FY2016

TWIN CITIES 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), Twin Cities Army Ammunition Plant (TCAAP), 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

AEDB-R	Army Environmental Database-Restoration
AOC	Area of Concern
ATK	Alliant Techsystems, Inc.
BGRS	Boundary Groundwater Recovery System
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CR	Compliance Restoration
CRA	Conestoga-Rovers Associates
cy	cubic yards
DD	Decision Document
EBS	Environmental Baseline Survey
EE/CA	Engineering Evaluation/Cost Analysis
ESA	Environmental Site Assessment
ESD	Explanation of Significant Differences
FFA	Federal Facility Agreement
FRA	Final Remedial Action
FS	Feasibility Study
FY	Fiscal Year
GAC	Granular Activated Carbon
GES	Global Environmental Solutions
HRL	Health Risk Limit
IAP	Installation Action Plan
ID	Identification
IR	Installation Restoration
IRA	Interim Remedial Action
IRP	Installation Restoration Program
K	thousand
LTM	Long-Term Management
LUC	Land Use Control
LUCRD	Land Use Control Remedial Design
mm	millimeter
MN	Minnesota
MNA	Monitored Natural Attenuation
MPCA	Minnesota Pollution Control Agency
N/A	Not Applicable
NFA	No Further Action
NPL	National Priorities List
NRDA	Natural Resource Damage Assessment
OFR	Outdoor Firing Range
ORNL	Oak Ridge National Laboratory
OU	Operable Unit
PA	Preliminary Assessment
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PGRS	Plume Groundwater Recovery System

Acronyms

PP	Proposed Plan
PRC	PRC Environmental Management, Inc.
PTA	Primer/Tracer Area
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RA(C)	Remedial Action (Construction)
RA(O)	Remedial Action (Operation)
RAB	Restoration Advisory Board
RC	Response Complete
RD	Remedial Design
RI	Remedial Investigation
RIP	Remedy-in-Place
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
SI	Site Investigation
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compound
TAPP	Technical Assistance for Public Participation
TBD	To Be Determined
TCAAP	Twin Cities Army Ammunition Plant
TGRS	TCAAP Groundwater Recovery System (formerly BGRS)
TIES	Total Installation Environmental Support
TRC	Technical Review Committee
TVA	Tennessee Valley Authority
USACE	US Army Corps of Engineers
USAEC	US Army Environmental Command
USAEHA	US Army Environmental Hygiene Agency
USATHAMA	US Army Toxic and Hazardous Materials Agency
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
VOC	Volatile Organic Compound
WWII	World War II

Site Alias List

AEDB-R/AEDB-CC Site ID to Alias List

AEDB-R/AEDB-CC #	Alias
CCTCAAP-32	EBS AOCs
TCAAP-01	SITE A
TCAAP-05	SITE C
TCAAP-06	SITE D
TCAAP-07	SITE E
TCAAP-09	SITE G
TCAAP-10	SITE H
TCAAP-11	SITE 129-3
TCAAP-12	SITE 129-5
TCAAP-13	SITE129-15
TCAAP-15	SITE I
TCAAP-16	SITE K
TCAAP-17	OU1 GW
TCAAP-19	OU2 GW
TCAAP-20	GRENADE RN
TCAAP-21	OFR
TCAAP-23	135 PTA
TCAAP-27	OU3 GW
TCAAP-30	BLDG 102
TCAAP-31	Round Lake

Installation Information

Installation Locale

Installation Size (Acreage): 2,370.00
City: Arden Hills
County: Ramsey
State: Minnesota
Other Locale Information

When TCAAP was placed on the National Priorities List (NPL) in 1983, it occupied approximately 2,370 acres in northwest Ramsey County, Minnesota, within the Minneapolis/St. Paul metropolitan area. Since 1983, some of the property has been transferred outside of federal ownership to Ramsey County and the city of Arden Hills. Control of two other portions of the federally-owned property has been re-assigned to the National Guard Bureau and Army Reserves. The remaining acres of TCAAP are in various stages of being transferred. For the purposes of this IAP, references to TCAAP include all of the Army-owned installation property in 1983, which is also referred to as operable unit (OU) 2.

Installation Mission

The TCAAP no longer has a production mission and is in various stages of being transferred.

Lead Organization

Base Realignment and Closure Division

Lead Executing Agencies for Installation

Installation

Regulator Participation

Federal	US Environmental Protection Agency (USEPA), Region V
State	Minnesota Pollution Control Agency (MPCA)

National Priorities List (NPL) Status

A score of 59.6 was recorded on 01-SEP-83.

Final RA(C) Completion Date: 201311

Date for NPL Deletion: TBD

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

RAB established 1996

Installation Program Summaries

IRP

Primary Contaminants of Concern: Explosives, Metals, Polychlorinated Biphenyls (PCB), Polycyclic Aromatic Hydrocarbons (PAH), Semi-volatiles (SVOC), Volatiles (VOC)

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

CR

Primary Contaminants of Concern: Metals, Polycyclic Aromatic Hydrocarbons (PAH)

Affected Media of Concern: Soil

Cleanup Program Summary

Installation Historic Activity

The construction of the TCAAP began on Aug. 28, 1941, on a site that was primarily farmland. Field construction was completed in January 1943. The principal functions of the facility were the manufacture of small caliber ammunition and related materials and 105 millimeter (mm) and 155mm projectile metal parts, the proof testing of small caliber ammunition, and the storage and handling of strategic and critical raw materials for other government agencies. The majority of ammunition manufacturing occurred during World War II (WWII), the Korean Conflict, and the Southeast Asia Conflict. Most of the many tenants performed nonmilitary, industrial-based activities. The TCAAP preliminary assessment (PA) details activities of the various tenants.

The facility had over 300 structures, including five major production buildings, numerous auxiliary buildings, and supporting utilities. Between the late-1950s and 2005, when operations were terminated, Alliant Techsystems, Inc. (ATK) (formerly part of Honeywell, Inc., which is potentially responsible for the site) manufactured fuses and selected ammunition at the facility. ATK is now Orbital ATK and is cooperating with the Army in the cleanup of past contamination.

In 1982 the 25-square-mile New Brighton/Arden Hills superfund site (which includes the entire four-square-mile TCAAP facility) was proposed for addition to the NPL. In September 1983 the superfund site made the final NPL with a hazard ranking index score of 59.6.

In December 1987 a three-party federal facilities agreement (FFA) between the Army, the USEPA, and the MPCA was implemented. A two-party Defense and State Memorandum of Agreement/Cooperative Agreement between the Army and the MPCA became effective in June 1991. The regulatory driver for TCAAP is the interagency agreement/FFA associated with the NPL site. A record of decision (ROD) was completed for OU3 in September 1992, for OU1 in September 1993, and for OU2 in December 1997. Amendments to the OU1 and OU3 RODs were completed in 2006. Amendments and explanations of significant differences (ESD) to the OU2 ROD were completed in 2007, 2009, 2012, and 2014.

Installation Program Cleanup Progress

IRP

Prior Year Progress: Remedial action-operations [RA(O)] is continuing for groundwater sites and long-term management (LTM) is continuing for soil sites [land use controls (LUC), cover maintenance and five-year reviews]. Work continues toward completing the Round Lake (TCAAP-31) feasibility study (FS). Revision 3 of the OU2 Land Use Control Remedial Design (LUCRD) was completed.

Future Plan of Action: The RA(O) for groundwater sites will continue and LTM will continue for soil sites. The FS for Round Lake (TCAAP-31) should be approved and an accompanying ROD should be completed. Revision 4 of the LUCRD is expected. New standards for 1,4-dioxane has resulted in an OU1 Remedy time-out, with New Brighton developing a response. Monitoring for 1,4-dioxane has been initiated with ongoing evaluation of remedy impacts.

CR

Prior Year Progress: LTM is continuing.

Future Plan of Action: LTM will continue (LUCs, cover maintenance and five-year reviews).

5-Year / Periodic Review Summary

5-Year / Periodic Review Summary

Status	Begin Date	End Date	End FY
Complete	201308	201408	2014
Complete	200401	200409	2004
Complete	200901	200909	2009
Complete	199901	199909	1999
Planned	201804	201904	2019

Last Completed 5-Year / Periodic Review Details

Associated ROD/DD Name	Sites
OU1 ROD	TCAAP-17
OU1 ROD	TCAAP-17
OU1 ROD Amendment	TCAAP-17
OU1 ROD Amendment	TCAAP-17
OU2 ROD	TCAAP-01, TCAAP-02, TCAAP-05, TCAAP-06, TCAAP-07, TCAAP-09, TCAAP-10, TCAAP-11, TCAAP-12, TCAAP-13, TCAAP-15, TCAAP-16, TCAAP-19
OU2 ROD	TCAAP-01, TCAAP-02, TCAAP-05, TCAAP-06, TCAAP-07, TCAAP-09, TCAAP-10, TCAAP-11, TCAAP-12, TCAAP-13, TCAAP-15, TCAAP-16, TCAAP-19
OU2 ROD Amendment #1	TCAAP-05
OU2 ROD Amendment #1	TCAAP-05
OU2 ROD Amendment #2	TCAAP-15
OU2 ROD Amendment #2	TCAAP-15
OU2 ROD Amendment #3	TCAAP-06, TCAAP-07, TCAAP-09, TCAAP-10, TCAAP-13, TCAAP-20, TCAAP-21, TCAAP-22, TCAAP-24
OU2 ROD Amendment #3	TCAAP-06, TCAAP-07, TCAAP-09, TCAAP-10, TCAAP-13, TCAAP-20, TCAAP-21, TCAAP-22, TCAAP-24
OU2 ROD Amendment #4	TCAAP-16, TCAAP-25, TCAAP-28, TCAAP-30
OU2 ROD Amendment #4	TCAAP-16, TCAAP-25, TCAAP-28, TCAAP-30
OU2 ROD ESD #1	TCAAP-01, TCAAP-16, TCAAP-19
OU2 ROD ESD #1	TCAAP-01, TCAAP-16, TCAAP-19
OU2 ROD ESD #2	TCAAP-01, TCAAP-02, TCAAP-05, TCAAP-11, TCAAP-12
OU2 ROD ESD #2	TCAAP-01, TCAAP-02, TCAAP-05, TCAAP-11, TCAAP-12
OU3 ROD	TCAAP-27
OU3 ROD	TCAAP-27
OU3 ROD Amendment	TCAAP-27
OU3 ROD Amendment	TCAAP-27

Results Remedies remain protective and are functioning as intended.

Actions Continue with implementation of the remedies at OU1 and OU3. For OU2, implement the recommendations noted below so that the remedy continues to be protective over the long-term.

Plans Continue to monitor revisions to MN Health Risk Limits (HRLs) for groundwater, particularly for any sites that approach the point of potential closure.

5-Year / Periodic Review Summary

Recommendations and Implementation Plans:
OU1: No specific recommendations; therefore, continue with implementation of the remedy as intended in the OU1 ROD (as amended). OU2: For Site A shallow groundwater, evaluate if monitored natural attenuation (MNA) will adequately control plume migration and continue with implementation of the remedy as intended in the OU2 ROD (as amended). OU3: No specific recommendations; therefore, continue with implementation of the remedy as intended in the OU3 ROD (as amended).

Land Use Control (LUC) Summary

LUC title: OU1 LUC

Site(s): TCAAP-17

ROD/DD title: OU1 ROD

Location of LUC

The area affected by the North Plume of off-TCAAP deep groundwater contamination as defined by the Minnesota Department of Health Special Well Construction Area.

Land Use Restriction: Media specific restriction - restrict drinking water well installation, Media specific restriction - restrict withdrawal or use of groundwater w/out treatment

Types of Engineering Controls: None

Types of Institutional Controls: Restrictions on Groundwater Withdrawal

Date in Place: 199309

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: N/A

LUC Enforcement: Annual Inspections, 5 Year Reviews

Contaminants: VOC

Additional Information

N/A

LUC title: OU2 LUCs

Site(s): TCAAP-06, TCAAP-07, TCAAP-09, TCAAP-10, TCAAP-13, TCAAP-20, TCAAP-21

ROD/DD title: OU2 ROD Amendment #3

Location of LUC

Site D, Site E, Site G, Site H, Site 129-15, Grenade Range, and Outdoor Firing Range.

Land Use Restriction: Landfill restriction - Prohibit activities that would impact the LF cap (or cover system) and drainage system, Landfill restriction - Restrict plantings that interfere LF cap or cover system (roots that penetrate the cap or cover system), Media specific restriction - Prohibit, or otherwise manage excavation, Restrict land use - No daycare/hospital/school use, Restrict land use - No residential use

Types of Engineering Controls: Signs

Types of Institutional Controls: Restrictions on land use

Date in Place: 201009

Modification Date: 201106

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: 201009

LUC Enforcement: Annual Inspections, 5 Year Reviews

Contaminants: METALS, NITROAROMATICS, PAH, PCBs, VOC

Additional Information

The contaminants of concern and types of controls vary between the sites. See the OU2 Land Use Control Remedial Design (2010) for details.

Land Use Control (LUC) Summary

LUC title: OU2 LUCs

Site(s): TCAAP-30

ROD/DD title: OU2 ROD Amendment #4

Location of LUC

Building 102

Land Use Restriction: Media specific restriction - Prohibit groundwater extraction that interferes with Remedial Action system, Media specific restriction - prohibit use of groundwater for consumption or domestic purposes, Media specific restriction - restrict drinking water well installation

Types of Engineering Controls: None

Types of Institutional Controls: Restrictions on Groundwater Withdrawal

Date in Place: 201009

Modification Date: 201106

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: 201009

LUC Enforcement: Annual Inspections, 5 Year Reviews

Contaminants: VOC

Additional Information

N/A

LUC title: OU2 LUCs

Site(s): CCTCAAP-32, TCAAP-01, TCAAP-23

ROD/DD title: OU2 ROD Amendment #5

Location of LUC

Soil Areas of Concern at Site A, 135 Primer Tracer Area, and Environmental Baseline Survey Areas.

