FY2015

MILAN ARMY AMMUNITION PLANT

Army Defense Environmental Restoration Program

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 the Milan Army Ammunition Plant (MLAAP). The plan identifies environmental cleanup requirements at each site or area of concern, 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), MLAAP, the executing agencies, regulatory agencies, and the public, an IAP was completed. The IAP is used to track requirements, schedules, and 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

AAP	Army Ammunition Plant
ACM	Asbestos-Containing Material
AEDB-R	Army Environmental Database-Restoration
CC	Compliance-related Cleanup
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act 1980
CFR	Code of Federal Regulations
CMS	Corrective Measures Study
CS	Confirmatory Sampling
CSM	Conceptual Site Model
DoD	Department of Defense
ESD	Explanation of Significant Difference
F&A	Fisher and Arnold
FRA	Final Remedial Action
FRC	Flight Refueling and Countermeasures Incorporated
FS	Feasibility Study
ft	Feet
FY	Fiscal Year
GW	Groundwater
GWTP	Groundwater Treatment Plant
GWTS	Groundwater Treatment System
IAP	Installation Action Plan
ID	Identification
IRA	Interim Remedial Action
IRP	Installation Restoration Program
IWTF	Industrial Wastewater Treatment Facility
K	thousand
LAP	Load, Assemble and Pack
LTM	Long-Term Management
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
MAAP	Milan Army Ammunition Plant (AEDB-R site designation)
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
MLAPP	Milan Army Ammunition Plant
MMRP	Military Munitions Response Program
MNA	Monitored Natural Attenuation
MR	Munitions Response
MRS	Munitions Response Site
N/A	Not Applicable
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
NI	Northern Industrial
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OBG	Open Burning Ground

Acronyms

OU	Operable Unit
PA	Preliminary Assessment
PBA	Performance-Based Acquisition
PBC	Performance-Based Contract
POL	Petroleum, Oil and Lubricants
PP	Proposed Plan
ppm	parts per million
RA	Remedial Action
RA(C)	Remedial Action (Construction)
RA(O)	Remedial Action (Operation)
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RDX	Cyclotrimethylenetrinitramine
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RI/FS	Remedial Investigation / Feasibility Study
RIP	Remedy-in-Place
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SWMU	Solid Waste Management Unit
TAPP	Technical Assistance for Public Participation
TBD	To Be Determined
TDEC	Tennessee Department of Environment and Conservation
TNT	Trinitrotoluene
TRC	Technical Review Committee
USACE	United States Army Corps of Engineers
USAEC	US Army Environmental Command
USEPA	US Environmental Protection Agency
UXO	Unexploded Ordnance
WWII	World War II

Installation Information

Installation Locale

Installation Size (Acreage): 22357
City: Milan
County: Gibson and Carroll
State: Tennessee
Other Locale Information

MLAAP is located in portions of Gibson and Carroll counties in western Tennessee and is approximately 50 miles east of the Mississippi River. The city of Milan lies immediately to the west. MLAAP covers a total of 22,357 acres and is bordered on the northeast and east by land owned by the National Guard Bureau, on the west and northwest by land owned by the city of Milan and the University of Tennessee, and on the north and south by private farmland.

Installation Mission

The mission of the MLAAP is to "maintain a production-ready ammunition plant and on order - load, assemble, and pack (LAP) reliable medium to large caliber ammunition for the joint warfighter"

MLAAP also has the capability to receive, store and ship ammunition, and provide storage surveillance function.

MLAAP facilities include 10 ammunition LAP lines, one washout and rework line, one central x-ray facility, one test area, two shop maintenance areas, 12 magazine storage areas, a demolition and burning ground area, an administrative area, and three industrial wastewater treatment facilities (IWTF).

Lead Organization

Army Materiel Command (AMC)

Lead Executing Agencies for Installation

USAEC

Regulator Participation

Federal	US Environmental Protection Agency (USEPA), Region 4
State	Tennessee Department of Environment and Conservation (TDEC)

National Priorities List (NPL) Status

A score of 58.5 was recorded on 01-JUL-87.

