Army
FEIS	Final Environmental Impact Statement
FRA	Final Remedial Action
FS	Feasibility Study
FY	Fiscal Year
GSA	General Services Administration
IAP	Installation Action Plan
ICM	Interim Corrective Measure
IM	Interim Measure
IRA	Interim Remedial Action
IRP	Installation Restoration Program
K	thousand
LTM	Long-Term Management
LUC	Land Use Control
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
MNA	Monitored Natural Attenuation
N/A	Not Applicable
NAA	New Acid Area
NFA	No Further Action
NPL	National Priorities List
OPS	Operating Properly and Successfully
PA	Preliminary Assessment
PAH	Polycyclic Aromatic Hydrocarbon

Acronyms

PBA	Performance-Based Acquisition
PBC	Performance-Based Contract
PBC	Public Benefit Conveyance
PBC@VAAP	Performance-Based Contract @ Volunteer Army Ammunition Plant
PCB	Polychlorinated Biphenyls
POP	Period of Performance
PP	Proposed Plan
RA	Remedial Action
RA(C)	Remedial Action (Construction)
RA(O)	Remedial Action (Operation)
RAB	Restoration Advisory Board
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Assessment
RFI	RCRA Facilities Investigation
RI	Remedial Investigation
RIP	Remedy-in-Place
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
SHPO	State Historic Preservation Office
SI	Site Investigation
SoB	Statement of Basis
SWMU	Solid Waste Management Unit
TAPP	Technical Assistance for Public Participation
TBD	To Be Determined
TDEC	Tennessee Department of Environment and Conservation
TNT	Trinitrotoluene
TRC	Technical Review Committee
TSCA	Toxic Substances Control Act
TSDS	Toluene Storage and Distribution System
USACE	US Army Corps of Engineers
USAEC	US Army Environmental Command
USATHAMA	US Army Toxic and Hazardous Materials Agency
USEPA	US Environmental Protection Agency
VAAP	Volunteer Army Ammunition Plant
VOC	Volatile Organic Compound
WP	Work Plan
WWII	World War II

Installation Information

Installation Locale

Installation Size (Acreage): 7,353.00

City: Chattanooga

County: Hamilton

State: Tennessee

Other Locale Information

The Volunteer Army Ammunition Plant (VAAP) is a closed (excess) Army facility that once occupied a total of 7,353 acres in eastern Hamilton County, Tennessee, approximately 10 miles northeast of Chattanooga's central business district. The surrounding areas of Hamilton County and Chattanooga have expanded to include the development of residential, commercial, and industrial areas in the vicinity of VAAP. All property has been transferred out of Army ownership, the primary recipient/owner being Hamilton County.

Installation Mission

Volunteer Army Ammunition Plant does not have a current mission as it was closed as an excess facility and all property has been transferred out of Army ownership.

Lead Organization

Base Realignment and Closure Division

Lead Executing Agencies for Installation

BRAC Division

US Army Corps of Engineers (USACE), Mobile District

Regulator Participation

State Tennessee Department of Environment and Conservation (TDEC)

National Priorities List (NPL) Status

VOLUNTEER ARMY AMMUNITION PLANT is not on the NPL

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

RAB established

Installation Program Summaries

IRP

Primary Contaminants of Concern: Explosives, Metals, Nitrate/Nitrite, Polychlorinated Biphenyls (PCB), Polycyclic Aromatic Hydrocarbons (PAH), Volatiles (VOC)

Affected Media of Concern: Groundwater, Sediment, Soil

Cleanup Program Summary

Installation Historic Activity

Between 1941 and 1943 the original trinitrotoluene (TNT) production facility was built here by the US Army Corp of Engineers (USACE). The plant included 16 TNT batch process lines and related acid facilities (nitric and sulfuric acids). In July 1942 operations began with the Hercules Powder Company of Wilmington, Delaware, as the operating contractor. The plant continued production until 1945; by then, over 800,000,000 pounds of TNT had been produced. The plant was then placed in standby status from January 1946 until the spring of 1952. During this time, the government maintained the plant.

In spring 1952, the plant was reactivated in support of the Korean War and its operation was awarded to the Atlas Powder Company of Wilmington, Delaware. From 1953 until the plant was shut down and placed in standby status in 1957 more than 283,000,000 pounds of TNT were produced. In 1965 the plant was reactivated again as a result of the Vietnam War and 10 of the old TNT batch processing lines were operated until 1969 when the production requirements began to decrease. After 1969, the number of batch processing lines in operation was reduced until all production using the old batch TNT lines ceased in 1975.

Between 1970 and 1972 new acid facilities were built and between 1971 and 1975 the TNT production facilities were modernized when six new continuous process lines were built in an area where four of the old batch process lines were previously razed; however, only one of the new continuous process lines was ever operated from 1974 until 1977, when the last TNT production occurred. From 1965 to 1977 approximately 1.8 billion pounds of TNT were produced. A total of 2.8 billion pounds of TNT were produced during the plant's operating history.

In 1972 Atlas Chemical Industries, the operating contractor, was purchased by ICI Americas Incorporated. ICI Americas, Inc.'s contract expired on Dec. 31, 1998 and from 1999 to 2005 Tecumseh Professional Associates was the operating contractor. There is no operating contractor at this time. The current status of the plant is inactive excess.

From 1942 to 1945 and again from 1952 to 1957 the area now known as the CF Industries, Inc. (CFI) lease area was used by the Army for nitric and sulfuric acid production. In 1962 the CFI lease area was established when the Army leased that land to CFI. CFI used the leased 824-acre site for the commercial production of ammonium nitrate fertilizer, urea, and related products. In 1965, at the start of the Vietnam War, the Army reclaimed the use of all the existing acid production equipment in the CFI area to increase its nitric acid production and sulfuric acid concentration capacity.

The CFI constructed a new acid plant adjacent to the ammonia plant they had previously built for their commercial ammonium nitrate production and simultaneously operated the old acid plants to produce nitric acid and concentrated sulfuric acid for the VAAP.

Commercial production by CFI continued until 1982 when all operations were terminated for economic reasons. During 1985 and 1986 all of the CFI production areas were dismantled for salvage. CFI no longer leases the property; however, former Army acid production facilities were not dismantled until 1997. On Nov. 1, 1991 the VAAP received a notification of the USEPA's intention to issue an order and agreement pursuant to Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). After subsequent negotiations and correspondence between Army representatives and the USEPA, the USEPA Region IV decided not to issue the order. The USEPA Region IV has expressed interest in work being conducted at the VAAP; however, in a meeting on Feb. 20, 1996 the USEPA Region IV stated that because the VAAP would not likely be added to the the National Priorities List (NPL), they would leave remediation entirely to the state.

In March 1997 the VAAP was advised that the lead regulatory agency would be the Tennessee Department of Environment and Conservation (TDEC) Division of Superfund. Subsequently, in the absence of an interagency agreement, the state began to review documents and provide constructive comments in an informal partnering spirit. In September 1997 the VAAP solicited interest in forming a RAB. The public petitioned to form a RAB and on Feb. 19, 1998 the first RAB meeting was held.

As mentioned earlier, in 1997 the Army determined that VAAP was excess to its needs. In Congress, legislation was passed to allow transfer of 975.95 acres to Hamilton County/city of Chattanooga. The General Services Administration (GSA), the disposal agency for the Army, is acting as the executing agency for all property transfer actions. In September 2000 for \$7.5 million via negotiated sale under early transfer authority the city of Chattanooga bought the 975.95 acres.

In 2001 the Army completed removal of contaminated soil on-site. As of 2002, all work under early transfer authority was completed and the Army gave the CERCLA covenants. In April 2002, the property was removed from the notice of hazardous substance sites (removed from State Superfund) in the state of Tennessee.