Land Use Restriction: Restrict land use - No daycare/hospital/school use, Restrict land use - No residential use

Types of Engineering Controls: None

Types of Institutional Controls: Restrictions on land use

Date in Place: 201404

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: 201009

LUC Enforcement: Annual Inspections, 5 Year Reviews

Contaminants: METALS, PAH

Additional Information

N/A

LUC title: OU2 LUCs

Site(s): TCAAP-01, TCAAP-16, TCAAP-19

Land Use Control (LUC) Summary

ROD/DD title: OU2 ROD ESD #1

Location of LUC

Site A, Site K, and OU2 Deep Groundwater

Land Use Restriction: Media specific restriction - Prohibit groundwater extraction that interferes with Remedial Action system, Media specific restriction - prohibit use of groundwater for consumption or domestic purposes, Media specific restriction - restrict drinking water well installation

Types of Engineering Controls: None

Types of Institutional Controls: Restrictions on Groundwater Withdrawal

Date in Place: 201009

Modification Date: 201106

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: 201009

LUC Enforcement: Annual Inspections, 5 Year Reviews

Contaminants: METALS, VOC

Additional Information

The contaminants of concern vary between the sites. See the OU2 Land Use Control Remedial Design (2010) for details.

LUC title: OU2 LUCs

Site(s): TCAAP-01, TCAAP-05, TCAAP-11, TCAAP-12

ROD/DD title: OU2 ROD ESD #2

Location of LUC

Site A, Site C-1, Site 129-3, and Site 129-5.

Land Use Restriction: Restrict land use - No daycare/hospital/school use, Restrict land use - No residential use

Types of Engineering Controls: None

Types of Institutional Controls: Restrictions on land use

Date in Place: 201009

Modification Date: 201106

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: 201009

LUC Enforcement: Annual Inspections, 5 Year Reviews

Contaminants: METALS, NITROAROMATICS

Additional Information

The contaminants of concern vary between the sites. See the OU2 Land Use Control Remedial Design (2010) for details.

LUC title: OU3 LUC

Site(s): TCAAP-27

ROD/DD title: OU3 ROD Amendment

Location of LUC

Land Use Control (LUC) Summary

The area affected by the South Plume of off-TCAAP deep groundwater contamination as defined by the Minnesota Department of Health Special Well Construction Area.

Land Use Restriction: Media specific restriction - restrict drinking water well installation, Media specific restriction - restrict withdrawal or use of groundwater w/out treatment

Types of Engineering Controls: None

Types of Institutional Controls: Restrictions on Groundwater Withdrawal

Date in Place: 200608

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: N/A

LUC Enforcement: Annual Inspections, 5 Year Reviews

Contaminants: VOC

Additional Information

N/A

LUC title: Site C-2 LUC

Site(s): TCAAP-05

ROD/DD title: OU2 ROD Amendment #1

Location of LUC

Site C-2

Land Use Restriction: Media specific restriction - Prohibit groundwater extraction that interferes with Remedial Action system, Media specific restriction - Prohibit, or otherwise manage excavation, Media specific restriction - prohibit use of groundwater for consumption or domestic purposes, Media specific restriction - restrict drinking water well installation, Restrict land use - Mitigation area(s) protection, Restrict land use - No daycare/hospital/school use, Restrict land use - No residential use

Types of Engineering Controls: Signs

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

Date in Place: 201009

Modification Date: 201106

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: 201009

LUC Enforcement: Annual Inspections, 5 Year Reviews

Contaminants: METALS

Additional Information

See the OU2 Land Use Control Remedial Design (2010) for details.

LUC title: Site I LUC

Site(s): TCAAP-15

Land Use Control (LUC) Summary

ROD/DD title: OU2 ROD Amendment #2

Location of LUC

Site I, consisting of Building 502 and adjacent land.

Land Use Restriction: Media specific restriction - Prohibit groundwater extraction that interferes with Remedial Action system, Media specific restriction - Prohibit, or otherwise manage excavation, Media specific restriction - prohibit use of groundwater for consumption or domestic purposes, Media specific restriction - restrict drinking water well installation, Restrict land use - No daycare/hospital/school use, Restrict land use - No residential use

Types of Engineering Controls: None

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

Date in Place: 201009

Modification Date: 201106

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: 201009

LUC Enforcement: Annual Inspections, 5 Year Reviews

Contaminants: METALS, PCBs, VOC

Additional Information

See the OU2 Land Use Control Remedial Design (2010) for details.

Parcel Summary

Summary of Parcel Prioritization and Transfer Strategy

Parcel Name: **Public Benefit Conveyance, Ramsey County**
Parcel Size: 108.00
Associated Sites: TCAAP-19, TCAAP-05, TCAAP-23
Transfer Date: 201609
Current Land Use: Industrial
Future Land Use: Recreational
Encumbrances: N/A
Leases/Permits/Licenses: N/A
Transfer Strategy: Public Benefit Conveyance (PBC)
Recipient Organization: Ramsey County, MN
Other Issues Affecting Transfer: N/A

Parcel Name: **Public Sale Area**
Parcel Size: 427.00
Associated Sites: TCAAP-15, TCAAP-30, TCAAP-19, TCAAP-16
Transfer Date: 201606
Current Land Use: Industrial
Future Land Use: Other (Mixed Use)
Encumbrances: N/A
Leases/Permits/Licenses: N/A
Transfer Strategy: Public Sale
Recipient Organization: Ramsey Co.
Other Issues Affecting Transfer: N/A

TWIN CITIES ARMY AMMUNITION PLANT

Non-BRAC Excess
Installation Restoration Program

IRP Summary

Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count: 27/8

Installation Site Types with Future and/or Underway Phases

3 Burn Area
(TCAAP-05, TCAAP-10, TCAAP-12)
1 Chemical Disposal
(TCAAP-06)
3 Contaminated Buildings
(TCAAP-15, TCAAP-16, TCAAP-23)
4 Contaminated Ground Water
(TCAAP-17, TCAAP-19, TCAAP-27, TCAAP-30)
1 Contaminated Sediments
(TCAAP-31)
1 Disposal Pit/Dry Well
(TCAAP-11)
2 Firing Range
(TCAAP-20, TCAAP-21)
3 Landfill
(TCAAP-07, TCAAP-09, TCAAP-13)
1 Surface Disposal Area
(TCAAP-01)

Most Widespread Contaminants of Concern

Explosives, Metals, Polychlorinated Biphenyls (PCB), Polycyclic Aromatic Hydrocarbons (PAH), Semi-volatiles (SVOC), Volatiles (VOC)

Media of Concern

Groundwater, Sediment, Soil, Surface Water

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

Site ID	Site Name	Action	Remedy	FY	Cost
TCAAP-06	Leach/Burn Pits (Site D)	IRA	CAPPING	1986	TBD
TCAAP-09	Dump (Site G)	IRA	CAPPING	1986	TBD
TCAAP-15	Bldg. 502 and Area (Site I)	IRA	WASTE REMOVAL - SOILS	1986	TBD
TCAAP-06	Leach/Burn Pits (Site D)	IRA	INCINERATION	1989	TBD
TCAAP-01	Burial/Burn Area (Site A)	IRA	GROUND WATER TREATMENT	1994	TBD
TCAAP-27	OU3 Deep Groundwater	FRA	GROUND WATER TREATMENT	1994	TBD
TCAAP-22	Water Tower Area	FRA	WASTE REMOVAL - SOILS	1996	TBD
TCAAP-06	Leach/Burn Pits (Site D)	IRA	SOIL VAPOR EXTRACTION	1998	TBD
TCAAP-06	Leach/Burn Pits (Site D)	FRA	SOIL VAPOR EXTRACTION	1998	TBD
TCAAP-09	Dump (Site G)	FRA	SOIL VAPOR EXTRACTION	1998	TBD
TCAAP-09	Dump (Site G)	IRA	SOIL VAPOR EXTRACTION	1998	TBD
TCAAP-17	OU1 Deep Groundwater	IRA	GROUND WATER TREATMENT	1998	TBD
TCAAP-17	OU1 Deep Groundwater	FRA	GROUND WATER TREATMENT	1998	TBD
TCAAP-08	Open Burn/Burial Area (Site F)	FRA	SOIL WASHING	2000	TBD
TCAAP-17	OU1 Deep Groundwater	FRA	ALTERNATE WATER SUPPLY/WATER SUPPLY TREATMENT	2000	TBD
TCAAP-01	Burial/Burn Area (Site A)	FRA	SOIL VAPOR TREATMENT	2001	TBD
TCAAP-29	AEC Phytoremediation Demo Areas	FRA	GROUND WATER TREATMENT	2001	TBD
TCAAP-29	AEC Phytoremediation Demo Areas	IRA	GROUND WATER TREATMENT	2001	TBD
TCAAP-16	Bldg. 103 (Site K)	FRA	GROUND WATER TREATMENT	2002	TBD

IRP Summary

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

Site ID	Site Name	Action	Remedy	FY	Cost
TCAAP-19	OU2 Deep Groundwater	FRA	GROUND WATER TREATMENT	2003	TBD
TCAAP-27	OU3 Deep Groundwater	FRA	NATURAL ATTENUATION	2006	TBD
TCAAP-27	OU3 Deep Groundwater	FRA	INSTITUTIONAL CONTROLS	2006	TBD
TCAAP-01	Burial/Burn Area (Site A)	FRA	WASTE REMOVAL - SOILS	2008	TBD
TCAAP-05	Open Burn/Disposal Area (Site C)	FRA	WASTE REMOVAL - SOILS	2008	TBD
TCAAP-05	Open Burn/Disposal Area (Site C)	FRA	GROUND WATER TREATMENT	2008	TBD
TCAAP-05	Open Burn/Disposal Area (Site C)	IRA	GROUND WATER TREATMENT	2008	TBD
TCAAP-06	Leach/Burn Pits (Site D)	FRA	WASTE REMOVAL - SOILS	2008	TBD
TCAAP-07	Dump and Burning Area (Site E)	FRA	WASTE REMOVAL - SOILS	2008	TBD
TCAAP-09	Dump (Site G)	FRA	CAPPING	2008	TBD
TCAAP-10	Burn/Burial Area (Site H)	FRA	WASTE REMOVAL - SOILS	2008	TBD
TCAAP-11	Leaching Pits (Site 129-3)	FRA	WASTE REMOVAL - SOILS	2008	TBD
TCAAP-12	Burn/Disposal Area (Site 129-5)	FRA	WASTE REMOVAL - SOILS	2008	TBD
TCAAP-13	Dump (Site 129-15)	FRA	CAPPING	2008	TBD
TCAAP-15	Bldg. 502 and Area (Site I)	FRA	OTHER	2008	TBD
TCAAP-20	Grenade Range	FRA	WASTE REMOVAL - SOILS	2008	TBD
TCAAP-21	Outdoor Firing Range	FRA	WASTE REMOVAL - SOILS	2008	TBD
TCAAP-21	Outdoor Firing Range	FRA	CAPPING	2008	TBD
TCAAP-30	Bldg. 102 Degreasing Operations	FRA	NATURAL ATTENUATION	2009	TBD
TCAAP-16	Bldg. 103 (Site K)	FRA	WASTE REMOVAL - SOILS	2010	TBD
TCAAP-28	Bldg. 535 Primer/Tracer Area	FRA	WASTE REMOVAL - SOILS	2010	TBD
TCAAP-25	OU2 Waterbodies	FRA	CHEMICAL REDUCTION/OXIDATION	2012	TBD
TCAAP-01	Burial/Burn Area (Site A)	FRA	WASTE REMOVAL - SOILS	2014	TBD
TCAAP-23	Bldg. 135 Primer/Tracer Area	FRA	WASTE REMOVAL - SOILS	2014	TBD

Duration of IRP

Year of IRP Inception: 197801

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201809/204609

Date of IRP completion including Long Term Management (LTM): 204609

IRP Contamination Assessment

Contamination Assessment Overview

In June 1981 the Installation Restoration Program (IRP) began when the Army and the state discovered chlorinated solvents [a type of volatile organic compound (VOC)] in TCAAP and New Brighton drinking water supplies, indicating that TCAAP may be the source of contamination. As studies of TCAAP activities and groundwater were initiated the residents were supplied with alternate water supplies.

As a result of past TCAAP ammunition and munitions manufacturing operations, contamination has been detected in groundwater, soil, sediment, and surface water. The contaminants of concern are VOCs, especially chlorinated solvents; explosives; metals, especially lead; and semi-volatile organic compounds (SVOC), including PCBs and PAHs.

The TCAAP IRP activities include OU1, OU2, and OU3. OU3, which is the south TCAAP plume (TCAAP-27) located outside the fenced boundaries of TCAAP, was the first OU for which a ROD was signed in 1992.

OU1, which is the north TCAAP plume (TCAAP-17) located outside the fenced boundaries of TCAAP, was the second OU for which a ROD was signed in 1993. Prior to the RA being initiated, an interim remedial action (IRA) (pump-and-treat/containment system) was constructed and began operation. The remedy includes the New Brighton contaminated groundwater recovery system, a municipal water line interconnection, alternative well water supplies, and well advisories.

OU2 includes all media of concern within the boundary of TCAAP in 1983, when placed on the NPL. Between 1986 and 1988 IRAs were initiated to pump and treat and contain the shallow and deep groundwater contamination, as well as to begin remediation of soil source areas. The OU2 ROD was signed in December 1997.

In 2015 an emerging chemical of concern, 1,4-dioxane, was found to be present in OU1/OU2/OU3 deep groundwater. The OU1 remedy is currently in a time-out while the City of New Brighton evaluates treatment options for 1,4-dioxane. The Army is conducting additional monitoring in coordination with the regulators to evaluate impacts to the remedy.

Cleanup Exit Strategy

There are 19 active Army Environmental Database-Restoration (AEDB-R) sites. Ten are at response complete (RC) with LTM for LUCs and five-year reviews. Eight sites have groundwater contamination, with estimated RC dates ranging from 2020 to 2046.

TCAAP-31 (Round Lake) is still in the remedial investigation (RI)/FS phase, which is expected to be completed in 2017. The Draft Final RI/FS is currently under dispute based on regulatory review. Dispute resolution is underway.