Date for RA(C) Completion: 201406

Date for NPL Deletion: TBD

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

RAB established 199407

Installation Information

Installation Program Summaries

IRP

Primary Contaminants of Concern: Asbestos, Explosives, Metals, Munitions and explosives of concern (MEC)

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

MMRP

Primary Contaminants of Concern: Munitions and explosives of concern (MEC)

Affected Media of Concern: Soil

CR

Primary Contaminants of Concern: Petroleum, Oil and Lubricants (POL)

Affected Media of Concern: Groundwater, Soil

5-Year / Periodic Review Summary

5-Year / Periodic Review Summary

Status	Start Date	End Date	End FY
Complete	200912	201104	2011
Complete	200412	200509	2005
Complete	199709	200011	1997
Underway	201411	201509	2015

Last Completed 5-Year / Periodic Review Details

Associated ROD/DD Name	Sites
OLINE PONDS - GROUNDWATER	MAAP-014
OPERABLE UNIT 3&4 NORTHERN INDUSTRIAL	MAAP-003A, MAAP-004A, MAAP-005A, MAAP-006A, MAAP-007A, MAAP-008A, MAAP-009A, MAAP-011A, MAAP-012A, MAAP-013A, MAAP-018A, MAAP-032A
OPERABLE UNIT 4, REGION 1 GROUNDWATER	MAAP-011, MAAP-035
Operable Unit 3 Northern Boundary GW	MAAP-034
ROD OPERABLE UNIT #2 - SOILS O-LINE	MAAP 014A

Results All remedial actions are deemed protective. EPA non-concurred by letter dated 19 Sept 2011 with the protectiveness statement for OU4 Region 1 Groundwater remedy.

Actions Army provided a response to EPA Region 4 non-concurrence of the five-year review by asserting that EPA has failed to provide substantive information that would lead to a non-protective conclustion for this operable unit final remedial action.

Plans Army will explore the possibility of addressing LUC and RAO concerns for OU4 Region 1 through a Site-Wide groundwater FS/PP/ROD.

Recommendations and Implementation Plans:
Since the last five-year review conducted in 2011, the concerns expressed by USEPA over the OU4 Region 1 groundwater protectiveness have been addressed by the implementation of a site-wide groundwater remedy.

Land Use Control (LUC) Summary

LUC Title: Groundwater Restriction

Site(s): MAAP-036

ROD/DD Title: AREA I WATER LINE INSTALLATION

Location of LUC

The soil and groundwater adjacent to Well I-11. During October 1992 soil below the elevated water tower adjacent to Well I-11 was determined through sampling to have total and leachable lead present at levels well in excess of background lead levels. In March 1994, an interim action to excavate soils above 5 parts per million (ppm) was performed. Lead remaining on the site after removal was fixed in place with drainage/erosion controls implemented.

Land Use Restriction: Media specific restriction - prohibit use of groundwater for consumption or domestic purposes, Media specific restriction - restrict drinking water well installation, Media specific restriction - restrict withdrawal or use of groundwater for agricultural/irrigation purposes

Types of Engineering Controls: None

Types of Institutional Controls: Dig Permits, Restrictions on Groundwater Withdrawal

Date in Place: 199405

Modification Date: 200505

Date Terminated: 201201

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: 199701

LUC Enforcement: 5 Year Reviews

Contaminants: METALS

Additional Information

All contaminated soil was excavated and removed from the water tower locations. The construction activities were documented by Fluor Daniel, Inc. in the "Final Lead Contaminated Soil and Debris Removal Action Evaluation" dated February 1998. The Tennessee Department of Environment and Conservation and EPA approved this report and indicated that no further action was necessary.

A LUC remained in place for annual inspections that were solely to check for soil erosion and proper surface drainage. In 1997, all areas had been backfilled and graded for drainage. In addition, drainage of surface water away from the water towers is a maintenance requirement mandated in State drinking water regulations. On 25 April 2005 Arcadis G&M Inc. petitioned the EPA to officially drop the requirement. EPA approved this request by letter on 31 May 2005. Documentation may be found in the MLAAP Administrative Record.

LUC Title: O-Line

Site(s): MAAP-014

ROD/DD Title: OLINE PONDS - GROUNDWATER

Location of LUC

The site is defined as OU1 and encompasses the groundwater in the area known as the former O-Line Ponds and the drainage ditches from this area.

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, Media specific restriction - restrict withdrawal or use of groundwater for agricultural/irrigation purposes, Media specific restriction - restrict withdrawal or use of groundwater w/out treatment

Types of Engineering Controls: Fences, Guards, Signs

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

Date in Place: 199209

Land Use Control (LUC) Summary

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: NITROAROMATICS

Additional Information

N/A

LUC Title: OU3 GW Restrictions

Site(s): MAAP-034

ROD/DD Title: Operable Unit 3 Northern Boundary GW

Location of LUC

The groundwater at the northern facility boundary is part of OU3, which consists of the northeast portion of the facility (the area of Route 54 and east of Line B). OU3 is composed of different areas and contaminant sources. The LUC is downgradient from the OU1 (groundwater immediately downgradient of the O-Line Ponds).