In late 2000, TDEC consulted with the USEPA Region IV on appropriate actions to encourage expedited cleanup of the site. A

Cleanup Program Summary

determination was made that the USEPA would issue an enforcement vehicle [(3008 (h)) of the Resource Conservation and Recovery Act (RCRA)] to the Army. The Army received the final order on Dec. 4, 2001.

In 2003, approximately 262 acres along the southern boundary of VAAP were transferred to the city of Chattanooga and Hamilton County. In 2005, 2,812 acres of VAAP comprising the eastern portions of the facility were transferred to the National Park Service, the city of Chattanooga, and Hamilton County. In 2006 approximately 159 acres of the VAAP along the western ridge of the facility, toluene-loading facilities, and settling pond north of Highway 58, including the water treatment plants, was transferred. An additional 128 acres on the western ridge south of the east side parcel is scheduled for transfer in 2010 as a public benefit conveyance. In April 2005 the remainder of the VAAP property (1787 acres) was transferred to Hamilton County and the city of Chattanooga under early transfer while the remaining cleanup activities continue.

In July 2006 a performance-based acquisition (PBA) was awarded to address four contaminated soil sites (VAAP-001, VAAP-020, VAAP-021, and VAAP-032). In September 2007 VAAP-001 achieved RC. VAAP 20 and 21 achieved RC in 2009. VAAP 32 achieved RC in 2011.

All the remaining soils sites (VAAP 366 and 37) remediation was completed in 2011 and are pending regulatory approval for RC. VAAP 35 (groundwater) and VAAP 02 (CFI Lease Area) are currently in the corrective measures study (CMS) and corrective measures implementation {CMI(C)} phases respectively. Both sites are anticipated to have remedies-in-place (RIP) in 2012.

In September 2009 Army and TDEC entered a consent order replacing USEPA's 2001 RCRA Order, thereby making TDEC the primary/sole regulatory oversight authority. The Army and TDEC have opted for use of an alternative streamlined corrective action process known as a Facility Action Plan under this order.

Installation Program Cleanup Progress

IRP

Prior Year Progress: VAAP-01: Long-term management (LTM) ongoing
VAAP-02: : Corrective measures implementation (Operation) (CMI(O)) ongoing
VAAP-20: LTM ongoing
VAAP-21: LTM ongoing
VAAP-32: LTM ongoing.
VAAP-35: CMS received regulatory approval March 2013; anticipated to complete CMI(C)Phase in FY 2013. Semiannual monitoring ongoing.
VAAP-36 and VAAP-37 received regulatory approval; RC in FY13. Begin LTM.

Future Plan of Action: All sites in CMI(O) or LTM phases by early FY14.

Performance based contract (PBC): PBC: Anticipate possible early close-out FY 14, to put all sites in single PBA.

VAAP-01: LTM ongoing

VAAP-02: CMI(O) ongoing

VAAP-20: LTM ongoing

VAAP-21: LTM ongoing

VAAP-32: LTM ongoing.

Cleanup Program Summary

VAAP-35: CMIO) ongoing; anticipate operating properly and successfully (OPS) determination from USEPA late FY14 or early FY15

VAAP-36: LTM ongoing

VAAP-37: LTM ongoing

5-Year / Periodic Review Summary

5-Year / Periodic Review Summary

Status	Begin Date	End Date	End FY
Planned	201607	202107	2021

5-Year / Periodic Review Details

Associated ROD/DD Name	Sites
VAAP-02 CFI Lease ROD	VAAP-02

Land Use Control (LUC) Summary

LUC title: CDDA LUC

Site(s): VAAP-20

ROD/DD title: VAAP-20 CDDA DD

Location of LUC

Construction Debris Landfill Site (VAAP-20)

Land Use Restriction: Landfill restriction - Prohibit activities that would impact the LF cap (or cover system) and drainage system, Landfill restriction - Prohibit excavation on LF cap or cover system, Landfill restriction - Prohibit installation of utility system lines through the site, Landfill restriction - Restrict construction of buildings that may interfere with LF cap or cover system, Landfill restriction - Restrict plantings that interfere LF cap or cover system (roots that penetrate the cap or cover system), Media specific restriction - prohibit use of groundwater for consumption or domestic purposes, Media specific restriction - restrict drinking water well installation, Media specific restriction - restrict withdrawal or use of groundwater for agricultural/irrigation purposes

Types of Engineering Controls: Markers, Signs

Types of Institutional Controls: Deed Restrictions, Restrictions on Groundwater Withdrawal, Restrictions on land use

Date in Place: 200808

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: USACE District

Record of LUC: Master Plan or Equivalent

Documentation Date: 200808

LUC Enforcement: Markers, Other

Contaminants: METALS

Additional Information

N/A

LUC title: WW II LF LUC

Site(s): VAAP-21

ROD/DD title: VAAP 21. WWII LF DD

Location of LUC

World War II Landfill (VAAP-21)

Land Use Restriction: Landfill restriction - Prohibit activities that would impact the LF cap (or cover system) and drainage system, Landfill restriction - Prohibit excavation on LF cap or cover system, Landfill restriction - Prohibit installation of utility system lines through the site, Landfill restriction - Restrict construction of buildings that may interfere with LF cap or cover system, Landfill restriction - Restrict plantings that interfere LF cap or cover system (roots that penetrate the cap or cover system), Media specific restriction - prohibit use of groundwater for consumption or domestic purposes, Media specific restriction - restrict drinking water well installation, Media specific restriction - restrict withdrawal or use of groundwater for agricultural/irrigation purposes

Types of Engineering Controls: Markers, Signs

Types of Institutional Controls: Deed Restrictions, Restrictions on Groundwater Withdrawal, Restrictions on land use, Zoning

Date in Place: 200808

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: USACE District

Record of LUC: Master Plan or Equivalent

Land Use Control (LUC) Summary

Documentation Date: 200808

LUC Enforcement: Markers, Other

Contaminants: METALS, NITROAROMATICS, PAH

Additional Information

N/A

Summary of Parcel Prioritization and Transfer Strategy

Parcel Name: Eastside Utilities/TNT Valley Remainder

Parcel Size: 159.00

Associated Sites:

Transfer Date: 200609

Current Land Use: Industrial

Future Land Use: Industrial

Encumbrances: N/A

Leases/Permits/Licenses: N/A

Transfer Strategy: Public Sale

Recipient Organization: East Side Utilities

Other Issues Affecting Transfer:N/A

Parcel Name: Tennessee DOT Road

Parcel Size: 2.00

Associated Sites:

Transfer Date: 200604

Current Land Use: Industrial

Future Land Use: Industrial

Encumbrances: N/A

Leases/Permits/Licenses: N/A

Transfer Strategy: Public Benefit Conveyance (PBC)

Recipient Organization: N/A

Other Issues Affecting Transfer:N/A

Parcel Name: Western Ridge Area

Parcel Size: 128.00

Associated Sites:

Transfer Date: 201209

Current Land Use: Other (Buffer Area)

Future Land Use: Recreational

Encumbrances: N/A

Leases/Permits/Licenses: N/A

Transfer Strategy: Public Benefit Conveyance (PBC)

Recipient Organization: Hamilton County

Other Issues Affecting Transfer:N/A

VOLUNTEER ARMY AMMUNITION PLANT

Non-BRAC Excess Installation Restoration Program

IRP Summary

Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count: 21/16

Installation Site Types with Future and/or Underway Phases

- 2 Contaminated Ground Water
(PBC @ VAAP, VAAP-35)
- 2 Landfill
(VAAP-20, VAAP-21)
- 1 Spill Site Area
(VAAP-02)

Most Widespread Contaminants of Concern

Explosives, Metals, Nitrate/Nitrite, Polychlorinated Biphenyls (PCB), Polycyclic Aromatic Hydrocarbons (PAH), Volatiles (VOC)