Many of the individual sites fall within OU2, and "blanket" LUCs were implemented across most of OU2 to restrict activities. The cleanup strategy also includes working with the USEPA and MPCA to reduce the footprint of the LUCs through review of existing soil data and, perhaps, additional testing efforts.

IRP Previous Studies

	Title	Author	Date
1978			
	Installation Assessment of Twin Cities Army Ammunition Plant, Report No. 129	USATHAMA	OCT-1978
1988			
	Preliminary Assessment of the Twin Cities Army Ammunition Plant and Drawings and Maps,	Argonne National Lab	FEB-1988
	Supplement to the Preliminary Assessment of the Twin Cities Army Ammunition Plant	Argonne National Lab	FEB-1988
	Final Remedial Investigation Report for New Brighton/Arden Hills, TCAAP Force Main,	Camp Dresser & McKee	DEC-1988
1989			
	1988 Annual Monitoring Report, Volumes I, II, III, IV	Wenck Associates, Inc	SEP-1989
	Boundary Groundwater Recovery System (BGRS), IRA-BGRS 1988 Annual Monitoring Report and Monitoring Plan, Volume 1 - Text, Volume 2 - Appendices	CRA	OCT-1989
1990			
	Ecological Assessment (February 1990 - April 1991) - Volume I & Appendices	USAEHA	FEB-1990
	Fiscal Year 1990 Annual Monitoring Plan, Volumes 1 - 3	Wenck Associates, Inc	APR-1990
	1989 Annual Monitoring Report, Volumes 1-3	Wenck Associates, Inc	MAY-1990
	Characterization and Evaluation of Contaminated Soil and Sewer Sludge at Twin Cities Army Ammunition Plant	IT Corporation	MAY-1990
1991			
	Phase IA Multi-Point Source Groundwater Remedial Investigation - Volume 1 & 2, + Drawings	Camp Dresser & McKee	FEB-1991
	Remedial Investigation Report - Volumes 1, 2, 3, & 4	Argonne National Lab	APR-1991
	Human Health Risk Assessment New Brighton/Arden Hills Superfund Site - Volume I & II	PRC	APR-1991
	Groundwater Recovery System (TGRS), IRA-TGRS 1989 Annual Monitoring Report and Monitoring Plan, Volumes 1 - 2	CRA	JUN-1991
	Groundwater Recovery System (TGRS), IRA-TGRS, Site I and Site K 1990 Annual Monitoring Report, Volumes 1 -2,	CRA	JUL-1991
	Fiscal Year 1990 Annual Monitoring Report and Drawings	Wenck Associates, Inc	JUL-1991
1992			
	Operable Unit 3 Feasibility Study	CRA	JUL-1992
	Record of Decision, Groundwater Remediation Operable Unit 3	None on record	SEP-1992
	Fiscal Year 1991 Annual Monitoring Report and Drawings	Wenck Associates, Inc	OCT-1992
	CERCLA Administrative Record New Brighton/Arden Hills NPL Site, Master Record of Decision Index	None on record	NOV-1992
1993			
	Feasibility Study, Final OU-1 FS	Montgomery Watson	JUL-1993
	Fiscal Year 1992 Annual Monitoring Report and Drawings	Wenck Associates, Inc	JUL-1993
	Record of Decision, Groundwater Remediation Operable Unit 1	None on record	SEP-1993

IRP Previous Studies

	Title	Author	Date
1994			
	Final Site J Closure Report	Montgomery Watson	MAR-1994
	TCAAP Operable Unit 2 Feasibility Study, Sites I & K Field Investigation Data Report	CRA	MAY-1994
	Fiscal Year 1993 Annual Monitoring Report and Drawings	Wenck Associates, Inc	JUN-1994
1995			
	Environmental Geophysics and Sequential Aerial Photo Study at Sunfish and Marsden Lakes	Argonne National Lab	AUG-1995
	Phase I Archeological Investigations of the Trap Shooting Area and CERCLA Site B	Loucks & Associates	SEP-1995
	Fiscal Year 1994 Annual Monitoring Report and Drawings	Wenck Associates, Inc	SEP-1995
1996			
	Construction Documentation Report, PGAC Raw and Waste Water Pipelines, City of New Brighton, Minnesota	Barr Engineering	JAN-1996
	Fiscal Year 1995 Annual Monitoring Report and Drawings	Wenck Associates, Inc	OCT-1996
1997			
	GES-Community Relations Plan	Alliant Techsystems Inc	FEB-1997
	Inventory of Wells in the Vicinity of TCAAP, 1995 Update	CRA	MAR-1997
	Operable Unit 2 Feasibility Study	Montgomery Watson	MAR-1997
	"Road Map" or Army Agency Approval of Ordnance and Explosives Clearance Work Completed at TCAAP	Wenck Associates, Inc	JUN-1997
	Comprehensive Unexploded Ordnance Compilation Report, Volume I and Volume II	Wenck Associates, Inc	JUN-1997
	Fiscal Year 1996 Annual Monitoring Report and Drawings	Wenck Associates, Inc	SEP-1997
	Construction Documentation Report, OU1 Modifications: Well 14 and Well 14 Wellhouse,	Barr Engineering	SEP-1997
	Tier I Screening Risk Assessment of Aquatic Ecosystems No. 39-EJ-1393-97 (October 1992 -July 1993),	US Army CHPPM	OCT-1997
	Operable Unit 2 Record of Decision	USAEC	OCT-1997
1998			
	Field Sampling Report, Sites D and G	Stone & Webster	MAR-1998
	Bioavailability of Sediment-Metals in Round and Sunfish Lakes, Preliminary Study Tier II Ecological Risk Assessment	US Army CHPPM	MAR-1998
	Grenade Range Engineering Evaluation/Cost Analysis (EE/CA), December 1997, Revised March 1998	Alliant Techsystems Inc	MAR-1998
	Outdoor Firing Range Engineering Evaluation/Cost Analysis (EE/CA)	Alliant Techsystems Inc	MAR-1998
	Sediment Toxicity Evaluation of Round Lake, Preliminary Study, Tier II Ecological Risk Assessment (10-15 July 1995),	US Army CHPPM	JUN-1998
	Construction Documentation Report, OU1 Modifications, Well 15 and Well 15 Wellhouse,	Barr Engineering	JUL-1998
	Final Site A Engineering Evaluation/Cost Analysis, Revision 0	Stone & Webster	AUG-1998
	Fiscal Year 1997 Annual Performance Report and	Wenck Associates, Inc	AUG-1998

IRP Previous Studies

	Title	Author	Date
1998			
	Drawings		
	Cognis Terramet Lead Extraction Process, Innovative Technology Evaluation Report, SITE Superfund Innovative Technology Evaluation	USEPA	SEP-1998
1999			
	Inventory of Wells in the Vicinity of TCAAP, 1996/1997 Update	CRA	MAR-1999
	Alternate Water Supply Construction Report for Period 1997 through 1998	Montgomery Watson	MAR-1999
	Work Plan, Tier II Ecological Risk Assessment	US Army CHPPM	JUN-1999
	Site F Closure Certification Report, Volumes 1 - 3	Alliant Techsystems Inc.	JUL-1999
	Fiscal Year 1998 Annual Performance Report	Wenck Associates, Inc	JUL-1999
	Final Field Investigation Report, Site G Tar-Like Material, Revision 2,	Stone & Webster	AUG-1999
	Five-Year Review Report of the Final Remedy for the New Brighton/Arden Hills Superfund Site	Wenck Associates, Inc	SEP-1999
2000			
	Results of Sampling and Analysis of Soil Vapor Extraction (SVE) Vents at Sites D and G	Alliant Techsystems Inc	JAN-2000
	Removal Site Evaluation, Preliminary Assessment, Trap Range Site	Alliant Techsystems Inc	FEB-2000
	Evaluation of Natural Attenuation of Chlorinated Solvents in Groundwater at the Twin Cities Army Ammunition Plant - Site A	USEPA	JUN-2000
	Final Report on the Demonstration Results for the Phytoextraction of Lead-Contaminated Soil at the Twin Cities Army Ammunition Plant	TVA	JUL-2000
	OU-1 Remedial Action Report	Montgomery Watson	AUG-2000
	Evaluation of the Protocol for Natural Attenuation of Chlorinated Solvents: Case Study at the Twin Cities Army Ammunition Plant	USEPA	SEP-2000
	Plume History Evaluation, Operable Unit 3, Twin Cities Army Ammunition Plant, Technical Memorandum in Support of Alliant Techsystems Inc.'s Request to Shut Down the Plume Groundwater Recovery System (PGRS) in Operable Unit 3 of the New Brighton/Arden Hills Superfund Site	CRA	OCT-2000
	Soil Vapor Extraction System: A Post-Audit Modeling Study	Argonne National Lab	OCT-2000
	Fiscal Year 1999 Annual Performance Report	Wenck Associates, Inc	OCT-2000
2001			
	Final Site B Dump Investigation, Characterization, and Closeout Report, Revision 2	Stone & Webster	JAN-2001
	Dual Phase Vacuum Extraction Pilot Study, Predesign Investigation Report, Site I	CRA	MAR-2001
	Final Closeout Report, Grenade Range Soil Removal Action Completion of Soil Removal	Alliant Techsystems Inc	JUL-2001
	Final Startup Report, Site A Soil Vapor Extraction/Air Sparging System, Revision 2	Stone & Webster	SEP-2001
	Fiscal Year 2000 Annual Performance Report	Wenck Associates, Inc	NOV-2001

IRP Previous Studies

	Title	Author	Date
2001			
	Final Remedial Action Completion and Shallow Soil Sites Close Out Report plus Drawings, Volume I - Site A Activities, Volume II - Site 129-5 Activities, Revision 2,	Stone & Webster	DEC-2001
	Final Closeout Report, Outdoor Firing Range and #150 Reservoir Site, Soil Removal Action Completion of Soil Removal, Revision 1	Alliant Techsystems Inc	DEC-2001
	Final Preliminary Assessment, 135 Primer/Tracer Area	Alliant Techsystems Inc	DEC-2001
	Final Preliminary Assessment, 535 Primer/Tracer Area	Alliant Techsystems Inc	DEC-2001
	Site K Predesign Investigation Report	CRA	DEC-2001
2002			
	Final Remedial Action Completion and Shallow Soil Sites Close Out Report, Volume III, Site H Activities, Revision 2	Stone & Webster	FEB-2002
	Summary Report for Grenade Range Groundwater Investigation at Marsden Lake, Revision 2	EnecoTech Midwest, Inc	MAY-2002
	Final Remedial Action Completion and Shallow Soil Sites Close Out Report, Volume IV, Site E Activities, Revision 2	Stone & Webster	JUN-2002
	Final Site D Shallow and Deep Soil Volatile Organic Compound Investigation and Close Out Report, Revision 2	Stone & Webster	AUG-2002
	Final Remedial Action Completion and Shallow Soil Sites Close Out Report, Volume V, Site 129-3 Activities, Revision 2	Stone & Webster	NOV-2002
	Final Site 129-15 Dump Investigation, Characterization, and Remedial Action Completion and Close Out Report, Revision 3	Stone & Webster	DEC-2002
	Fiscal Year 2001 Annual Performance Report	Wenck Associates, Inc	DEC-2002
2003			
	Site K Remedial Action Report	CRA	FEB-2003
	Phase II Sitewide Groundwater Monitoring Well Abandonment Completion Report	Stone & Webster	MAY-2003
	Fiscal Year 2002 Annual Performance Report	Wenck Associates, Inc	AUG-2003
2004			
	Final Remedial Action Completion and Shallow Soil Sites Closeout Report, Volume VIII, Site A Former 1945 Trench Activities, Revision 2	Shaw Environmental, Inc	JAN-2004
	Final Remedial Action Completion and Shallow Soil Sites Closeout Report, Volume VII, Site D Activities, Revision 2	Shaw Environmental, Inc	FEB-2004
	Final Construction, Operation, and Closeout Report, Corrective Action Management Unit, Volume IX, CAMU Activities, Revision 2	Shaw Environmental, Inc	MAR-2004
	Final TGRS Operating Strategy, Modifications 1 through 3	CRA	MAY-2004
	Fiscal Year 2003 Annual Performance Report	Tecumseh/Wenck	JUL-2004
	Five-Year Review Report of the Final Remedy for the New Brighton/Arden Hills Superfund Site	Tecumseh/Wenck	SEP-2004
	Final Site G Volatile Organic Compound Investigation and Dump Closeout Report, Revision 2	Shaw Environmental, Inc	DEC-2004