Land Use Restriction: Media specific restriction - prohibit use of groundwater for consumption or domestic purposes, Media specific restriction - restrict drinking water well installation, Media specific restriction - restrict withdrawal or use of groundwater for agricultural/irrigation purposes

Types of Engineering Controls: None

Types of Institutional Controls: Education programs, Restrictions on Groundwater Withdrawal

Date in Place: 199409

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: NITROAROMATICS

Additional Information

N/A

LUC Title: Operable Unit 2

Site(s): MAAP 014A

ROD/DD Title: ROD OPERABLE UNIT #2 - SOILS O-LINE

Location of LUC

OU2 addresses contaminated soils beneath and around the former ponds, and immediately downgradient from the former ponds, and surface water and shallow sediment in the drainage ditch that flows along the east and north sides of the ponds, which have become contaminated as a result of past disposal practices.

Land Use Restriction: Media specific restriction - prohibit use of groundwater for consumption or domestic purposes, Media specific restriction - restrict drinking water well installation, Media specific restriction - restrict withdrawal or use of groundwater for agricultural/irrigation purposes

Types of Engineering Controls: Fences, Guards, Signs

Land Use Control (LUC) Summary

Types of Institutional Controls: Dig Permits, 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: NITROAROMATICS

Additional Information

The following land used controls have been implemented at OU2.
1. Maintain the integrity of the cap.
2. Monitor the groundwater (performed under the Sitewide groundwater ROD)
3. Test groundwater from any new wells
4. Access restrictions/fence with signage along the LUC boundary
5. Prevent unauthorized disturbance of contaminated soil areas covered with engineered caps (Dig Restrictions)
6. Prevent residential use or other child-occupied facilities
7. Special inspections following severe weather events
8. Deed restrictions upon transfer of property

LUC Title: Restriction on GW OU4 R1

Site(s): MAAP-011

ROD/DD Title: OPERABLE UNIT 4, REGION 1 GROUNDWATER

Location of LUC

OU1 Region 1 is the contaminated groundwater emanating directly form the sumps and ditches within Line X. The contaminated groundwater within OU4 Region 1 has migrated laterally from the original source at Line X and presently extends 6,000 feet laterally within the city of Milan.

Land Use Restriction: 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: Education programs, Local Use ordinances, Notices (in the grantor/grantee index, newspapers, etc.), Restrictions on Groundwater Withdrawal

Date in Place: 200007

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: N/A

LUC Enforcement: 5 Year Reviews, Transferee Reporting

Contaminants: NITROAROMATICS

Additional Information

The following land used controls have been implemented as a result of the Site Wide Groundwater ROD signed in 2014.
1. Fencing, signage and security personnel at MLAAP entrances to prohibit unauthorized access to the facility.
2. Monthly Samples of Drinking Water Wells S-99 and T-99.
3. Restrictions on Groundwater Withdrawal on MLAAP

Land Use Control (LUC) Summary

4. Maintain the land lease prohibiting access, withdrawal, invasion, or use of groundwater on the University of Tennessee property along western boundary of MLAAP (252 acres).
5. Maintain the restrictive easement prohibiting access to or use of groundwater at the former Line G (10 acres).
6. Maintain the restrictive easement prohibiting access to or use of groundwater on the private property along the northern boundary of MLAAP (740 acres).
7. Maintain the consent order/restrictive easement prohibiting access to our use of groundwater on private property along the northwestern boundary area of MLAAP adjacent to Wolf Creek (45 acres).
8. Initiate a public awareness and education program related to the City of Milan Code of Ordinances related to restrictions on groundwater use within the City of Milan.
o Communication with City of Milan officials on an annual basis.
o Develop a process for reporting and documenting violations of the City¿s ordinances.
o Working with the City of Milan to distribute literature regarding the requirements and intent associated with the ordinance to Milan residents via mail, flyers, newspaper or other appropriate means.
o Issuance of an annual fact sheet regarding status of site-wide groundwater remedy progress, to be made available for Milan residences.
9. Continue an educational and outreach program with the City of Milan¿s government officials to ensure restrictions on groundwater use are being properly monitored and enforced.
10. Deed restrictions upon transfer of property.
11. Annual Site Inspection

LUC Title: Restriction on Soil

Site(s): MAAP-003A, MAAP-004A, MAAP-005A, MAAP-006A, MAAP-007A, MAAP-008A, MAAP-009A, MAAP-011A, MAAP-012A, MAAP-013A, MAAP-018A, MAAP-032A

ROD/DD Title: OPERABLE UNIT 3&4 NORTHERN INDUSTRIAL

Location of LUC

Explosive-contaminated soil within both OU 3 and OU 4 where OU 3 consists of the northeast sector of the facility and OU 4 consists of the northwest sector of the facility.