Media of Concern

Groundwater, Sediment, Soil

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

Site ID	Site Name	Action	Remedy	FY	Cost
VAAP-05	OLD STORAGE AREA (EXP MAG)	FRA	WASTE REMOVAL - SOILS	2004	\$184.0 K
VAAP-16	BURNING GROUND (WWII)	FRA	WASTE REMOVAL - SOILS	2004	TBD
VAAP-02	CFI LEASE AREA	IRA	WASTE REMOVAL - SOILS	2006	\$3,800.0 K
VAAP-31	WAREHOUSE AND PESTICIDE STORAGE	IRA	REMOVAL	2006	\$255.0 K
VAAP-01	OLD EAST ACID AREA	FRA	WASTE REMOVAL - SOILS	2007	\$3,200.0 K
VAAP-36	Toluene Storage and Dist System	IRA	REMOVAL	2008	TBD
PBC @ VAAP	PBC	FRA	OTHER	2009	TBD
VAAP-37	Miscellaneous Disposal Areas	IRA	WASTE REMOVAL - SOILS	2009	TBD
VAAP-20	CONSTRUCTION DEBRIS DISPOSAL AREA	FRA	CAPPING	2010	TBD
VAAP-21	LANDFILL (WW II)	FRA	CAPPING	2010	TBD
VAAP-18	VANADIUM PENTOXIDE/ASBESTOS BURIAL GRND	FRA	REMOVAL	2011	TBD
VAAP-32	TNT MFG VALLEY/INCL RDWTR TREATMENT PLT	FRA	OTHER	2011	TBD
VAAP-02	CFI LEASE AREA	FRA	NATURAL ATTENUATION	2013	TBD
VAAP-35	GROUNDWATER	FRA	NATURAL ATTENUATION	2013	TBD

Duration of IRP

Year of IRP Inception: 197801

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201310/204310

Date of IRP completion including Long Term Management (LTM): 204701

IRP Contamination Assessment

Contamination Assessment Overview

The Installation Restoration Program (IRP) at the VAAP was initiated with the completion of the 1978 Installation Assessment of Volunteer Army Ammunition Plant [United States Army Toxic and Hazardous Material Agency (USATHAMA)]. Numerous additional investigations have been conducted and are listed in the Previous Studies section.

Multiple TNT production related contaminants have been found in soils, sediments, and groundwater at or near the TNT manufacturing and associated supporting facilities. Arsenic, lead, PCB, PAH and explosives have also been detected in soils near former processing facilities. Off-post groundwater contamination has been observed in residential wells and springs north and south of the facilities. Studies of off-post groundwater contamination have concluded that only low levels of explosives are present and that there is no immediate risk to human health or the environment. Certain residents were placed on the public water supply. Follow-on studies are underway.

The site investigation (SI), remedial investigation (RI) and feasibility study (FS) were performed on the installation as a whole, not by specific AEDB-R sites. This resulted in one draft SI report, one draft RI report, and one draft FS completed for the installation. In December 1994 the draft SI report was submitted to both the USEPA Region IV and the state of Tennessee for review and comment. In June 1995 the draft RI report was submitted for review and in July 1997 the draft FS was submitted. In 1997 the TDEC's Superfund Division became the lead regulatory agency. On Dec. 4, 2001, when the RCRA 3008 (h) order became effective, the USEPA became the lead agency.

Additional investigations including RCRA facility investigations (RFIs), RCRA facility assessments (RFAs), and confirmatory sampling (CS) events have since been conducted at all identified sites at the VAAP as required under the USEPA 3008(h) order. Reporting for these investigations is underway. Multiple interim and final RAs have taken place (see specific sites for details). All RAs have been completed or are in final phases with the exception of VAAP-35 (site-wide groundwater). VAAP-35 is in the CMS phase but is expected to complete that phase and the CMI(C) phase in 2012. It is anticipated that all sites will attain RIP/RC by late calendar year (CY)12.

Cleanup Exit Strategy

There are currently four AOCs and solid waste management units (SWMUs) receiving funding through the IRP. Two of the SWMUs (VAAP-20, VAAP-21) are at RC, and were part of a PBC; costs for these sites are captured under PBC@VAAP site through FY18 as part of the PBC contract. LTM costs beyond the PBC period of performance (POP) are shown under the specific sites.

At VAAP-02, additional investigation for nitrates in soil, and nitrates and lead in groundwater has been completed. An RI/FS was approved by regulatory agencies and a draft proposed plan (PP) submitted in August 2010 which is pending regulatory approval. Execution (design and construction phases) of a monitored natural attenuation (MNA) remedy is anticipated in early FY 12.

VAAP-35 (site-wide groundwater) remains in the RFI/CMS phase. In March 2008 a bench scale study was performed to evaluate a potential new technology for treatment of explosives in groundwater and deep soils; the study was completed in January 2009. A pilot study was recommended. Following additional (FY 10) rounds of semiannual groundwater sampling analyses, the most probable remedy is considered to be MNA with an execution in FY 12.

IRP Previous Studies

	Title	Author	Date
1979	A study of Landfill Leachates at VAAP	USATHAMA	JAN-1979
	Installation Assessment of VAAP, Records Evaluation Report No. 123	USATHAMA	JAN-1979
1984	Survey of VAAP, Chattanooga, Tennessee, Final Technical Report	USATHAMA	JAN-1984
	Environmental Contamination Survey of VAAP: Confirmatory Phase	USATHAMA	JAN-1984
	Historical Installation Assessment VAAP (Aerial Photography) The Biometrics Corporation, TS-PIC-84001	USATHAMA	DEC-1984
1985	Archives Search (Part I) and Limited Sampling and Analysis (Part II) at the CF Industries, Inc. Lease Area on VAAP	USATHAMA	JAN-1985
1987	Final Draft Report of Remedial Investigations, VAAP	USATHAMA	JAN-1987
1989	Public Involvement and Response Plan for VAAP	USATHAMA	JAN-1989
1990	Remedial Investigation/Feasibility Study Addendum, Background Soil Study for the CF Industries, Inc.	USATHAMA	JAN-1990
	Remedial Investigation/Feasibility Study VAAP, Addendum Follow-up Report	USATHAMA	JAN-1990
	Historic Resource Survey of VAAP	USACE, Mobile District, ICI Americas Incorporated	JAN-1990
	US Army Industrial Operations Command Environmental Baseline Survey	Tecumseh Professional Associates, Inc.. Vista Technologies (Vista)	NOV-1990
1991	Future Archaeological Surveys of the VAAP Projects	Tennessee Historical Commission	JAN-1991
	Future SHPO Review of Volunteer Army Ammunition Plant Projects,	Tennessee Historical Commission	JAN-1991
1992	Residential Well Sampling at VAAP	USATHAMA	JAN-1992
1993	Interim Report: Preliminary Site Reconnaissance Activities	USAEC	JAN-1993
	Quality Assurance Project Plan, Remedial Investigation/Feasibility Study and Site Investigation	USAEC	JAN-1993
1994	Closure/Post Closure Plan, Sanitary Landfill	ICI Americas, Inc.	JAN-1994
	Technical and Sampling Plan for SI and RI/FS at VAAP	USAEC	JAN-1994
	Technical and Sampling Plan for SI and RI/FS at VAAP, Draft Addendum	USAEC	JAN-1994
	Technical and Sampling Plan for SI and RI/FS at VAAP, Draft Addendum II	USAEC	JAN-1994