IRP Previous Studies

	Title	Author	Date
2004			
	Tier II Ecological Risk Assessment Report, Volumes I and II	US Army CHPPM	DEC-2004
	Technical Memorandum, Statistical Evaluation Method for Operable Unit 1 Water Quality Data	OU1 Technical Group	DEC-2004
2005			
	Summary Report for 535 Primer/Tracer Area Site Inspection Investigation	Tecumseh/Wenck	JAN-2005
	Off-TCAAP, Vapor Intrusion Pathway Analysis, Operable Unit 1, Operable Unit 3, and Operable Unit 2 (Site A	Tecumseh/Wenck	MAY-2005
	Groundwater Statistical Evaluation, Operable Unit 3, Technical Memorandum in Support of Proposed Record of Decision (ROD) Amendment	CRA	MAY-2005
	Fiscal Year 2004 Annual Performance Report	Tecumseh/Wenck	SEP-2005
	Modification #1 To: Technical Memorandum, Statistical Evaluation Method for Operable Unit 1 Water Quality Data	OU1 Technical Group	OCT-2005
	Proposed Plan for Groundwater Remediation for Operable Unit 3 at the New Brighton/Arden Hills Superfund Site	CRA	OCT-2005
2006			
	Outdoor Firing Range 1900 Yard Range Cover Construction: An Addendum to the -Final Closeout Report, Outdoor Firing Range and #150 Reservoir Site Soil Removal- (Revision 1, December 2001)	Alliant Techsystems Inc. & Wenck Associates, Inc	FEB-2006
	Final Technical Memorandum, Site C-2 Alternatives Evaluation, Revision 1	Shaw Environmental, Inc	FEB-2006
	Groundwater Investigation Report for Building 102	Wenck Associates, Inc. & Keres Consulting, Inc	FEB-2006
	Proposed Plan for Groundwater Remediation For Operable Unit 1 at the New Brighton/Arden Hills Superfund Site	Wenck Associates, Inc	MAR-2006
	Record of Decision Amendment, Groundwater Remediation, Operable Unit 1 at New Brighton/Arden Hills Superfund Site	Army/USEPA/MPCA	MAY-2006
	Record of Decision Amendment for Operable Unit 3 of the New Brighton/Arden Hills Superfund Site	Army/USEPA/MPCA	JUL-2006
	Closeout Report: Removal of Contaminated Sediment at the 135 Primer/Tracer Area Stormwater Outfall	Wenck Associates, Inc.	JUL-2006
	Fiscal Year 2005 Annual Performance Report	Tecumseh/Wenck	DEC-2006
2007			
	Proposed Plan for Operable Unit 2, Site C-2	Shaw Environmental, Inc.	MAR-2007
	Record of Decision Amendment for Operable Unit 2, Site C-2	Army/USEPA/MPCA	JUL-2007
	Fiscal Year 2006 Annual Performance Report	Wenck Associates, Inc.	SEP-2007
2008			
	Site A Shallow Groundwater: 10-Year Evaluation Report	Wenck Associates, Inc.	JUL-2008
	Fiscal Year 2007 Annual Performance Report	Wenck Associates, Inc.	JUL-2008
	Building 102 Groundwater Engineering Evaluation/Cost Analysis	Wenck Associates, Inc.	JUL-2008
	Engineering Evaluation/Cost Analysis, Site K	CRA	JUL-2008

IRP Previous Studies

	Title	Author	Date
2008			
	Action Memorandum: Building 102 Groundwater	Army	OCT-2008
	Action Memorandum: Site K Soils	Army	OCT-2008
	Site C Groundwater Extraction System Evaluation Report	Wenck Associates, Inc.	NOV-2008
2009			
	Engineering Evaluation/Cost Analysis, 535 Primer/Tracer Area	Wenck Associates, Inc.	JAN-2009
	Action Memorandum: 535 Primer/Tracer Area Soil Removal	Army	MAR-2009
	Remedial Action Completion and Shallow Soil Sites Close Out Report, Site C Activities	Shaw Environmental, Inc.	MAY-2009
	OU2 ROD Amendment #2, Site I Groundwater	Army, USEPA, MPCA	MAY-2009
	OU2 ROD Amendment #3	Army, USEPA, MPCA	MAY-2009
	OU2 ROD Explanation of Significant Differences #1, Changes for Groundwater Sites	Army, USEPA, MPCA	MAY-2009
	OU2 ROD Explanation of Significant Differences #2, Changes for Soil Sites	Army, USEPA, MPCA	MAY-2009
	Fiscal Year 2008 Annual Performance Report	Wenck Associates, Inc.	JUN-2009
	Five-Year Review Report, New Brighton/Arden Hills Superfund Site	Wenck Associates, Inc.	AUG-2009
	Removal Action Completion Report, Site K	CRA	AUG-2009
2010			
	Closeout Report for Soil Removal Action at the 535 Primer/Tracer Area	Wenck Associates, Inc.	JAN-2010
	Fiscal Year 2009 Annual Performance Report	Wenck Associates, Inc.	MAY-2010
	Operable Unit 2 Land Use Control Remedial Design	Wenck Associates, Inc.	SEP-2010
	Feasibility Study for Rice Creek, Sunfish Lake, Marsden Lake, and Pond G	Wenck Associates, Inc.	DEC-2010
2011			
	Operable Unit 2 - Land Use Control Remedial Design - Revision 2	Wenck Associates, Inc.	JUN-2011
	FY2010 Annual Performance Report	Wenck Associates, Inc.	AUG-2011
2012			
	OU2 ROD Amendment #4	Army, USEPA, MPCA	JAN-2012
	FY2011 Annual Performance Report	Wenck Associates, Inc.	JUN-2012
	Community Relations Plan	ATK/GES (Updated by Wenck)	SEP-2012
	Engineering Evaluation/Cost Analysis, Soil Investigations at Areas of Concern	Wenck Associates, Inc.	NOV-2012
	Action Memorandum, Soil Areas of Concern	Army	DEC-2012
2013			
	FY 2012 Annual Performance Report	Wenck Associates, Inc.	MAY-2013
	Remedial Action Completion and Aquatic Site Close out Report -Pond G	Wenck Associates, Inc.	NOV-2013
	Removal Action Completion Report, Soil Areas of Concern	Wenck Associates, Inc.	NOV-2013
2014			

IRP Previous Studies

	Title	Author	Date
2014			
	OU2 ROD Amendment #5	Army, USEPA, MPCA	MAR-2014
	Five-Year Review Report, New Brighton/Arden Hills Superfund Site	USACE	AUG-2014
	FY 2013 Annual Performance Report	Wenck Associates, Inc.	OCT-2014
2015			
	Operable Unit 2 - Land Use Control Remedial Design - Revision 3	Wenck Associates, Inc.	MAR-2015
2016			
	FY 2014 Annual Performance Report	Wenck Associates, Inc.	JAN-2016

TWIN CITIES ARMY AMMUNITION PLANT

Non-BRAC Excess

Installation Restoration Program
Site Descriptions

Site ID: TCAAP-01
Site Name: Burial/Burn Area (Site A)
Alias: SITE A

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Metals, Volatiles (VOC)

Media of Concern: Groundwater, Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	201212
RD	199712	201303
IRA	198809	199712
RA(C)	199712	201311
RA(O)	199712	202609

RIP Date: 201311

RC Date: 202702

SITE DESCRIPTION

Site A consists of 12.3 acres used between the early-1940s and 1966 for burial and/or burning of wastes, such as sewage sludge, solvents, explosive-containing wastes, and mercury crack cases. These activities resulted in the contamination of the soil and shallow groundwater with VOCs and metals.

From 1988 to 1994 a groundwater IRA operated consisting of an extraction well near the source area with granular activated carbon (GAC) treatment and surface discharge. In 1994, after conducting an engineering estimate/cost analysis (EE/CA), a new IRA was implemented to prevent off- site migration of VOCs in groundwater. The system consisted of eight extraction wells, with direct discharge to the publicly-owned treatment works. The 1997 OU2 ROD made this system part of the final RA. The remedial action (construction) [RA(C)] start date for the final groundwater RA is shown as the date of the ROD, since no construction took place. The RA(O) start date is also the ROD date as this triggered these activities for the final RA. In 2000 four of the extraction wells were turned off as the plume had reduced in size. The ROD required that the groundwater remedy be reevaluated after 10 years. An evaluation report was approved in 2008, whereby operation of the extraction system was suspended pending further evaluation of MNA. A December 2015 technical memorandum evaluated MNA results and recommended formally changing the groundwater extraction remedy to MNA, which has been approved by the regulators. A ROD amendment will be prepared in 2016 to document this change. Current data suggests groundwater cleanup levels will be achieved, with RC in 2027, after verification monitoring, system dismantlement, well sealing, and a closeout report. In 2009, the OU2 ROD was modified by ESD No. 1 to clarify LUC requirements for groundwater. In 2013, subsurface soil vapor sampling along County Road I found nothing.

In 1997, site characterization was performed with respect to the source area for VOC-contaminated groundwater. A disposal trench was identified as the source of VOC contamination. Following approval of an EE/CA, a removal action was conducted. Between 2000 and 2002 a soil vapor extraction (SVE)/air sparging system removed 536 pounds of VOCs. Soil sampling in 2002 suggested that the SVE system would not achieve the cleanup levels. The regulators then approved a work plan for excavation and off-site disposal of the VOC- contaminated soil. In November 2002 approximately 688 cubic yards (cy) were removed, which resulted in unrestricted use. In 2003 the closeout report for this work received regulatory approval. In 2009, ESD No. 1 documented this work as part of the final remedy for Site A.

The OU2 ROD also specified excavation, stabilization, and off-site disposal of the metals-contaminated soil to site-specific industrial levels. In 1998 and 1999, approximately 16,226 cy of contaminated soil were removed. In 2001, a closeout report for metals-contaminated soils received partial approval from the regulators pending resolution of LUC issues. In 2009, ESD No. 2 added LUC requirements for the metals-contaminated soil. In 2010 the OU2 LUCRD was approved and the closeout report received final consistency approval.

Site ID: TCAAP-01
Site Name: Burial/Burn Area (Site A)
Alias: SITE A

Environmental baseline survey (EBS) work discovered metals contamination in soil just south of previous excavation work. The EE/CA and action memorandum were completed in 2012, completing the RI/FS phase (the end date shown is the signature date of the action memorandum). The selected remedy was soil removal. The remedial design (RD) work plan was approved in 2013, completing the RD phase (the end date shown is the approval date for the work plan). The soil removal and disposal (60 cy) was completed in 2013 (the RA(C) end date and remedy-in-place (RIP) date are the approval date for the removal action completion report). RC for soils was achieved in fiscal year (FY)14 (signature of ROD Amendment).

The LUCs and five-year reviews will continue beyond RC (shown in LTM through 30 years to be consistent with cost estimate guidance). Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

CLEANUP/EXIT STRATEGY

MNA will be implemented in lieu of the shallow groundwater containment system to achieve the site-specific cleanup goals with RC estimated to occur in 2027 (funded under TCAAP-19). A ROD amendment will be prepared in 2016 to document the remedy change to MNA.

The LUC implementation by the National Guard and five-year reviews (funded under TCAAP-19) will continue and are considered RA(O) until RC and then will be considered LTM.

Site ID: TCAAP-05
Site Name: Open Burn/Disposal Area (Site C)
Alias: SITE C

STATUS

Parcel: Public Benefit Conveyance, Ramsey County (108 acres)

Regulatory Driver: CERCLA

RRSE: HIGH

Contaminants of Concern: Metals

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

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199708	199804
IRA	200207	200710
RA(C)	200001	200809
RA(O)	199712	202109

RIP Date: 200809

RC Date: 202202

SITE DESCRIPTION

Site C is approximately 6.4 acres. From 1947 through 1957 it was used for burning scrap wooden boxes, solvents, oils, and production materials. It was also used for land disposal and open storage.

In 1997, the USAEC sponsored a field demonstration project to phytoremediate lead-contaminated soil at Site C. The project had the unintended consequence of contaminating groundwater and surface water with lead. In 2000, the state took enforcement action. In 2002, the Army began operating a groundwater pump-and-treat system as an IRA (under a separate site designation, TCAAP-29). In 2004, a stipulation agreement was signed, thereby resolving the enforcement action and directing that response actions be conducted under the authority of the FFA. With this development, the alternatives analysis and OU2 ROD Amendment No. 1, discussed above in regard to soil and sediment, were expanded to include groundwater and surface water. With this change, TCAAP-29 has been closed out, and the activities have been incorporated into TCAAP-05.

The 1997 OU2 ROD required excavation, stabilization, and off-site disposal of the contaminated soil to site-specific industrial levels at two sub-areas designated Sites C-1 and C-2. Excavation work proceeded from 2000 to 2002 and then stopped in July 2002 due to an issue raised by the regulators involving unanticipated site conditions. The issue involved whether excavation to groundwater was adequate (at this site, typically two to five feet below ground), or a revised remedy was needed. In November 2002, additional characterization work was completed to assess the amount of contamination which may be left in place below the water table. During review of the results and an alternatives analysis, the regulators requested additional sampling of sediments in ditches at the site; this was performed in 2003. The regulators also gave approval for excavation work to continue at the south end of the site, where contamination was less than two feet deep. In 2006, an alternatives analysis was approved, which recommended a combination of excavation and/or placement of fill to provide a four-foot soil cover to serve as a protective barrier between the ground surface and any contamination remaining in place. In 2007, OU2 ROD Amendment No. 1 documented this change for Site C-2, and added LUC requirements for the soil and cover. The fieldwork was completed in 2008, which represents the RA(C) end date and RIP date. A total of 21,450 cy of soil was removed from Sites C-1 and C-2. In 2009, OU2 ESD No. 2 clarified that LUCs are also required for soil at Site C-1. The closeout report for Sites C-1 and C2 was approved in 2009.

The 2007 OU2 ROD Amendment No. 1 made the existing IRA groundwater extraction system a final remedy, with an effective date of October 2007, and added LUCs for groundwater. With declining contaminant concentrations, an evaluation report was approved in 2008, whereby operation of the extraction system was suspended. It is estimated that cleanup levels will be achieved in 2021, with RC in 2022, after verification monitoring, system dismantlement, well sealing, and a closeout report.

The LUCs cover maintenance and five-year reviews will continue beyond RC. Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

Site ID: TCAAP-05
Site Name: Open Burn/Disposal Area (Site C)
Alias: SITE C

CLEANUP/EXIT STRATEGY

The RA(O) groundwater monitoring will continue to verify that the containment system can remain off until site-specific cleanup levels are met. The estimated date for this is 2021 (funded under TCAAP-19).

The LUC implementation, cover maintenance, and five-year reviews (all funded under TCAAP-19) will continue and are considered RA(O) until RC and then will be considered LTM.

Site ID: TCAAP-06
Site Name: Leach/Burn Pits (Site D)
Alias: SITE D

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Explosives, Metals, Polychlorinated Biphenyls (PCB), Volatiles (VOC)

Media of Concern: Groundwater, Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199602	200210
IRA	198510	199712
RA(C)	199712	200809
RA(O)	199712	200809
LTM	200809	204609

RIP Date: 200809

RC Date: 200809

SITE DESCRIPTION

Site D is approximately 1.8 acres. From 1949 or 1950 to 1968, in addition to receiving neutralized cyanide wastes, the pits at this site were used to burn sump wastes, scrap propellants, solvents, paint thinners, oils, rags and chemicals.

IRAs included excavation of approximately 1,400 cy of PCB-contaminated soil in 1985, with subsequent on-site incineration in 1989. Residual PCB contamination is overlain by a half-acre soil cover that was documented as part of the final remedy, along with LUCs, by OU2 ROD Amendment No. 3 in 2009.

An 18-inch-thick clay cover was installed at the site in 1985. In 1986 an SVE system was implemented as an IRA to address VOC-contaminated soil. The SVE system was declared part of the final RA in the 1997 OU2 ROD. The RA(C) start and end dates for the SVE RA are shown as the date of the ROD, since no further construction took place. The RA(O) start date was also triggered by the ROD. From 1986 to 1998 the SVE system removed 116,199 pounds of chlorinated solvents. It was then shut down and later dismantled. In 2002, a closeout report for VOC-contaminated soil received partial approval from the regulators pending resolution of LUC issues (see below).

In 2001, based on a separate ROD requirement, additional shallow soils characterization was performed (shown as an RD activity) to assess metals and explosives contamination remaining at the site. In 2002, the regulators approved a work plan for soil excavation, stabilization, and disposal off-site. In November that year, approximately 1,381 cy were removed, which cleaned up the soil to site-specific industrial levels. In 2004, the closeout report for this work received partial approval from the regulators, pending resolution of LUC issues. In 2009, OU2 ROD Amendment No. 3 documented the soil removal as part of the final remedy and added LUCs [Note: the RA(C) end date and RC date represent when the Army signed the amendment]. In 2010, the OU2 LUCRD was approved and the two closeout reports received final consistency approval.

Groundwater monitoring related to VOCs is addressed as part of "OU2 Deep Groundwater" Site TCAAP-19. The OU2 ROD also required five years of groundwater monitoring (which have been completed) to verify that there have been no impacts from metals and nitroglycerine.

The LUCs, cover maintenance, and five-year reviews will continue beyond RC (shown in LTM through 30 years to be consistent with cost estimate guidance). Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

Site ID: TCAAP-06
Site Name: Leach/Burn Pits (Site D)
Alias: SITE D

CLEANUP/EXIT STRATEGY

The LUC implementation and cover maintenance by the National Guard and five-year reviews (funded under TCAAP-19) will continue and are considered LTM.

Site ID: TCAAP-07
Site Name: Dump and Burning Area (Site E)
Alias: SITE E

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Metals

Media of Concern: Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199708	199804
RA(C)	199810	200809
RA(O)	199712	200809
LTM	200809	204609

RIP Date: 200809

RC Date: 200809

SITE DESCRIPTION

Site E is approximately 8.8 acres. Use of the site began in the early-1940s as a dump for both construction debris and trash, and as a burning ground for ammunition boxes and other materials, including large quantities of unknown chemicals. Both the dump and the burning area were closed in 1949.

The 1997 OU2 ROD required excavation, stabilization, and off-site disposal of the contaminated soil. The site was cleaned up to site-specific industrial levels. From 1999 to 2001 approximately 21,097 cy of contaminated soil were removed. Also, a soil cover was constructed over approximately 1.6 acres of the site, where asbestos-containing material remains in place. In 2002 a closeout report received partial approval from the regulators pending resolution of LUC issues. In 2009, OU2 ROD Amendment No. 3 documented the soil cover as part of the final remedy and added LUCs [note: the RA(C) end date and RC date represent when the Army signed the Amendment]. In 2010, the OU2 LUCRD was approved and the closeout report received final consistency approval. The OU2 ROD also required five years of groundwater monitoring (which have been completed) to verify that there have been no impacts from metals.

The LUCs, cover maintenance, and five-year reviews will continue beyond RC (shown in LTM through 30 years to be consistent with cost estimate guidance). Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

CLEANUP/EXIT STRATEGY

The LUC implementation and cover maintenance by the National Guard and five-year reviews (funded under TCAAP-19) will continue and are considered LTM.

Site ID: TCAAP-09
Site Name: Dump (Site G)
Alias: SITE G

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Volatiles (VOC)

Media of Concern: Groundwater, Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199602	200312
IRA	198509	199712
RA(C)	199712	200809
RA(O)	199712	200809
LTM	200809	204609

RIP Date: 200809

RC Date: 200809

SITE DESCRIPTION

Site G is approximately 4.6 acres. Operations at the site appear to have begun during WW II and continued through 1976. It was used as a general dump area for the disposal of rubble, asphalt pavement, barrels, oil filters, rocket propellant research materials, floor-absorbent sweepings, metal dusts and grindings, burning operation ashes, and scrap roofing debris.

In 1985 an 18-inch-thick clay cover was installed at the site. In 1986 an SVE system was implemented as an IRA to address VOC-contaminated soil. The SVE system was declared part of the final RA in the 1997 OU2 ROD. The RA(C) start and end dates for the SVE RA are shown as the date of the ROD, since no further construction took place. The RA(O) start date was also triggered by the ROD. From 1986-1998 the SVE system removed 104,418 pounds of chlorinated solvents, at which time it was shut down and later dismantled. In 2002, the regulators approved revised remediation goals based on the existing cover minimizing the potential for leaching to groundwater. Beyond maintenance of the cover, no further action (NFA) is required for VOC contaminated soil. Groundwater monitoring related to VOCs is addressed as part of "OU2 Deep Groundwater" Site TCAAP-19.

The OU2 ROD also required additional characterization to determine the appropriate course of action for the general dump. In 2003, the regulators approved a report discussing these matters, along with a work plan for improving the cover system. In 2003 construction of the approximately 4.4-acre cover was also completed. The remedy meets industrial solid waste rules. In 2004 the closeout report for the VOC-contaminated soil and dump received partial approval from the regulators, pending resolution of LUC issues. In 2009, OU2 ROD Amendment No. 3 documented the revised cleanup level and the soil cover as part of the final remedy, and added LUCs [Note that the RA(C) end date and RC dates represent when the Army signed the amendment]. In 2010, the OU2 LUCRD was approved and the closeout report received final consistency approval.

The LUCs, cover maintenance, and five-year reviews will continue beyond RC (shown in LTM through 30 years to be consistent with cost estimate guidance). Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

CLEANUP/EXIT STRATEGY

The LUC implementation and cover maintenance by the National Guard and five-year reviews (funded under TCAAP-19) will continue and are considered LTM.

Site ID: TCAAP-10
Site Name: Burn/Burial Area (Site H)
Alias: SITE H

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Metals

Media of Concern: Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199708	199804
RA(C)	199810	200809
RA(O)	199712	200809
LTM	200809	204609

RIP Date: 200809

RC Date: 200809

SITE DESCRIPTION

Site H is approximately 11.7 acres. From the early-1940s until the late-1960s it was a burning site with a burning cage located in the center. Burning (primarily wood, paper, cardboard, and combustible trash) took place here. In addition to waste burning, portions of the site may have been used to bury and dump industrial sludge, paint residue, incineration ash, and solvents.

The 1997 OU2 ROD required excavation, stabilization and off-site disposal of the contaminated soil. The site was cleaned up to site-specific industrial levels. From 1999 to 2001 approximately 8,615 cy of contaminated soil was removed. Also, a soil cover was constructed over approximately 2.9 acres of the site, where asbestos-containing material remains in place. In 2002 a closeout report received partial approval from the regulators pending resolution of LUC issues. In 2009, OU2 ROD Amendment No. 3 documented the soil cover as part of the final remedy and added LUCs [Note that the RA(C) end date and RC dates represent when the Army signed the amendment]. In 2010, the OU2 LUCRD was approved and the closeout report received final consistency approval. The OU2 ROD also required five years of groundwater monitoring (which have been completed) to verify that there have been no impacts from metals.

The LUCs, cover maintenance, and five-year reviews will continue beyond RC (shown in LTM through 30 years to be consistent with cost estimate guidance). Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

CLEANUP/EXIT STRATEGY

The LUC implementation and cover maintenance by the National Guard and five-year reviews (funded under TCAAP-19) will continue and are considered LTM.

Site ID: TCAAP-11
Site Name: Leaching Pits (Site 129-3)
Alias: SITE 129-3

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Explosives, Metals, Volatiles (VOC)

Media of Concern: Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199708	199804
RA(C)	199810	200809
RA(O)	199712	200809
LTM	200809	204609

RIP Date: 200809

RC Date: 200809

SITE DESCRIPTION

Site 129-3 is approximately two acres. The site had three leaching pits which were used for the disposal and flashing of contaminated wastewater, which primarily came from the lead styphnate primer mix facility that began operation in 1971 and ended about 1972. Disposal activity at the site may also have included burning scrap powder and lead styphnate wastes.

The 1997 OU2 ROD required excavation, stabilization, and off-site disposal of the contaminated soil. The site was cleaned up to site-specific industrial levels. From 2000 to 2001 approximately 3,460 cy of contaminated soil was removed. In 2002 a closeout report received partial approval from the regulators pending resolution of LUC issues. In 2009, OU2 ESD No. 2 added LUCs [Note: the RA(C) end date and RC date represent when the Army signed the ESD]. In 2010, the OU2 LUCRD was approved and the closeout report received final consistency approval. The ROD also required five years of groundwater monitoring (which have been completed) to verify that there have been no impacts from metals.

The LUCs and five-year reviews will continue beyond RC (shown in LTM through 30 years to be consistent with cost estimate guidance). Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

CLEANUP/EXIT STRATEGY

The LUC implementation by the National Guard and five-year reviews (funded under TCAAP-19) will continue and are considered LTM.

Site ID: TCAAP-12
Site Name: Burn/Disposal Area (Site 129-5)
Alias: SITE 129-5

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: MEDIUM

Contaminants of Concern: Metals

Media of Concern: Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199708	199804
RA(C)	199810	200809
RA(O)	199712	200809
LTM	200809	204609

RIP Date: 200809

RC Date: 200809

SITE DESCRIPTION

Site 129-5 is approximately 7.2 acres. From about 1945 or 1946 through the late-1950s it was used for the open burning of scrap explosives, bullets, spent solvents, and disposal of primer/tracer sludge. In 1995 areas of this site with observed surface debris were fenced.

The 1997 OU2 ROD required excavation, stabilization, and off-site disposal of the contaminated soil. The site was cleaned up to site-specific industrial levels. Approximately 100 cy of contaminated soil was removed in 1999. In 2001, a closeout report received partial approval from the regulators pending resolution of LUC issues. In 2009, OU2 ESD No. 2 added LUCs [Note: the RA(C) end date and RC date represent when the Army signed the ESD]. In 2010, the OU2 LUCRD was approved and the closeout report received final consistency approval. The ROD also required five years of groundwater monitoring (which have been completed) to verify that there have been no impacts for metals.

The LUCs and five-year reviews will continue beyond RC (shown in LTM through 30 years to be consistent with cost estimate guidance). Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

CLEANUP/EXIT STRATEGY

The LUC implementation by the National Guard and five-year reviews (funded under TCAAP-19) will continue and are considered LTM.

Site ID: TCAAP-13
Site Name: Dump (Site 129-15)
Alias: SITE129-15

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: LOW

Contaminants of Concern: Metals, Polycyclic Aromatic Hydrocarbons (PAH)

Media of Concern: Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199806	200108
RA(C)	200108	200809
RA(O)	199712	200809
LTM	200809	204609

RIP Date: 200809

RC Date: 200809

SITE DESCRIPTION

Site 129-15 is approximately two acres. From 1970 through 1978 it was used as a landfill for construction debris. In 1994 PAHs were discovered during preliminary characterization of the dump material.

The 1997 OU2 ROD required characterization to determine the appropriate course of action for the dump. This action was performed in 1998, and lead was also identified as a contaminant of concern. The regulators approved a soil cover as the remedy for the dump. Construction of the approximately 1.6-acre cover was completed in 2001 and the site was remediated to site-specific industrial levels. In 2002, a closeout report received partial approval from the regulators pending resolution of LUC issues. In 2009, OU2 ROD Amendment No. 3 documented the soil cover as part of the final remedy and added LUCs [Note that the RA(C) end date and RC dates represent when the Army signed the amendment]. In 2010, the OU2 LUCRD was approved and the closeout report received final consistency approval. No groundwater monitoring was required.

The LUCs, cover maintenance, and five-year reviews will continue beyond RC (shown in LTM through 30 years to be consistent with cost estimate guidance). Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

CLEANUP/EXIT STRATEGY

The LUC implementation and cover maintenance by the National Guard and five-year reviews (funded under TCAAP-19) will continue and are considered LTM.

Site ID: TCAAP-15
Site Name: Bldg. 502 and Area (Site I)
Alias: SITE I

STATUS

Parcel: Public Sale Area (427 acres)

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Polychlorinated Biphenyls (PCB), Volatiles (VOC)

Media of Concern: Groundwater, Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199707	200103
IRA	198508	198608
RA(C)	200103	200809
RA(O)	199712	204609

RIP Date: 200809

RC Date: 204609

SITE DESCRIPTION

Site I is approximately 43 acres. It consists of the former Building 502 and its associated structures and facilities. Building 502 was constructed in 1942 and was used until 2004 for the production of various ammunition, projectiles and artillery ammunition components. In 1958, Honeywell Defense Systems (now Orbital ATK) assumed responsibility for general manufacturing activities in the building. TCAAP-15 is funded by Orbital ATK with oversight by the Army.

As an IRA in the mid-1980s, Orbital ATK excavated approximately 5,619 cy of PCB-contaminated soil and concrete from around the building; it was stored onsite with regulatory agency concurrence and in 1998 it was disposed of at an off-site facility.

The 1997 OU2 ROD required additional characterization of Unit 1 and Unit 2 soil and groundwater. This work was completed in 1999 and helped define the geologic conditions and extent of contamination for the purpose of designing a remedy pilot study. An engineering study, completed in 2001, indicated that the ROD requirement for extraction of shallow groundwater is not feasible at this site, due to the low permeability soils. In 2009, OU2 ROD Amendment No. 2 deleted the groundwater extraction requirement and added LUCs. For the purposes of AEDB-R, the amended final remedy is called "other". (The RA(C) end date and RIP date represent when the Army signed the amendment.)