IRP Previous Studies

	Title	Author	Date
1995	Remedial Investigation Report, Draft	USACE, Mobile District	JAN-1995
1997	Feasibility Study, Draft Final	USAEC	JAN-1997
1998	Field Sampling Plan Addenda - Supplemental Site Investigations/Remedial Investigations at Various Sites	USACE, Mobile District	JAN-1998
	Remediation Plan, Explosive Waste Burning Unit	ICI Americas, Inc.	JAN-1998
	Work Plan for Remediation Plan Facility Closure Explosive Waste Burning Unit/Burning Ground Area VAAP	Consolidated Technologies, Inc.	MAY-1998
	Preliminary Hydrogeologic Report, Proposed Class I Landfill VAAP Site	Consolidated Technologies, Inc.	JUN-1998
	Groundwater Data Report	Consolidated Technologies, Inc.	JUN-1998
1999	GSA Proposed VAAP Final Environmental Impact Statement (FEIS)	Potomac-Hudson Engineering, Inc.	JUL-1999
	Proposed Disposal, VAAP Final Environmental Impact Statement	Potomac-Hudson Engineering, Inc.	JUL-1999
	Contract NO. GS09D-98-CFC-001	Tecumseh Professional Associates, Inc.	NOV-1999
	Remediation Plan and Focused Remedial Design Vanadium Pentoxide Burial Ground Removal Action	IT Corp.	DEC-1999
2000	Report of Findings for Supplemental Site Investigations at Various Sites	IT Corp.	FEB-2000
	Residential Well Survey Letter Report for Areas South and West of VAAP	IT Corp.	FEB-2000
	Field Sampling Plan Addenda Supplemental Site Investigations Remedial Investigations Multiple Sites and Areas of Concern	IT Corp.	MAR-2000
	Installation Action Plan for VAAP	Engineering and Environment, Inc. for USAEC	MAR-2000
	Technical Sampling Plan Addenda Supplemental Site Investigations Remedial Investigations Multiple Sites and Areas of Concern	IT Corp.	MAR-2000
	Work Plan Addenda Supplemental Sampling at the Magazine Area	IT Corp.	JUL-2000
	Groundwater Sampling Results of the Twelve Quarterly Monitoring Wells First and Second Quarters Feb 2000 - April 2000	IT Corp.	AUG-2000
2001	Report of Findings and Basis for a Soil Removal Action in the Western Magazine Area	IT Corp.	MAR-2001
	Draft Annual Groundwater Sampling Report, TNT Manufacturing Valley (Feb, Apr, Jul & Oct 2000)	IT Corp.	NOV-2001
	Draft Annual Groundwater Sampling Report, Western Magazine Area (Nov 2000, Mar, Apr & Aug 2001)	IT Corp.	NOV-2001
	Draft Soil Removal Action Report for the Western Magazine Area	IT Corp.	NOV-2001

IRP Previous Studies

Year	Title	Author	Date	
2001	Draft Site Investigations/Confirmatory Sampling at Various Redwater Ash Handling and Disposal Area	IT Corp.	DEC-2001	
	Draft Supplemental Site Investigation Results/Confirmatory Sampling at Various Areas of Concern	IT Corp.	DEC-2001	
2002	Draft Interim Corrective Measures for the Soil Removal Action at the Vanadium Pentoxide Area	IT Corp.	FEB-2002	
	Draft Interim Corrective Measures for the Soil Removal Action at the Vanadium Pentoxide Area	IT Corp.	MAR-2002	
	Phase I Environmental Site Assessment and Phase II Site Investigation, Railroad Network Easement	Potomac-Hudson Engineering Inc,	APR-2002	
	Final RCRA Facility Assessment Report, Areas of Concern 9, 10,10b, and Salvage Yard	IT Corp.	JUN-2002	
	Final Installation Quality Assurance Project Plan for Environmental Investigating and Corrective Measures	IT Corp.	JUL-2002	
	Final Installation Quality Assurance Project Plan for Environmental Investigating and Corrective Measures	IT Corp.	JUL-2002	
	Interim Measures Work Plan, Area of Concern #2 - Pistol Ranges	World Environmental, Inc.	SEP-2002	
	Public Participation Plan Update	IT Corp.	SEP-2002	
	Confirmatory Sampling Work Plan, Redwater Ash/Gypsum Sludge Landfill, SWMU-5	IT Corp.	OCT-2002	
	Final Environmental Assessment in Support of Clean Parcel Determination for the 200-acre and 85-acre Parcels along the Southern Boundary	IT Corp.	NOV-2002	
	Final Groundwater Sampling Report, March 2000 through August 2002, Western Magazine Area & 940 Acre Parcel	IT Corp.	NOV-2002	
	2003	Redwater Ash Disposal & Handling Area, Misc. Disposal RFI Work Plan	Tetra Tech/MACTEC	JAN-2003
		Warehouse Area RFA Work Plan	Tetra Tech/MACTEC	JAN-2003
		Summary of Interim Measures, Area of Concern #2 - Pistol Ranges	World Environmental, Inc.	MAY-2003
		Final Confirmatory Sampling Report for the Eastern Magazine Area and Surrounding Property,	Shaw Environmental, Inc.	JUL-2003
Industrial Landfill (aka Construction Debris Disposal) Area RFI Work Plan		Tetra Tech/MACTEC	AUG-2003	
New Landfill/Burning Ground Area RFI/CMS Report (approved by USEPA on 8/12/03)		Tetra Tech/MACTEC	AUG-2003	
Redwater Ash Disposal & Handling Area, Misc. Disposal RFA Report		Tetra Tech/MACTEC	AUG-2003	
Salvage Yard RFI Work Plan		Tetra Tech/MACTEC	AUG-2003	
Site Wide Groundwater Investigation Phase I RFI Work Plan, Phase I (approved by USEPA on August 27, 2003)		Tetra Tech/MACTEC	AUG-2003	
World War II Burning Ground RFI Work Plan (approved by USEPA on August 13, 2003)		Tetra Tech/MACTEC	AUG-2003	
CFI Lease Area RFA Report, RFA Text, table and CAD files		Tetra Tech/MACTEC	SEP-2003	
Final Burn Cage Removal Action Report, New Landfill/Burning Ground Area		Shaw Environmental, Inc.	SEP-2003	

IRP Previous Studies

2003	Title	Author	Date
	New Acid Area RFI Work Plan Draft-final submitted February 2003 (Revised Appendix A sent out with NAA buildings and history 9/17/03)	Tetra Tech/MACTEC	SEP-2003
	Phase II Environmental Site Assessment, Field Sampling Plan	Plexus Scientific Corp.	SEP-2003
	Final Installation-Wide Quality Assurance Project Plan for Environmental Investigations and Corrective Measures, Revision 1	Shaw Environmental, Inc	OCT-2003
	Final Interim Corrective Measures Report for the Soil Removal Action at the Vanadium Pentoxide Burial Ground	Shaw Environmental, Inc.	OCT-2003
	Warehouse Area including Pesticide Storage Area RFA Report	Tetra Tech/MACTEC	OCT-2003
	ICM Work Plan for AOC 4, AOC 10b, and AOC 11	Tetra Tech/MACTEC	OCT-2003
2004	Site-wide Groundwater Investigation Area, Phase II CMS Work Plan	Tetra Tech/MACTEC	JAN-2004
	Final Interim Corrective Measure Work Plan for the Railcar Loading Building 908-4	Shaw Environmental, Inc,	FEB-2004
	Railcar Loading Area and Old Explosives Magazine Area, Interim Corrective Measure Work Plan	Shaw Environmental, Inc.	FEB-2004
	CFI Lease Area, Interim Corrective Measures Work Plan, Final	Shaw Environmental, Inc.	APR-2004
	Tenant Risk Evaluation, Rail Tenants	Shaw Environmental, Inc.	APR-2004
	Warehouse Area, Confirmatory Sampling Work Plan	Shaw Environmental, Inc.	APR-2004
	CFI Lease Area, RCRA Facility Assessment/RCRA Facility Investigation Re	TetraTech/MACTEC & Shaw Environmental, Inc.	MAY-2004
	Redwater Ash Handling Area (AOC-11), Pellet Disposal Area (AOC-12), AOC-4, Redwater Ash Handling and Disposal Areas, and Miscellaneous Areas of Concern, RCRA Facility Assessment/Interim Corrective Measure Report	Shaw Environmental, Inc.	SEP-2004
	AOC-10b, Interim Corrective Measure Report	Shaw Environmental, Inc.	SEP-2004
	New Acid Area, RCRA Facility Investigation Report	Shaw Environmental, Inc.	SEP-2004
	Pistol Ranges, Final RCRA Facility Investigation/Interim Corrective Measure Report	World Environmental, Inc.	SEP-2004
	Railcar Loading Area and Old Explosives Magazine Area Corrective Measure Study/Interim Corrective Measure Report	Shaw Environmental, Inc.	SEP-2004
	East Acid Area, RCRA Facility Investigation/Corrective Measure Study Report	TetraTech/MACTEC & Shaw Environmental, Inc.	OCT-2004
2005	Soil CMS, TNT Manufacturing Valley	Shaw Environmental, Inc.	JAN-2005
	Old & New TNT Areas and Redwater Treatment Plant Area, RCRA Facility Investigation/ Corrective Measure Study Report	Shaw Environmental, Inc.	JAN-2005
	Pistol Ranges, RCRA Facility Investigation Work Plan	Shaw Environmental, Inc.	FEB-2005
	Tenant Risk Evaluation, Rail and Non-rail Tenants	Shaw Environmental, Inc.	FEB-2005
	World War II Landfill Area, RCRA Facility Investigation Report	Shaw Environmental, Inc.	FEB-2005

IRP Previous Studies

2005	Title	Author	Date
	Construction Debris Disposal Area, RCRA Facility Investigation Report,	Shaw Environmental, Inc.	MAR-2005
	Warehouse Area/Pesticide Storage Area, Interim Corrective Measure Work Plan	Shaw Environmental, Inc.	MAR-2005
	Site-wide Groundwater Investigation Area, RCRA Facility Investigation Report	Shaw Environmental, Inc.	MAR-2005
	World War II Burning Ground, RCRA Facility Investigation Report	Shaw Environmental, Inc.	SEP-2005
	Site-wide Groundwater Investigation Area, Phase 2 CMS Work Plan	Tetra Tech/MACTEC	NOV-2005
	Site-wide Groundwater Investigation Area, Focused CMS Report for Low Risk Groundwater Areas,	Tetra Tech/MACTEC	DEC-2005
	Site-wide Groundwater Investigation Area, Focused Statement of Basis for Low Risk Groundwater Areas	Tetra Tech/MACTEC	DEC-2005
	Pistol Ranges, RCRA Facility Investigation Report	Shaw Environmental, Inc.	DEC-2005
2006	Salvage Yard, RCRA Facility Investigation/Interim Corrective Measure Report	Shaw Environmental, Inc.	MAR-2006
	Miscellaneous Disposal Area, RCRA Facility Investigation Work Plan	Shaw Environmental, Inc.	APR-2006
	Toluene Storage & Distribution System, RCRA Facility Investigation Work Plan	Shaw Environmental, Inc.	APR-2006
	Construction Debris Disposal Area, RCRA Corrective Measures Study	Shaw Environmental, Inc.	MAY-2006
	Old East Acid Area, Statement of Basis	Shaw Environmental, Inc.	JUL-2006
	Old & New TNT Areas and Redwater Treatment Plant Area, Statement of Basis	Shaw Environmental, Inc.	JUL-2006
	Warehouse Area, Final Confirmatory Sampling/Interim Corrective Measure Report	Shaw Environmental, Inc.	AUG-2006
	Site-wide Groundwater Investigation Area, Final Focused Corrective Measures Implementation Work Plan for Selected Portions of the South TNT Groundwater Basin and Associated Environs	Tetra Tech, Inc.	SEP-2006
	Old East Acid Area, Final Corrective Measures Implementation Work Plan	Tetra Tech, Inc.	DEC-2006
	World War II Landfill, Final Corrective Measures Study	Tetra Tech, Inc.	DEC-2006
	Old & New TNT Areas & Redwater Treatment Plant Area, Final Corrective Measures Implementation Work Plan	Tetra Tech, Inc.	DEC-2006
2007	Miscellaneous Disposal Area, Final Interim Corrective Measure Work Plan, MDA-B	Shaw Environmental, Inc.	JAN-2007
	Miscellaneous Disposal Area, Final Interim Corrective Measure Work Plan, MDA-A	Shaw Environmental, Inc.	MAR-2007
	TNT Manufacturing Valley (VAAP-32), CMI Work Plan	Tetra Tech	JUN-2007
	Statement of Basis, Construction Debris Disposal Area	Tetra Tech	AUG-2007
	Statement of Basis, World War II Landfill	Tetra Tech	AUG-2007
	Revised Final, CMS for the World War II Landfill	Tetra Tech	SEP-2007
2008	RCRA Corrective Measures Study Bench-Scale	Tetra Tech	JAN-2008

IRP Previous Studies

2008	Title	Author	Date
	Treatability Study Work Plan for the North and South TNT Manufacturing Valley Groundwater Investigation		
	Final Abbreviated Preliminary Assessment/Site Investigation Report CFI Lease Area	Tetra Tech Inc.	APR-2008
	Technical Approach for Sampling in Support of the Interim Corrective Measure Miscellaneous Disposal Area A	Shaw Environmental, Inc.	APR-2008
	TNT Manufacturing Valley, Addendum to the CMI Work Plan	Tetra Tech	APR-2008
	Final CFI Lease Area Nitrate Remedial Investigation Work Plan Addendum	Tetra Tech Inc.	JUN-2008
	Final Interim Corrective Measure Work Plan Ammonium Nitrate Spill Area Toluene Storage and Distribution System (SWMU #12)	Shaw Environmental, Inc.	JUN-2008
	Technical Approach for Continuation of the Interim Corrective Measure, Miscellaneous Disposal Area A	Shaw Environmental, Inc.	AUG-2008
	Summary of RCRA Facility Investigation Findings, North Toluene Loading Facility Toluene Storage and Distribution System (SWMU #12)	Shaw Environmental, Inc.	SEP-2008
	2006-2007 Site-Wide Focused Groundwater Monitoring Report	Tetra Tech Inc.	NOV-2008
	Final Corrective Measures Implementation Work Plan for the Construction Debris Disposal Area (SWMU #1), Volunteer Army Ammunition Plant, Chattanooga, Tennessee	Tetra Tech	DEC-2008
2009	Final RCRA Interim Corrective Measure Report Miscellaneous Disposal Area A Area of Concern #14	Shaw Environmental, Inc.	JAN-2009

VOLUNTEER ARMY AMMUNITION PLANT

Non-BRAC Excess

Installation Restoration Program

Site Descriptions

Site ID: PBC @ VAAP
Site Name: PBC

STATUS

Parcel: NONE

Regulatory Driver: RCRA

RRSE: LOW

Contaminants of Concern: Explosives, Metals, Polychlorinated Biphenyls (PCB), Polycyclic Aromatic Hydrocarbons (PAH)

Media of Concern: Groundwater, Sediment, Soil

Phases	Start	End
RFA.....	200002.....	200009
CMI(C).....	200604.....	200909
LTM.....	200910.....	201609

RIP Date: N/A

RC Date: 200909

SITE DESCRIPTION

This site is comprised of four sites (VAAP-01, VAAP-20, VAAP-21, and VAAP-32) which were being combined under a PBA. The contract was awarded in July 2006, activating five bid items. It included the final CMS and statement of basis (SOB) for VAAP-21, RIP/RC for VAAP-01 and VAAP-32. In December 2006 optional bid items for RIP/RC at VAAP-20 and RIP/RC at VAAP-21 were awarded. Regulatory delays and use of a new innovative method to destroy the nitroaromatic contamination resulted in delays that would have pushed execution of many of the PBA LTM contract line item numbers (CLINs) out until 2018, two years after the 2016 POP end date of the contract. RC for all sites was attained in December 2009 (FY10) with LTM ongoing. In December 2012 it was determined that the POP for the PBA contract could not be extended. Thus PBA site(s) LTM beyond the FY16 POP end date are captured under the individual sites.