Groundwater monitoring, LUCs and five-year reviews are considered RA(O) until the groundwater cleanup levels have been met, which is assumed to be in 30 years, concurrent with the estimate for cleanup of deep groundwater at TCAAP (the RC date). The RA(O) start date reflects the 1997 ROD date, which triggered these activities. Ultimately, when the remediation goals have been achieved, the wells will be sealed and a closeout report will be prepared.

Shallow soils have been remediated by Ramsey County as part of their purchase agreement with the Army/General Services Administration (GSA) so there are no Army costs included in AEDB-R. Apportioning Orbital ATK's responsibilities to remediate the site is still being considered by the Army.

CLEANUP/EXIT STRATEGY

The RA(O) of the shallow groundwater remedy (monitoring) will continue until site-specific cleanup levels have been met; this is estimated to occur in 30 years (funded by Orbital ATK).

Since the land has been transferred and will be redeveloped, the regulators have agreed to defer any soil or vapor issues to the

developer.

The LUC implementation and five-year reviews (funded under TCAAP-19) will continue and are considered RA(O) until RC and then will be considered LTM.

Site ID: TCAAP-16
Site Name: Bldg. 103 (Site K)
Alias: SITE K

STATUS

Parcel: Public Sale Area (427 acres)

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Volatiles (VOC)

Media of Concern: Groundwater, Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	200810
RD	199707	200904
IRA	198508	199712
RA(C)	199712	200911
RA(O)	199712	204609

RIP Date: 200911

RC Date: 204609

SITE DESCRIPTION

Site K is approximately 21 acres. It consists primarily of former Building 103, a two-story structure built in 1943. The building was used for munitions manufacturing and assembly operations, and various solvents were used to clean machines, parts, and floors. In 1961, the operations were reactivated for the production of fuses, mines, and weapon systems by Honeywell (subsequently Orbital ATK). In 2006 Building 103 was demolished; however, the concrete slab remains in place. TCAAP-16 is funded by Orbital ATK with oversight by the Army.

In 1985 a containment pump-and-treat system was initiated as an IRA to remove chlorinated solvents from the shallow groundwater. The 1997 OU2 ROD designated this system as part of the final RA. The start date of the RA(C) and RA(O) for the final RA are shown as the date of the ROD, since no further construction actually took place. The groundwater system is expected to operate for 30 years, concurrent with the best estimate for cleanup of the deep groundwater at TCAAP. RA(O) will be followed by verification monitoring, system dismantlement, well sealing, and a closeout report. In 2009, OU2 ESD No. 1 added LUCs related to groundwater.

The ROD also required further investigation of the shallow soils, which act as the source for groundwater contamination. The investigation was completed in 2000, and the report of findings was finalized in 2001. Orbital ATK took the position that soil remediation was not feasible, because the soils were beneath an existing building (103); hence, soil remediation was not a requirement of the 1997 OU2 ROD. The building was removed in 2006. In 2008, an EE/CA was approved and an action memorandum was signed for removal of contaminated soil beneath the floor slab. For purposes of AEDB-R, the EE/CA was considered in the RI/FS phase (end date of 2008), followed by RD (completed in 2009), and the removal of approximately 69 tons of contaminated soil and rubble. The soil closeout report was approved in 2009, which is the RA(C) end date and RIP date. The soil removal achieved unrestricted use levels, so there are no LUC requirements for soil. Amendment No. 4 to the OU2 ROD was signed in 2012, which declared the removal action as the final remedy, with NFA required for the soil area.

CLEANUP/EXIT STRATEGY

The RA(O) of the groundwater pump-and-treat system will continue until site-specific levels are met; this is estimated to occur in 30 years (funded by Orbital ATK).

Since the land has been transferred and will be redeveloped, the regulators have agreed to defer any soil or vapor issues to the developer.

Site ID: TCAAP-16
Site Name: Bldg. 103 (Site K)
Alias: SITE K

The LUC implementation and five-year reviews (funded under TCAAP-19) will continue and are considered RA(O) until RC and then become LTM.

Site ID: TCAAP-17
Site Name: OU1 Deep Groundwater
Alias: OU1 GW

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Volatiles (VOC)

Media of Concern: Groundwater

Phases	Start	End
PA	198702	199006
SI	198702	199006
RI/FS	198702	199307
RD	199002	199705
IRA	199309	199803
RA(C)	199309	200005
RA(O)	199803	204609
LTM	204609	204609

RIP Date: 200005

RC Date: 204609

SITE DESCRIPTION

Past industrial activities at TCAAP have resulted in VOC contamination of deep aquifers (Units 3 and 4). Off-post, the VOC plumes diverge into two plumes termed the north plume (TCAAP-17) and south plume (TCAAP-27). OU1 addresses the north plume. OU3 addresses the south plume.

In June 1990, a permanent GAC treatment facility, with a capacity of 3,900 gallons per minute, was installed in New Brighton to treat contaminated municipal wells. As an integral part of New Brighton's municipal water supply system, the treatment plant supplies drinking water to area residents and aids in the remediation of the TCAAP-related contaminated groundwater plume.

The 1993 OU1 ROD required additional extraction wells for containment of the plume. Construction was completed in 1998. RA(O) is executed by New Brighton, with reimbursement from a settlement agreement operating fund. RA(O) is projected to continue for 30 years to be consistent with cost estimate guidance.

Other ROD requirements include alternate water supply/well abandonment, well advisory, monitoring, and reporting, which are funded under TCAAP-19.

In May 2006, a ROD amendment was executed which replaces the requirement for containment with a requirement to demonstrate aquifer restoration, through statistical evaluation of monitoring results.

In 2015 an emerging chemical of concern, 1,4-dioxane, resulted in the need for the City of New Brighton to suspend remedy pumping to evaluate treatment options and modify their treatment facility. The Army is conducting additional monitoring and coordinating with the regulators to evaluate remedy impacts.

Once the cleanup levels have been achieved, the treatment system will be dismantled, monitoring wells will be sealed, a closeout report issued, and the site delisted (one-time LTM activity).

CLEANUP/EXIT STRATEGY

In 2015 an emerging chemical of concern, 1,4-dioxane, was found to be present in OU1/OU2/OU3 deep groundwater. The OU1 remedy is currently in a time-out while the City of New Brighton evaluates treatment options for 1,4-dioxane. The Army is

conducting additional monitoring in coordination with the regulators to evaluate impacts to the remedy.

Operation of the groundwater treatment system is expected to continue through 2046 until site-specific levels are met, at which time delisting of OU1 will occur (shown as a one-time LTM activity).

Site ID: TCAAP-19
Site Name: OU2 Deep Groundwater
Alias: OU2 GW

STATUS

Parcel: Public Benefit Conveyance, Ramsey County (108 acres),Public Sale Area (427 acres)

Regulatory Driver: CERCLA

RRSE: HIGH

Contaminants of Concern: Volatiles (VOC)

Media of Concern: Groundwater

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199712	200306
IRA	198606	199712
RA(C)	199712	200306
RA(O)	199712	204609
LTM	204609	204609

RIP Date: 200306

RC Date: 204609

SITE DESCRIPTION

This site addresses deep groundwater contamination in lithological Units 3 and 4 within the original TCAAP boundary.

In 1986, the TCAAP groundwater recovery system (TGRS) [formerly the boundary groundwater recovery system (BGRS)] began operation as an IRA. It included 12 extraction wells along the southwest boundary to capture contamination migrating off-post and five source control wells near known contamination sources. Discharge water from the wells is treated through air strippers and recharged via a gravel pit. The 1997 OU2 ROD made the TGRS part of the final RA. The RA(C) start date for the final remedy is shown as the date of the ROD, even though no further construction actually took place. The RA(O) start date was also triggered by the ROD.

The RA(O), including operation and maintenance, monitoring, reporting, and five-year reviews, is executed by Orbital ATK under a cost-sharing apportionment agreement with the Army. Funding requested reflects the Army's 80 percent share of the costs.

The OU2 ROD also required a reconfiguration analysis to optimize mass removal. In 2003 the resulting TGRS operating strategy was approved by the regulators (and subsequent modifications adjusting flow rates have also been approved). Further construction was not required, so the RA(C) completion date is the same date.

The current best estimate is that the TGRS will operate for 30 years. Once the remediation goals have been achieved, the groundwater monitoring will be verified, the system dismantled, the wells sealed, a closeout report issued, and the site delisted (one-time LTM activity).

In 2009, the OU2 ROD was modified by ESD No. 1 to clarify LUC requirements for groundwater.

Funding for TCAAP-19 also includes annual performance monitoring and reporting, well abandonment, administrative record management, and RA(O) activities conducted through the existing Environmental Restoration Services contract for TCAAP sites. Five-year reviews (the next review is scheduled for 2019) are also included in RA(O).

The Army is conducting additional 1,4-dioxane monitoring.

Site ID: TCAAP-19
Site Name: OU2 Deep Groundwater
Alias: OU2 GW

CLEANUP/EXIT STRATEGY

The RA(O) of the TGRS will continue; it is expected to run until site-specific levels are met (an estimated 30 years), at which time delisting of OU2 will occur (shown as a one-time LTM activity).

The LUC implementation and five-year reviews will continue until cleanup levels are met and are considered RA(O) until RC. The RA(O) and LTM activities will continue to be implemented for other TCAAP sites (TCAAP-01, TCAAP-05 through TCAAP-07, TCAAP-09 through TCAAP-13, TCAAP-15-17, TCAAP-20-21, TCAAP-23, TCAAP-27, TCAAP-30-31 and CCTCAAP-32) that are being executed through the Environmental Restoration Services contract or by the US Army Corps of Engineers (USACE) for five-year reviews, which are funded under TCAAP-19.

Site ID: TCAAP-20
Site Name: Grenade Range
Alias: GRENADE RN

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Metals

Media of Concern: Soil

Phases	Start	End
PA	199307	199310
SI	199310	199501
RI/FS	199411	199803
RD	199901	199903
RA(C)	199903	200809
RA(O)	200010	200809
LTM	200809	204609

RIP Date: 200809

RC Date: 200809

SITE DESCRIPTION

The M550 Grenade Range is approximately 19 acres. From March 1967 until July 1975 the range consisted of two launching structures and three landing pads. The range was operated by Orbital ATK.

Based on a 1999 EE/CA and action memorandum, a removal action was implemented, consisting of excavation, stabilization, and off-site disposal of contaminated soil. The site was cleaned up to site-specific industrial levels. In 1999 approximately 2,179 cy of contaminated soil were removed. In 2002, a closeout report received partial approval from the regulators pending resolution of LUC issues. In 2009, OU2 ROD Amendment No. 3 documented the soil removal as the final remedy and added LUCs [Note: the RA(C) end date and RC date represent when the Army signed the amendment]. In 2010, the OU2 LUCRD was approved and the closeout report received final consistency approval. Per the action memorandum, four years of groundwater monitoring were conducted to verify that there were no impacts from metals.

The LUCs and five-year reviews will continue beyond RC (shown in LTM through 30 years to be consistent with cost estimate guidance). Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

CLEANUP/EXIT STRATEGY

The LUC implementation by the National Guard and five-year reviews (funded under TCAAP-19) will continue and are considered LTM.

Site ID: TCAAP-21
Site Name: Outdoor Firing Range
Alias: OFR

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Metals, Polycyclic Aromatic Hydrocarbons (PAH)

Media of Concern: Soil

Phases	Start	End
PA	199310	199408
SI	199404	199612
RI/FS	199608	199803
RD	199806	199903
RA(C)	199904	200809
RA(O)	200209	200809
LTM	200809	204609

RIP Date: 200809

RC Date: 200809

SITE DESCRIPTION

The Outdoor Firing Range is approximately 150 acres. From the 1950s through the 1970s it consisted of three bullet catchers that were used to test ammunition.

Based on a 1999 EE/CA and action memorandum, a removal was implemented, consisting of excavation, stabilization, and off-site disposal of contaminated soil. The site was cleaned up to site-specific industrial levels. In 1999 approximately 990 cy of contaminated soil were removed. In 2001, a closeout report received partial approval from the regulators pending resolution of LUC issues.

Near one of the range backstops (the 1900-yard range) soil was found to be contaminated with PAHs. In 2003, the regulators approved a work plan for placing a soil cover over roughly a one-half acre area. The cover was initially constructed in 2003, with additional cover material placed in 2004. In 2006 an addendum to the closeout report received partial approval, pending resolution of LUC issues.

In 2009, OU2 ROD Amendment No. 3 documented the soil removal and soil cover as the final remedy, and added LUCs [Note: the RA(C) end date and RC date represent when the Army signed the Amendment]. In 2010, the OU2 LUCRD was approved and the closeout report and addendum received final consistency approval.

The LUCs, cover maintenance, and five-year reviews will continue beyond RC (shown in LTM through 30 years to be consistent with cost estimate guidance). Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

CLEANUP/EXIT STRATEGY

The LUC implementation and cover maintenance by the National Guard and five-year reviews (funded under TCAAP-19) will continue and are considered LTM.

Site ID: TCAAP-23
Site Name: Bldg. 135 Primer/Tracer Area
Alias: 135 PTA

STATUS

Parcel: Public Benefit Conveyance, Ramsey County (108 acres)

Regulatory Driver: CERCLA

RRSE: LOW

Contaminants of Concern: Polycyclic Aromatic Hydrocarbons (PAH)

Media of Concern: Soil

Phases	Start	End
PA	197801	198802
SI	199509	199609
RI/FS	200001	201212
RD	200506	201303
RA(C)	200507	201311
LTM	201403	204609

RIP Date: N/A

RC Date: 201403

SITE DESCRIPTION

This area is approximately 65 acres. It consists of Building 135 and associated structures and utilities dedicated to the manufacture of small caliber ammunition primer and tracer mixtures. The manufacturing period included all of TCAAP production.

In 1988 a site-wide PA was performed for TCAAP; however, the primer/tracer areas (PTA) were part of an Army mobilization mission at that time, so they were not investigated. Likewise, this area was not included during the site-wide RI completed in 1991. Limited soil sampling was performed in 1996 to obtain a relative risk site evaluation (RRSE) score, which was considered the site investigation (SI) phase.