CLEANUP/EXIT STRATEGY

Please see the individual site description and specific cleanup strategy located under the specific site's section.

Site ID: VAAP-02
Site Name: CFI LEASE AREA

STATUS

Parcel: NONE

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Metals, Nitrate/Nitrite, Polychlorinated Biphenyls (PCB), Polycyclic Aromatic Hydrocarbons (PAH)

Media of Concern: Sediment, Soil

Phases	Start	End
RFA.....	197801.....	198505
CS.....	197801.....	200801
RFI/CMS.....	200801.....	201006
DES.....	201007.....	201009
IRA.....	200407.....	200607
CMI(C).....	201110.....	201212
CMI(O).....	201212.....	204212

RIP Date: 201212

RC Date: 204212

SITE DESCRIPTION

Site VAAP-02 consists of approximately 686 acres located along the western boundary of VAAP. Nitric acid, sulfuric acid and oleum were produced during Army use. From 1962 to 1982 CFI leased the facilities for production of fertilizers and urea. All equipment and facilities have been disposed of. For soils, some constituents exceeded the data evaluation criteria (DEC) including arsenic, total chromium, lead, manganese, total carcinogenic PAH and total PCBs. The site is a high risk area and is a part of the USEPA RCRA Order issued in December 2001. The site is also a state (TDEC) Superfund site. An SI was performed in 1994 and a RI was initiated in 1995 and given final approval as an RFI/CMS in 2004. In that year a decision document (DD) to support an interim measure (IM) cleanup of soil constituents exceeding DEC was issued prior to starting work. Remediation of PCBs was accomplished under a hybrid cleanup approach using procedures of 40CFR761(a). Soils that were contaminated with metals were stabilized on-site and then disposed of at an approved off-site landfill. The PCBs, which did not meet DEC, were treated as a hazardous waste and disposed of off-site at a Toxic Substance Control Act (TSCA) approved landfill.

In June 2004 the final interim corrective measure (ICM) work plan (WP) for removal of contamination associated with the area was approved. In 2006, as part of the interim corrective action, removal of 13,335 cubic yards (cy) of soil and sediment contaminated with lead, PCB, arsenic, vanadium, and chromium was completed. Originally, a final CMS for the site was to be completed by the end of FY08; however, regulatory agencies and the cleanup team determined that groundwater would be more appropriately addressed for this site in a CMS rather than inclusion in the site-wide groundwater CMS.

As part of the CS for the soils corrective measures work, nitrate/nitrite exceeding maximum contaminant levels (MCLs) was discovered in groundwater at the site. Since nitrate contamination is not RCRA waste subject to the 2003 USEPA administrative order, and the CMS for soils was not drafted, all contaminants will be included in one set of documents under the CERCLA process (rather than having a RCRA and a CERCLA set of documents). This resulted in extension of the previous projected RIP/RC date for the site. An abbreviated preliminary assessment (PA)/SI was finalized in June 2008. A draft RI/FS was submitted to the regulatory agencies in February 2009, and approval of the RI/FS and selected remedy was received in February 2010. A PP was approved and finalized in July 2010 and a record of decision (ROD) finalized and signed in August 2011. Final remedy is MNA of groundwater and LUCs.

Design (DES) phase was completed in FY11 with corrective measures implementation (construction) [CMI(C)]complete in FY12 and corrective measures implementation (operation) [CMI(O)] initiated in FY12.

CLEANUP/EXIT STRATEGY

Site ID: VAAP-02
Site Name: CFI LEASE AREA



CMI(C) completed in FY12 and CMI(O) initiated in FY12 with groundwater monitoring for MNA and will continue for 30 years. This site was RIP/RC in FY12. It is anticipated that the MNA for this site will be combined with site VAAP-35 in FY14. After FY16, it is anticipated that this site's costs will be combined with all other sites in a site-wide PBA for LTM/CMI(O).

Site ID: VAAP-20

Site Name: CONSTRUCTION DEBRIS DISPOSAL AREA

STATUS

Parcel: NONE

Regulatory Driver: RCRA

RRSE: MEDIUM

Contaminants of Concern: Explosives, Metals, Polychlorinated Biphenyls (PCB), Polycyclic Aromatic Hydrocarbons (PAH), Volatiles (VOC)

Media of Concern: Soil

Phases	Start	End
RFA.....	197801.....	198403
CS.....	197801.....	199412
RFI/CMS.....	200206.....	200705
DES.....	200705.....	200904
CMI(C).....	200906.....	200912
LTM.....	201001.....	203912

RIP Date: N/A

RC Date: 200912

SITE DESCRIPTION

Site VAAP-20 is located approximately 800 feet east of the East Acid Area in an undeveloped part of the VAAP. The site consists of a three-acre unlined landfill for decontaminated industrial waste and construction debris. The landfill was in operation from the 1970s to 2002. Surface debris was removed in 2002.

The RFI concluded that soils contaminants are primarily PCBs, PAHs, metals and VOCs associated with subsurface soils. The site is a medium risk area and was included in the USEPA RCRA order issued in December 2001. The site is also a state (TDEC) Superfund site. An SI was performed in 1994 and RI was initiated 1995, but due to the switch to RCRA, in 2004 the SI and RI were combined and submitted as a final RFI. The CMS, which included a risk assessment, was completed in 2006. Results of the risk assessment were that xylene was the primary risk driver in the soil for the future industrial worker and construction work. In August 2007 the SOB was approved and in September 2007 the draft corrective measures implementation (CMI) WP design was issued and was approved by USEPA/TDEC in May 2009.

This site is included in a PBA and funding for the PBA portion of this site is tracked by site PBC@VAAP. The CMI was initiated by the PBA contractor in spring 2009 with the construction of a low permeability soil cover. The initial required LTM (through FY16) for this site is part of the PBA, and costs for same are captured under the PBC@VAAP. Regulatory delays resulted in delays in completion of planned PBA actions to beyond 2016. Thus LTM beyond the PBA end date of FY16 for this site is currently shown in the LTM phase and but is anticipated to be ultimately consolidated with other site(s) LTM costs and tracked in a site yet to be determined.

CLEANUP/EXIT STRATEGY

The CMI(C) was initiated in summer of 2009 and completed in 2009. The implemented remedy was a low-permeability soil cap. Required LTM will be conducted through FY16 as part of the PBA. LTM costs beyond the PBA end date of FY16 are tracked under this site. After the PBA end date, it is anticipated that this site's costs will be combined with all other sites in a site-wide PBA for LTM/CMI(O).

Site ID: VAAP-21
Site Name: LANDFILL (WW II)

STATUS

Parcel: NONE

Regulatory Driver: RCRA

RRSE: MEDIUM

Contaminants of Concern: Explosives, Metals, Polychlorinated Biphenyls (PCB), Polycyclic Aromatic Hydrocarbons (PAH)

Media of Concern: Groundwater, Soil

<u>Phases</u>	<u>Start</u>	<u>End</u>
RFA.....	197801.....	198403
CS.....	197801.....	199412
RFI/CMS.....	200103.....	200707
DES.....	200612.....	200906
CMI(C).....	200906.....	200912
LTM.....	201701.....	204701

RIP Date: N/A

RC Date: 200912

SITE DESCRIPTION

Site VAAP-21 is located in the west-central portion of the VAAP. The site comprises 10 to 15 acres and consists of an unlined landfill that operated between 1941 and the late-1960s. The landfill and disposal trenches received red water ash, red water sludge and refuse.

The site is a medium risk area and is included in the USEPA RCRA order issued in December 2001. The site is also a state (TDEC) Superfund site.

An RFI, including sampling and trenching, which was completed in December 2003, indicated contaminants of lead, explosives, PAHs, and PCBs in surface and subsurface soils. Additional groundwater data was gathered to fill data gaps from the RFI to support the CMS. During seasonal fluctuations groundwater appears to come in contact with wastes in the trenches. In December 2006 a CMS was submitted to the USEPA/TDEC. The final DD was provided by USEPA in accordance with the RCRA order in March 2008. Additional groundwater sampling and data analysis was conducted spring 2009 to rule out upwelling of groundwater into the debris field. As a result of the additional data collection, the selected remedy was changed to a low permeability soil cap and approved by USEPA/TDEC in May 2009. The CMI WP was approved in June 2009, and remedy construction ((CMI(C)phase) completed in December 2009 (FY10), with LTM Phase beginning in January 2010 (FY10).

This site is included in a PBA, and costs for the PBA portion of this site is tracked by site PBC@VAAP. The initial required LTM (through FY16) for this site is part of the PBA, and costs for same are captured under the PBC@VAAP. Regulatory delays resulted in delays in completion of planned PBA actions to beyond 2016. Thus LTM beyond the PBA end date of FY16 for this site is currently shown in the LTM phase and but is anticipated to be ultimately consolidated with other site(s) LTM costs and tracked in a site yet to be determined.

CLEANUP/EXIT STRATEGY

The CMI(C) was initiated in summer of 2009 and completed (RC) in 2009. The implemented remedy was a low-permeability soil cap. Required LTM will be through FY16 as part of the PBA. LTM costs beyond the PBA end date of FY16 are tracked under this site. After the PBA end date, it is anticipated that this site's costs will be combined with all other sites in a site-wide PBA for LTM/CMI(O).

Site ID: VAAP-35
Site Name: GROUNDWATER

STATUS

Parcel: NONE

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Explosives, Metals

Media of Concern: Groundwater

<u>Phases</u>	<u>Start</u>	<u>End</u>
RFA.....	199912.....	200002
RFI/CMS.....	200103.....	201302
CMI(C).....	201302.....	201308
CMI(O).....	201310.....	204310
RIP Date:	201310	
RC Date:	204310	

SITE DESCRIPTION

Site VAAP-035 includes groundwater issues at AEDB-R sites VAAP-001, VAAP-002, and VAAP-032.

This site addresses all groundwater treatment systems as well as installation-wide LTM. Explosive concentrations above State guidelines concentrations have been found in on-post wells and springs. Contaminants of concern are explosives, arsenic, and lead.

The site is a high risk area and is included in the USEPA RCRA order issued in December 2001. The site is also a state (TDEC) Superfund site.

In 1992, an RI was initiated and in 2003 and 2004 supplemental RFI fieldwork was conducted. In March 2005 an installation-wide groundwater RFI was approved. Site-wide groundwater is being addressed in two separate CMS documents and SOB.

The first is a focused CMS addressing plume areas in selected portions of the southern groundwater basin with a remedy of MNA. In FY06 the focused CMS was completed and in FY07 the USEPA completed an OPS determination for the focused CMS.

The second CMS addresses the more highly contaminated plume areas. Extensive analysis and modeling was completed to determine the most applicable remedy. The site contains complicated hydrogeologic conditions with the combination of tightly bound residuum and karst formations.

The alternative (MNA) proposed in the draft CMS was not accepted by the regulatory agencies. As a result of all work at VAAP being subject to a 2001 USEPA RCRA (3008h) Administrative Order, a new alternative, in situ chemical oxidation followed by MNA as a polishing step was developed. This alternative proposed source treatment of explosives in the saturated soils at 10 areas. Before finalizing a remedial alternative of in situ chemical oxidation as the selected remedy, the Army conducted a treatability study to determine if the method was viable prior to finalizing the CMS. The treatability study was conducted in 2008 and recommended that a pilot study be conducted. Due to costs associated with a pilot study, a phased approach was determined to be most efficient and was initially planned for 2010.

In the interim (2009), however, the USEPA and TDEC decided to move oversight and RCRA Order compliance of VAAP to their respective RCRA/Solid Waste Divisions which resulted in a change in regulatory agency personnel. In late 2009 TDEC was granted lead regulatory authority over a portion of VAAP which was subsequently removed from the USEPA RCRA Order. In 2010 TDEC requested lead regulatory agency status for the remainder of the VAAP sites subject to the USEPA Order and drafted a state RCRA order. Following equivalence review by USEPA in late 2010 and 2011, the Army and TDEC entered into a consent order which was finalized in September 2011. During the same time interval, multiple ongoing semiannual groundwater sampling rounds had taken place which yielded additional data supportive of the original proposed remedy of MNA. Following regulatory review of this groundwater sampling data, it was determined that the most probable remedy would be MNA. The CMS was revised to reflect this

Site ID: VAAP-35
Site Name: GROUNDWATER

remedy alternative, but TDEC requested stronger controls for off-site residents which required additional study, planning and revision. In February 2013, TDEC approved the final remedy of MNA and LUCs. The construction ((CMI(C)) phase is underway and expected to be complete by the end of FY13, with CMI(O) beginning in FY14.

CLEANUP/EXIT STRATEGY

Site-wide groundwater is being addressed in two separate actions. The first, a focused CMS addressed plume areas in selected portions of the southern groundwater basin, was completed in FY07. The selected remedy for the focused area is MNA and LUCs.

The remaining groundwater contaminant plumes are being addressed by a revised CMS which is underway. Following 2010 groundwater sampling data analysis, the most probable remedy was determined to be MNA which is reflected in the ongoing CMS revision. CMS phase completed in FY13, with CMI(C) phase underway and anticipated to complete in FY13. CMI(O) phase will begin in FY14 for 30 years. This site is anticipated to attain RIP in late FY13. It is further anticipated that this site will be combined in FY14 with VAAP-02 for funding, and ultimately combined with all other sites in a site-wide LTM/CMI(O) PBA after FY16.

IRP Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
VAAP-01	OLD EAST ACID AREA	200709	Further action at this site will be addressed under PBC@Volunteer until FY16, and VAAP-035 subsequently. Formal approval of RC on this site from the regulators is expected in June 2008 after their review of the Closure Report.
VAAP-03	PISTOL RANGE	198403	USEPA Approval Letter - Nov 2005
VAAP-04	ENVIRONMENTAL LAB	198403	USEPA - Final RCRA Order, Dec 2001
VAAP-05	OLD STORAGE AREA (EXP MAG)	200409	No Further Action USEPA Nov 2004
VAAP-06	NEW STORAGE AREA (EXP MAG)	200310	USEPA Approval Letter 8/12/2003
VAAP-15	BURNING GROUND/NEW LF	200308	USEPA Letter Oct 2004
VAAP-16	BURNING GROUND (WWII)	200409	USEPA Letter Oct 2004
VAAP-18	VANADIUM PENTOXIDE/ASBESTOS BURIAL GRND	201105	Tennessee Department of Environment and Conservation concurrence letter (1 November 2011)
VAAP-23	MAGAZINE AREA RWA-GS LANDFILL	200307	USEPA Letter Oct 12, 2004
VAAP-30	MUSTARD AGENT SPILL (1947, CLEANED)	198403	TDEC Letter 1/6/2000
VAAP-31	WAREHOUSE AND PESTICIDE STORAGE	200610	USEPA approved NFA 21 Sept 2006.
VAAP-32	TNT MFG VALLEY/INCL RDWTR TREATMENT PLT	201108	Tennessee Department of Environment & Conservation concurrence letter dated 20 December 2011
VAAP-33	NEW ACID AREA	200408	USEPA Letter 10/12/2004
VAAP-34	W W TREATMENT PONDS (POND 4, 5 + COE)	198403	Further action at this site will be addressed under VAAP-032.
VAAP-36	Toluene Storage and Dist System	201108	Tennessee Department of Environment & Conservation concurrence letter dated 16 November 2011
VAAP-37	Miscellaneous Disposal Areas	201212	Tennessee Department of Environment and Conservation Approval Letter (9/13/2012)