In 2001, a PA was approved which recommended that an SI be performed (both were considered to be under the RI/FS phase). In 2002, the fieldwork was completed and the report was approved in 2005. The SI report recommended that an EE/CA be performed to better delineate the extent and magnitude of contamination and to evaluate the appropriate response action.

A storm water outfall from the PTA resulted in contamination of ditch sediments with PAHs. This contamination was on a parcel of land (Rice Creek Area) that was transferred to Ramsey County, and action at this area was expedited to facilitate the transfer. In 2005, approximately 1,256 tons of contaminated sediments were excavated and landfilled offsite, achieving unrestricted use cleanup levels. In 2006, the closeout report was approved. In 2009, OU2 ROD Amendment No. 3 documented the sediment removal as a final remedy with NFA required.

The Building 135 PTA is on the parcel of property being transferred out of federal ownership. Beginning in 2007, the transfer strategy was to have the purchaser be responsible for completing studies and any RA, so the RC date was assumed to be the estimated date of property transfer. In 2010, the transfer strategy changed. A portion of the 135 PTA is now anticipated to be transferred to Ramsey County as a no-cost public conveyance. The current strategy is to have contamination identified on the Ramsey County portion be investigated and remediated (if necessary) by the county; however, execution of work on the remaining portion was completed by the Army. The EE/CA and action memorandum were completed in 2012, completing the RI/FS phase (the end date shown is the signature date of the action memorandum). The selected remedy was soil removal. The RD work plan was approved in 2013, completing the remedial design phase (the end date shown is the approval date for the work plan). The soil removal and disposal (50 cy) was completed in 2013 (The RA(C) end date is the approval date for the removal action completion report). RC for soils was achieved in FY14 (signature of ROD Amendment).

The LUCs and five-year reviews will continue beyond RC (shown in LTM through 30 years to be consistent with cost estimate guidance). Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

Site ID: TCAAP-23
Site Name: Bldg. 135 Primer/Tracer Area
Alias: 135 PTA

CLEANUP/EXIT STRATEGY

Oversight will be provided to Ramsey County during the investigation and remediation work on the parcel it intends to acquire. The LUC implementation and five-year reviews (funded under TCAAP-19) will continue and are considered LTM.

Site ID: TCAAP-27
Site Name: OU3 Deep Groundwater
Alias: OU3 GW

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Volatiles (VOC)

Media of Concern: Groundwater

Phases	Start	End
PA	198712	198804
SI	198712	198804
RI/FS	198804	199207
RD	199207	199305
RA(C)	199305	200608
RA(O)	199404	204609
LTM	204609	204609

RIP Date: 200608

RC Date: 204609

SITE DESCRIPTION

Past industrial activities at TCAAP resulted in VOC contamination of deep aquifers (Units 3 and 4). Off-post, the VOC plumes diverge into two plumes termed the north plume (TCAAP-17) and south plume (TCAAP-27). OU3 addresses the south plume. OU1 addresses the north plume.

The 1992 OU3 ROD required construction of an extraction well to hydraulically contain the south plume. The water was treated by GAC in a facility operated by the city of New Brighton, and was discharged to the New Brighton municipal water system. The system was known as the plume groundwater recovery system (PGRS). The RA(O) started in 1994 (original RIP date) and was executed by New Brighton, with reimbursement of costs by Orbital ATK. Levels of contamination were below action levels, beginning in late-1998, at the containment boundary; however, there are still areas above site-specific levels upgradient. In 2001 TCAAP received regulatory approval to temporarily stop pumping for remediation purposes. The regulators required the system to remain in standby until December 2004. In FY06 a ROD amendment was signed documenting that the PGRS is no longer needed and replacing this RA with MNA and adding LUCs. This changed the RIP date to 2006, reflecting implementation of the amended remedy.

Groundwater monitoring, groundwater use restrictions, and five-year reviews, considered RA(O), will be required until the remediation goals have been met, estimated to be in 30 years (the RC date). Once the cleanup levels have been achieved, the monitoring wells will be sealed, a closeout report issued, and the site delisted (one-time LTM activity).

The Army is conducting additional 1,4-dioxane monitoring.

CLEANUP/EXIT STRATEGY

Groundwater monitoring RA(O) will continue until site-specific cleanup levels are achieved, which is estimated in 30 years, with this activity funded by Orbital ATK. Five-year reviews (funded under TCAAP-19) will likewise continue until cleanup levels are achieved, at which time the OU will be delisted (shown as a one-time LTM activity).

Site ID: TCAAP-30
Site Name: Bldg. 102 Degreasing Operations
Alias: BLDG 102

STATUS

Parcel: Public Sale Area (427 acres)

Regulatory Driver: CERCLA
RRSE: LOW

Contaminants of Concern: Volatiles (VOC)

Media of Concern: Groundwater

Phases	Start	End
PA	200203	200301
SI	200301	200601
RI/FS	200601	200810
RD	200810	200812
RA(C)	200812	200812
RA(O)	200812	204609

RIP Date: 200812

RC Date: 204609

SITE DESCRIPTION

The former Building 102 was constructed in 1942 and used periodically until the mid-1970s for the production of small caliber ammunition and various other munitions components. Historical records indicate that portable degreasing machines were used in Building 102 during the early-1950s to reactivate production equipment for the Korean crisis.

Contamination was discovered emanating from beneath Building 102 during the phase I and phase II environmental site assessment (ESA) which was conducted between March 2002 and February 2004 in support of land transfer. Additional groundwater investigation work, including the installation of monitoring wells, was performed and documented in a January 2006 groundwater investigation report. The ESA-related work served as the PA and SI phases.

The RI began in January 2006, when the groundwater investigation report recommended that an EE/CA be performed to better delineate the extent and magnitude of contamination and to evaluate the appropriate response action.

The EE/CA was approved in July 2008 and the action memorandum was signed in October 2008 selecting MNA as the remedy (end of the RI/FS phase). The RD consisted of preparing the quality assurance project plan (QAPP) for MNA, which was approved in December 2008. This same date was used as the RA(C) start and end date since there was no construction for MNA. Amendment No. 4 to the OU2 ROD was signed in 2012, which declared the removal action (MNA) as the final remedy.

The current best estimate is that RA(O) for MNA will continue for 30 years. Once the remediation goals have been achieved, there will be well sealing and a closeout report. The MNA activities are performed through the Environmental Restoration Services contract, so the costs for RA(O) are included in TCAAP-19.

Regulatory required additional plume footprint characterization was conducted in 2013 resulting in no changes to the remedy.

CLEANUP/EXIT STRATEGY

For groundwater, RA(O) for MNA will continue until site-specific cleanup goals are achieved. The estimated date for this is 30 years (funded under TCAAP-19).

The LUC implementation and five-year reviews (funded under TCAAP-19) will continue until groundwater cleanup levels are met. Since the land has been transferred and will be redeveloped, the regulators have agreed to defer any soil or vapor issues to the developer.

Site ID: TCAAP-31
Site Name: Round Lake
Alias: Round Lake

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: MEDIUM

Contaminants of Concern: Metals

Media of Concern: Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	201809
IRA	201706	201806
LTM	201810	202809

RIP Date: N/A

RC Date: 201809

SITE DESCRIPTION

Round Lake is located southwest of TCAAP. The lake and surrounding shoreline were controlled by the Army from the early-1940s until 1974, when control was transferred to the US Fish and Wildlife Service (USFWS). As part of its watershed, the lake accepts storm water runoff from a portion of TCAAP. There was also periodic discharge of industrial waste from TCAAP until circa 1969. Round Lake is currently designated a Unit of the Minnesota Valley National Wildlife Refuge. The USFWS does not allow any public activity on Round Lake.

Limited investigations of contamination began in the early-1980s. The first relatively extensive investigation of surface water and sediment was conducted in 1992. Using this data as the foundation, the US Army Center for Health Promotion and Preventive Medicine performed additional phased investigation work in support of an ecological risk assessment. The Tier I Screening Risk Assessment was approved in 1997. The Tier II Ecological Risk Assessment Work Plan was approved in 1999. The Tier II Ecological Risk Assessment Report was approved in 2004. Metals in sediment were identified as the primary risk concern.

In September 2003, the Army, regulators, and USFWS agreed to conduct an FS for Round Lake. Draft versions of the FS have undergone regulatory and USFWS review in 2005, 2009, 2010 and 2012. There has been disagreement between the parties regarding ecological risk, human health risk, and an appropriate RA decision. The situation was further complicated when the state initiated a Natural Resource Damage Assessment (NRDA) in 2004 that requires coordination with the FS. In 2010, the USEPA and MPCA requested that additional sediment testing be performed in support of the FS. (Note: at that time, the Army decided to separate Round Lake from four other water bodies that were part of the ecological risk assessment and FS. Accordingly, Round Lake was separated from TCAAP-25 and TCAAP-31 was created.)

The additional sediment testing was completed in 2011. A supplemental Ecological Risk Assessment was completed in 2013 by Oak Ridge National Laboratory (ORNL). Revisions to the FS were completed in 2013 and submitted to the regulators as a Draft Final RI/FS in 2013. The Army initiated a dispute under the FFA in April 2014 based on regulator comments to the Draft Final RI/FS. Dispute resolution is underway. The end date of the RI/FS includes completion of a IRA and Final ROD. At this point in time, it is currently anticipated that limited thin layer capping is the most likely remedy.

CLEANUP/EXIT STRATEGY

The FS will be completed. Then public participation for the remedy selection will be conducted through a proposed plan (PP), and the selected remedy documented through a new ROD for OU 4. (All will be conducted in the RI/FS phase.)

It is not certain what the selected remedy will be, pending dispute resolution. It is assumed that the OU will eventually be delisted,

which is considered a one-time activity in the LTM phase.

IRP Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
TCAAP-02	Sewage Sludge Disposal (Site B)	200104	2001 Site B Dump Investigation, Characterization, and Closeout Report and 2009 OU2 ROD Explanation of Significant Differences No. 2.
TCAAP-08	Open Burn/Burial Area (Site F)	200009	Site F Closure Certification Report
TCAAP-22	Water Tower Area	199608	1996 Investigation Report of the Water Tower Area (Final) and 2009 OU2 ROD Amendment No. 3.
TCAAP-24	Recreational Trap-Shooting Range	200009	2000 Removal Site Evaluation, Preliminary Assessment, Trap Range Site, and 2009 OU2 ROD Amendment No. 3.
TCAAP-25	OU2 Waterbodies	201408	Remedial Action Completion and Aquatic Site Closeout Report - Pond G Nov 2013
TCAAP-26	All Uncharacterized Areas	199604	The PA/SI found no contamination requiring further action.
TCAAP-28	Bldg. 535 Primer/Tracer Area	201001	Record of Decision Amendment No. 4 for Operable Unit 2, New Brighton/Arden Hills Superfund Site, January 2012, signed by the BRAC Division, USEPA Region V, and the Minnesota Pollution Control Agency (MPCA)
TCAAP-29	AEC Phytoremediation Demo Areas	200410	TCAAP-05 included TCAAP-29 which was broken out as a separate project and is considered Response Complete in AEDB-R, future actions and costs are in TCAAP-05.

IRP Schedule

Date of IRP Inception: 197801

Past Phase Completion Milestones

1986	
IRA	(TCAAP-15 - Bldg. 502 and Area (Site I))
1988	
PA	(TCAAP-02 - Sewage Sludge Disposal (Site B), TCAAP-05 - Open Burn/Disposal Area (Site C), TCAAP-06 - Leach/Burn Pits (Site D), TCAAP-07 - Dump and Burning Area (Site E), TCAAP-08 - Open Burn/Burial Area (Site F), TCAAP-09 - Dump (Site G), TCAAP-10 - Burn/Burial Area (Site H), TCAAP-11 - Leaching Pits (Site 129-3), TCAAP-01 - Burial/Burn Area (Site A), TCAAP-23 - Bldg. 135 Primer/Tracer Area, TCAAP-24 - Recreational Trap-Shooting Range, TCAAP-25 - OU2 Waterbodies, TCAAP-26 - All Uncharacterized Areas, TCAAP-27 - OU3 Deep Groundwater, TCAAP-28 - Bldg. 535 Primer/Tracer Area, TCAAP-31 - Round Lake, TCAAP-12 - Burn/Disposal Area (Site 129-5), TCAAP-13 - Dump (Site 129-15), TCAAP-15 - Bldg. 502 and Area (Site I), TCAAP-16 - Bldg. 103 (Site K), TCAAP-19 - OU2 Deep Groundwater)
SI	(TCAAP-01 - Burial/Burn Area (Site A), TCAAP-02 - Sewage Sludge Disposal (Site B), TCAAP-05 - Open Burn/Disposal Area (Site C), TCAAP-06 - Leach/Burn Pits (Site D), TCAAP-07 - Dump and Burning Area (Site E), TCAAP-08 - Open Burn/Burial Area (Site F), TCAAP-10 - Burn/Burial Area (Site H), TCAAP-09 - Dump (Site G), TCAAP-25 - OU2 Waterbodies, TCAAP-27 - OU3 Deep Groundwater, TCAAP-31 - Round Lake, TCAAP-11 - Leaching Pits (Site 129-3), TCAAP-12 - Burn/Disposal Area (Site 129-5), TCAAP-15 - Bldg. 502 and Area (Site I), TCAAP-16 - Bldg. 103 (Site K), TCAAP-19 - OU2 Deep Groundwater, TCAAP-13 - Dump (Site 129-15))
1990	
PA	(TCAAP-17 - OU1 Deep Groundwater)
SI	(TCAAP-17 - OU1 Deep Groundwater)
1991	
SI	(TCAAP-22 - Water Tower Area)
PA	(TCAAP-22 - Water Tower Area)
1992	
RI/FS	(TCAAP-08 - Open Burn/Burial Area (Site F), TCAAP-27 - OU3 Deep Groundwater)
1993	
RD	(TCAAP-08 - Open Burn/Burial Area (Site F), TCAAP-27 - OU3 Deep Groundwater)
RI/FS	(TCAAP-17 - OU1 Deep Groundwater)
1994	
PA	(TCAAP-20 - Grenade Range, TCAAP-21 - Outdoor Firing Range)
1995	
SI	(TCAAP-20 - Grenade Range)
RD	(TCAAP-22 - Water Tower Area)
RI/FS	(TCAAP-22 - Water Tower Area)
1996	
RA(C)	(TCAAP-22 - Water Tower Area)
SI	(TCAAP-23 - Bldg. 135 Primer/Tracer Area, TCAAP-26 - All Uncharacterized Areas)
1997	
RI/FS	(TCAAP-05 - Open Burn/Disposal Area (Site C), TCAAP-06 - Leach/Burn Pits (Site D), TCAAP-07 - Dump and Burning Area (Site E), TCAAP-10 - Burn/Burial Area (Site H), TCAAP-09 - Dump (Site G), TCAAP-11 - Leaching Pits (Site 129-3), TCAAP-12 - Burn/Disposal Area (Site 129-5), TCAAP-15 - Bldg. 502 and Area (Site I), TCAAP-19 - OU2 Deep Groundwater, TCAAP-13 - Dump (Site 129-15))