IRP Schedule

Date of IRP Inception: 197801

Past Phase Completion Milestones

1978

CS (VAAP-05 - OLD STORAGE AREA (EXP MAG))
SI (VAAP-03 - PISTOL RANGE, VAAP-04 - ENVIRONMENTAL LAB)
PA (VAAP-03 - PISTOL RANGE, VAAP-04 - ENVIRONMENTAL LAB)
RFA (VAAP-06 - NEW STORAGE AREA (EXP MAG), VAAP-05 - OLD STORAGE AREA (EXP MAG))

1984

RFA (VAAP-15 - BURNING GROUND/NEW LF, VAAP-16 - BURNING GROUND (WWII), VAAP-18 - VANADIUM PENTOXIDE/ASBESTOS BURIAL GRND, VAAP-20 - CONSTRUCTION DEBRIS DISPOSAL AREA, VAAP-21 - LANDFILL (WW II), VAAP-23 - MAGAZINE AREA RWA-GS LANDFILL, VAAP-31 - WAREHOUSE AND PESTICIDE STORAGE, VAAP-32 - TNT MFG VALLEY/INCL RDWTR TREATMENT PLT, VAAP-01 - OLD EAST ACID AREA, VAAP-33 - NEW ACID AREA, VAAP-34 - W W TREATMENT PONDS (POND 4, 5 + COE))
RI/FS (VAAP-03 - PISTOL RANGE, VAAP-04 - ENVIRONMENTAL LAB)
PA (VAAP-30 - MUSTARD AGENT SPILL (1947, CLEANED))
CS (VAAP-15 - BURNING GROUND/NEW LF, VAAP-32 - TNT MFG VALLEY/INCL RDWTR TREATMENT PLT, VAAP-34 - W W TREATMENT PONDS (POND 4, 5 + COE))
SI (VAAP-30 - MUSTARD AGENT SPILL (1947, CLEANED))

1985

RFA (VAAP-02 - CFI LEASE AREA)

1994

CS (VAAP-18 - VANADIUM PENTOXIDE/ASBESTOS BURIAL GRND)

1995

CS (VAAP-16 - BURNING GROUND (WWII), VAAP-20 - CONSTRUCTION DEBRIS DISPOSAL AREA, VAAP-21 - LANDFILL (WW II), VAAP-23 - MAGAZINE AREA RWA-GS LANDFILL, VAAP-01 - OLD EAST ACID AREA, VAAP-33 - NEW ACID AREA)

2000

RFA (PBC @ VAAP - PBC, VAAP-35 - GROUNDWATER)

2003

RFA (VAAP-36 - Toluene Storage and Dist System)
RFI/CMS (VAAP-15 - BURNING GROUND/NEW LF, VAAP-23 - MAGAZINE AREA RWA-GS LANDFILL, VAAP-05 - OLD STORAGE AREA (EXP MAG))
DES (VAAP-05 - OLD STORAGE AREA (EXP MAG))

2004

DES (VAAP-16 - BURNING GROUND (WWII))
RFA (VAAP-37 - Miscellaneous Disposal Areas)
CMI(C) (VAAP-16 - BURNING GROUND (WWII), VAAP-05 - OLD STORAGE AREA (EXP MAG))
RFI/CMS (VAAP-16 - BURNING GROUND (WWII), VAAP-01 - OLD EAST ACID AREA, VAAP-32 - TNT MFG VALLEY/INCL RDWTR TREATMENT PLT, VAAP-33 - NEW ACID AREA)
CS (VAAP-06 - NEW STORAGE AREA (EXP MAG))

2005

DES (VAAP-01 - OLD EAST ACID AREA, VAAP-32 - TNT MFG VALLEY/INCL RDWTR TREATMENT PLT)

2006

IRP Schedule

2006

IRA (VAAP-31 - WAREHOUSE AND PESTICIDE STORAGE, VAAP-02 - CFI LEASE AREA)

2007

CMI(C) (VAAP-01 - OLD EAST ACID AREA)

RFI/CMS (VAAP-20 - CONSTRUCTION DEBRIS DISPOSAL AREA, VAAP-21 - LANDFILL (WW II))

CS (VAAP-31 - WAREHOUSE AND PESTICIDE STORAGE)

2008

CS (VAAP-02 - CFI LEASE AREA)

IRA (VAAP-36 - Toluene Storage and Dist System)

2009

CMI(C) (PBC @ VAAP - PBC)

DES (VAAP-20 - CONSTRUCTION DEBRIS DISPOSAL AREA, VAAP-21 - LANDFILL (WW II))

IRA (VAAP-37 - Miscellaneous Disposal Areas)

2010

RFI/CMS (VAAP-18 - VANADIUM PENTOXIDE/ASBESTOS BURIAL GRND, VAAP-02 - CFI LEASE AREA)

DES (VAAP-18 - VANADIUM PENTOXIDE/ASBESTOS BURIAL GRND, VAAP-02 - CFI LEASE AREA)

CMI(C) (VAAP-20 - CONSTRUCTION DEBRIS DISPOSAL AREA, VAAP-21 - LANDFILL (WW II))

2011

CMI(C) (VAAP-18 - VANADIUM PENTOXIDE/ASBESTOS BURIAL GRND, VAAP-32 - TNT MFG VALLEY/INCL RDWTR TREATMENT PLT)

RFI/CMS (VAAP-36 - Toluene Storage and Dist System)

Projected Phase Completion Milestones

See attached schedule

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

Site ID	Site Name	ROD/DD Title	ROD/DD Date
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Final RA(C) Completion Date: 201308

Schedule for Next Five-Year Review: 2021

Estimated Completion Date of IRP at Installation (including LTM phase): 204701

VOLUNTEER ARMY AMMUNITION PLANT IRP Schedule

 = phase underway

SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
PBC @ VAAP	PBC	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
VAAP-02	CFI LEASE AREA	CMI(O)						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
VAAP-20	CONSTRUCTION DEBRIS DISPOSAL AREA	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
VAAP-21	LANDFILL (WW II)	LTM						
SITE ID	SITE NAME	PHASE	FY14	FY15	FY16	FY17	FY18	FY19+
VAAP-35	GROUNDWATER	CMI(O)						

Community Involvement

Technical Review Committee (TRC): None

Community Involvement Plan (Date Published): 200703

Restoration Advisory Board (RAB): RAB established

RAB Adjournment Date:

RAB Adjournment Reason:

Additional Community Involvement Information

A RAB was established and the first meeting held on Feb. 19, 1998. The board is composed of 17 members with representatives from the Army, TDEC, USEPA and local citizens. They meet bimonthly and past activities have included an installation tour, updates from various agencies (GSA, USACE, consultants, the Chattanooga/Hamilton County Regional Planning Agency), and special topic discussions. RAB members are consulted on each proposed project and their comments considered.

An updated community relations plan has been completed and was issued in March 2007. The RAB members have been briefed on the plan and it will be updated on an as-needed basis.

An informative and active website has been established for the VAAP. The VAAP restoration team and the community RAB have been given an opportunity to view the web site and offer input. Comments were received from several individuals and team members, and revisions to the web site have been completed. The site will be available for public viewing by going directly to the web site address or by a link on the TDEC web page. It will be updated periodically as needed. The RAB schedule changed in 2012 from bimonthly to quarterly meetings.

Administrative Record is located at

Volunteer Army Ammunition Plant
Bldg 232, Room 2
8395 South Hickory Valley Rd.
Chattanooga, TN 37421

Information Repository is located at

Hamilton County Library, Chattanooga, TN

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

TAPP Title: N/A

Potential TAPP: N/A