IRP Schedule

1997	
RD	(TCAAP-17 - OU1 Deep Groundwater)
SI	(TCAAP-24 - Recreational Trap-Shooting Range, TCAAP-28 - Bldg. 535 Primer/Tracer Area, TCAAP-21 - Outdoor Firing Range)
1998	
RD	(TCAAP-05 - Open Burn/Disposal Area (Site C), TCAAP-07 - Dump and Burning Area (Site E), TCAAP-10 - Burn/Burial Area (Site H), TCAAP-11 - Leaching Pits (Site 129-3), TCAAP-12 - Burn/Disposal Area (Site 129-5))
IRA	(TCAAP-06 - Leach/Burn Pits (Site D), TCAAP-09 - Dump (Site G), TCAAP-01 - Burial/Burn Area (Site A), TCAAP-16 - Bldg. 103 (Site K), TCAAP-17 - OU1 Deep Groundwater, TCAAP-19 - OU2 Deep Groundwater)
RI/FS	(TCAAP-20 - Grenade Range, TCAAP-21 - Outdoor Firing Range)
1999	
RD	(TCAAP-20 - Grenade Range, TCAAP-21 - Outdoor Firing Range)
2000	
RI/FS	(TCAAP-24 - Recreational Trap-Shooting Range)
PA	(TCAAP-29 - AEC Phytoremediation Demo Areas)
RA(C)	(TCAAP-08 - Open Burn/Burial Area (Site F), TCAAP-17 - OU1 Deep Groundwater)
2001	
RD	(TCAAP-29 - AEC Phytoremediation Demo Areas, TCAAP-15 - Bldg. 502 and Area (Site I), TCAAP-13 - Dump (Site 129-15))
IRA	(TCAAP-29 - AEC Phytoremediation Demo Areas)
RI/FS	(TCAAP-02 - Sewage Sludge Disposal (Site B), TCAAP-29 - AEC Phytoremediation Demo Areas)
RA(C)	(TCAAP-29 - AEC Phytoremediation Demo Areas)
2003	
RD	(TCAAP-06 - Leach/Burn Pits (Site D), TCAAP-19 - OU2 Deep Groundwater)
RA(C)	(TCAAP-19 - OU2 Deep Groundwater)
PA	(TCAAP-30 - Bldg. 102 Degreasing Operations)
2004	
RD	(TCAAP-09 - Dump (Site G))
2005	
RA(O)	(TCAAP-29 - AEC Phytoremediation Demo Areas)
2006	
SI	(TCAAP-30 - Bldg. 102 Degreasing Operations)
RA(C)	(TCAAP-27 - OU3 Deep Groundwater)
2008	
RA(O)	(TCAAP-06 - Leach/Burn Pits (Site D), TCAAP-07 - Dump and Burning Area (Site E), TCAAP-09 - Dump (Site G), TCAAP-10 - Burn/Burial Area (Site H), TCAAP-11 - Leaching Pits (Site 129-3), TCAAP-12 - Burn/Disposal Area (Site 129-5), TCAAP-20 - Grenade Range, TCAAP-21 - Outdoor Firing Range, TCAAP-13 - Dump (Site 129-15))

IRP Schedule

2008

RA(C)	(TCAAP-05 - Open Burn/Disposal Area (Site C), TCAAP-06 - Leach/Burn Pits (Site D), TCAAP-07 - Dump and Burning Area (Site E), TCAAP-09 - Dump (Site G), TCAAP-10 - Burn/Burial Area (Site H), TCAAP-11 - Leaching Pits (Site 129-3), TCAAP-12 - Burn/Disposal Area (Site 129-5), TCAAP-13 - Dump (Site 129-15), TCAAP-15 - Bldg. 502 and Area (Site I), TCAAP-20 - Grenade Range, TCAAP-21 - Outdoor Firing Range)
IRA	(TCAAP-05 - Open Burn/Disposal Area (Site C))

2009

RD	(TCAAP-28 - Bldg. 535 Primer/Tracer Area, TCAAP-30 - Bldg. 102 Degreasing Operations, TCAAP-16 - Bldg. 103 (Site K))
RI/FS	(TCAAP-28 - Bldg. 535 Primer/Tracer Area, TCAAP-30 - Bldg. 102 Degreasing Operations, TCAAP-16 - Bldg. 103 (Site K))
RA(C)	(TCAAP-30 - Bldg. 102 Degreasing Operations)

2010

RA(C)	(TCAAP-28 - Bldg. 535 Primer/Tracer Area, TCAAP-16 - Bldg. 103 (Site K))

2012

RD	(TCAAP-25 - OU2 Waterbodies)
RA(C)	(TCAAP-25 - OU2 Waterbodies)
RI/FS	(TCAAP-25 - OU2 Waterbodies)

2013

RD	(TCAAP-01 - Burial/Burn Area (Site A), TCAAP-23 - Bldg. 135 Primer/Tracer Area)
RI/FS	(TCAAP-01 - Burial/Burn Area (Site A), TCAAP-23 - Bldg. 135 Primer/Tracer Area)

2014

RA(O)	(TCAAP-25 - OU2 Waterbodies)
RA(C)	(TCAAP-01 - Burial/Burn Area (Site A), TCAAP-23 - Bldg. 135 Primer/Tracer Area)

Projected Phase Completion Milestones

See attached schedule

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

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

Final RA(C) Completion Date: 201311

Schedule for Next Five-Year Review: 2019

Estimated Completion Date of IRP at Installation (including LTM phase): 204609

TWIN CITIES ARMY AMMUNITION PLANT IRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-01	Burial/Burn Area (Site A)	RA(O)						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-05	Open Burn/Disposal Area (Site C)	RA(O)						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-06	Leach/Burn Pits (Site D)	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-07	Dump and Burning Area (Site E)	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-09	Dump (Site G)	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-10	Burn/Burial Area (Site H)	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-11	Leaching Pits (Site 129-3)	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-12	Burn/Disposal Area (Site 129-5)	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-13	Dump (Site 129-15)	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-15	Bldg. 502 and Area (Site I)	RA(O)						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-16	Bldg. 103 (Site K)	RA(O)						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-17	OU1 Deep Groundwater	RA(O)						
		LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-19	OU2 Deep Groundwater	RA(O)						
		LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-20	Grenade Range	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-21	Outdoor Firing Range	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-23	Bldg. 135 Primer/Tracer Area	LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-27	OU3 Deep Groundwater	RA(O)						
		LTM						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-30	Bldg. 102 Degreasing Operations	RA(O)						
SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
TCAAP-31	Round Lake	RI/FS						
		IRA						
		LTM						

TWIN CITIES ARMY AMMUNITION PLANT

Non-BRAC Excess
Compliance Restoration

CR Summary

Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count: 1/0

Installation Site Types with Future and/or Underway Phases

1 Contaminated Fill
(CCTCAAP-32)

Most Widespread Contaminants of Concern

Metals, Polycyclic Aromatic Hydrocarbons (PAH)

Media of Concern

Soil

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

Site ID	Site Name	Action	Remedy	FY	Cost
CCTCAAP-32	Environmental Baseline Survey AOCs	FRA	WASTE REMOVAL - SOILS	2014	TBD

Duration of CR

Year of CR Inception: 199606

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201403/201403

Date of CR completion including Long Term Management (LTM): 204609

CR Contamination Assessment

Contamination Assessment Overview

EBS work performed between 1996 and 2005 identified two AOCs. Soil sampling indicated contamination by metals at both AOCs, and PAHs at one AOC. Site CTCAAP-32 was established in 2011 to address both AOCs. This newly eligible site was considered to be an Installation Restoration (IR) site; however, it is coded as Compliance Restoration (CR) in AEDB-R to distinguish it from the original IR sites and IR metrics. The site was coded this way because on Dec. 29, 2008, the Office of the Deputy Under Secretary of Defense for Installations and Environment issued an interim policy for Defense Environmental Restoration Program eligibility that rescinded the 1986 eligibility date for the IRP.

Soil remediation at the two AOC's was completed in 2013 as documented in the 2014 ROD Amendment.

Cleanup Exit Strategy

There is one active AEDB-R site: CCTCAAP-32 (EBS AOCs), with LTM for LUCs and five-year reviews (funded under TCAAP-19). Special emphasis is being placed on the portion of OU2 used by the Minnesota National Guard to enable them to fully conduct their mission.

CR Previous Studies

	Title	Author	Date
1999			
	Final Training Area F Addendum, Phase II Environmental Baseline Survey	Montgomery Watson	DEC-1999
2012			
	EE/CA, Soil Investigations at Areas of Concern	Wenck Associates, Inc.	NOV-2012
	Action Memorandum, Soil Areas of Concern	Army	DEC-2012
2013			
	Removal Action Completion Report, Soil Areas of Concern	Wenck Associates, Inc.	NOV-2013

TWIN CITIES ARMY AMMUNITION PLANT

Non-BRAC Excess

Compliance Restoration

Site Descriptions

Site ID: CCTCAAP-32
Site Name: Environmental Baseline Survey AOCs
Alias: EBS AOCs

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

Contaminants of Concern: Metals

Media of Concern: Soil

Phases	Start	End
PA	199606	200912
SI	199606	200912
RI/FS	201108	201212
RD	201108	201304
RA(C)	201108	201311
LTM	201403	204609

RIP Date: N/A

RC Date: 201403

SITE DESCRIPTION

EBS work performed between 1996 and 2005 identified two AOCs. Soil sampling indicates contamination by metals and PAHs.

The EBS work is considered the PA and SI phases. The EE/CA and action memorandum were completed in 2012, completing the RI/FS phase (the end date shown is the signature date of the action memorandum). The selected remedy was soil removal. The RD work plan was approved in 2013, completing the remedial design phase (the end date shown is the approval date for the work plan). The soil removal and disposal (1,120 cy) was completed in 2013 (the RA(C) end date is the approval date for the removal action completion report). RC was achieved in FY14 (signature of ROD amendment).

The LUCs and five-year reviews will continue beyond RC (shown in LTM through 30 years to be consistent with cost estimate guidance). Because these activities are common to many sites installation-wide, they are funded under a single site (TCAAP-19).

CLEANUP/EXIT STRATEGY

The LUC implementation by the National Guard and five-year reviews (funded under TCAAP-19) will continue and are considered LTM.

CR Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
There are no NFA sites			

CR Schedule

Date of CR Inception: 199606

Past Phase Completion Milestones

2010

PA	(CCTCAAP-32 - Environmental Baseline Survey AOCs)
SI	(CCTCAAP-32 - Environmental Baseline Survey AOCs)

2013

RD	(CCTCAAP-32 - Environmental Baseline Survey AOCs)
RI/FS	(CCTCAAP-32 - Environmental Baseline Survey AOCs)

2014

RA(C)	(CCTCAAP-32 - Environmental Baseline Survey AOCs)

Projected Phase Completion Milestones

See attached schedule

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

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

Final RA(C) Completion Date: 201311

Schedule for Next Five-Year Review: 2019

Estimated Completion Date of CR at Installation (including LTM phase): 204609

TWIN CITIES ARMY AMMUNITION PLANT CR Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY17	FY18	FY19	FY20	FY21	FY22+
CCTCAAP-32	Environmental Baseline Survey AOCs	LTM						

Community Involvement

Technical Review Committee (TRC): 198712

Community Involvement Plan (Date Published): 201209

Restoration Advisory Board (RAB): RAB established 1996

RAB Adjournment Date:

RAB Adjournment Reason:

Additional Community Involvement Information

The TCAAP RAB, established in 1996, identified a mission statement and operating procedures. The current RAB consists of seven community members and four non-community members. Community RAB members have the opportunity to participate in the Army/regulatory agency's TRC meetings. Some community members have participated in regional and national RAB workshops.

The RAB has, and continues to provide input on the FS for Round Lake, and revisions to the OU2 LUCRD. The RAB is expected to be involved in future remedy evaluation and/or selection for Round Lake (TCAAP-31). In 1999 the RAB was awarded a TAPP grant, which was used to provide support from the University of Minnesota. The RAB also received an award of appreciation from the state of Minnesota in 1999.

The communication/membership committee helps recruit RAB members and keeps the community informed, and the RAB has a website (TCAAPRAB.ORG). RAB members helped to communicate restoration activities to interested stakeholders in the early land transfer process through review of technical documents and participation in stakeholder meetings. The RAB has input to land use and institutional controls which will have an impact on TCAAP, and the board prepared a document to explain these to the public. This document was posted on the TCAAP RAB website.

A community relations plan is in place and was updated in 2012. TCAAP distributes a periodic newsletter to update the public on important restoration activities and milestones.

The RAB meets on an event basis, as needed. The last RAB meeting was in November 2015.

Administrative Record is located at

Twin Cities Army Ammunition Plant Office
4761 Hamline Ave.
Arden Hills, MN 55112
(651) 268-6870

Information Repository is located at

Twin Cities Army Ammunition Plant Office
4761 Hamline Ave.
Arden Hills, MN 55112
(651) 268-8670

An index of the information repository is also available at the Ramsey County Library.

Current Technical Assistance for Public Participation (TAPP): 199808

TAPP Title: TCAAP Technical Assistance

Potential TAPP: N/A