Land Use Restriction: Landfill restriction - Prohibit activities that would impact the LF cap (or cover system) and drainage system, Landfill restriction - Prohibit excavation on LF cap or cover system, Restrict land use - No daycare/hospital/school use, Restrict land use - No residential use

Types of Engineering Controls: Fences, Guards, Signs

Types of Institutional Controls: Dig Permits, Restrictions on Groundwater Withdrawal, Restrictions on land use, Restrictive covenants

Date in Place: 199509

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, Other

Contaminants: NITROAROMATICS

Additional Information

The following land use controls are applicable at site OU3/4 Industrial Area soils.
1. Access restrictions by guards at MLAAP and fencing at line/area.
2. Prevent unauthorized disturbance of contaminated soil areas covered with engineered caps (Dig Restrictions)
3. Maintain the integrity of the caps
4. Maintain contours and drainage of the cap and surrounding area.
5. Deed restrictions upon transfer of property

Land Use Control (LUC) Summary

LUC Title: Restrictive Groundwater

Site(s): MAAP-011

ROD/DD Title: CITY OF MILAN WATER SYSTEM REPLACEMENT

Location of LUC

Water located in the city of Milan migrating in a north/northwesterly direction has been determined to contain explosive contamination.

Land Use Restriction: 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: Local Use ordinances, Restrictions on Groundwater Withdrawal, Restrictive covenants

Date in Place: 199705

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: Installation

Record of LUC: Master Plan or Equivalent

Documentation Date: 200204

LUC Enforcement: 5 Year Reviews

Contaminants: NITROAROMATICS

Additional Information

N/A

Cleanup Program Summary

Installation Historic Activity

Of the 14 process areas active by the end of World War II (WWII), only five lines (A, B, D, O, and V) are maintained by the installation today. In 2002, MLAAP signed a 10-year lease with Flight Refueling and Countermeasures Incorporated (FRC) to use inactive lines E and Z. FRC manufactures flares and associated components for the Department of Defense (DoD) and began production in June 2004. FRC was sold in 2005, but continues to operate under the name ARMTEC Countermeasures (Esterline)

In the past, contamination to soil and groundwater was due to the demolition and disposal of explosive wastes and from various production activities in the lines where wastewater was discharged to open ditches that drained from sumps or impoundments into both intermittent and perennial streams and rivers. In the 1980s, MLAAP began treating all explosive contaminated in Pink Water Treatment Systems. The wastewater is processed by activated carbon adsorption systems. Wastewater from these treatment plants is now sent to the IWTFs slow rate spray irrigation system where land application and direct discharge through an ultraviolet discharge system is handled under the authority of a National Pollutant Discharge Elimination System (NPDES) permit.

MLAAP is a government-owned, contractor-operated facility that historically has had a primary mission of LAP, shipping, and demilitarizing ammunition items for the DoD. Administrative support, storage and disposal facilities, as well as active and inactive production facilities, are dispersed among wooded areas and cultivated fields. In January 1941 construction of the installation began and was completed in January 1942. The original land was 28,521.4 acres. Five-hundred and forty-eight acres enclose the various production lines and the storage areas total 7,930 acres. Other acreage is necessary to allow safe distances between explosive areas. In 1946 Line G, containing approximately 42 acres, was sold to the US Rubber Company. Other tracts have been sold, some have been deeded to the city of Milan and the University of Tennessee, and some leased and/or transferred to the National Guard Bureau. The installation now consists of 22,357 acres.

The MLAAP is a National Priorities List (NPL) site jointly regulated by USEPA Region 4 and TDEC. An interagency agreement, also referred to as the federal facility agreement, was signed by the US Army, USEPA, and TDEC, and went into effect in 1989. The regulatory requirements for restoration at MLAAP are derived from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requirements.

Installation Program Cleanup Progress

IRP

Prior Year Progress: Groundwater extraction system optimization will be performed annually.

The draft final remedial action report for site-wide groundwater was submitted in June 2014 and is under review in 2015.

Groundwater monitoring well abandonment of approximately 162 monitoring wells was completed.

A site-wide land use control implementation plan (LUCIP) was compiled.

The fourth five-year review of the operable units (OU) was completed on schedule.

Future Plan of Action: Optimization of groundwater extraction systems will be performed annually. Phase II installation of additional extraction wells may be required based upon groundwater model results from fiscal year (FY)15.

Long-term management (LTM) of sites OU2, OU3, OU4, and OU5 will continue in accordance with the LUCIPs.

MMRP

Prior Year Progress: Land use controls (LUC) have been implemented at the Open Burning Ground (OBG) Military Munitions Response Program (MMRP) site during 2015.

Future Plan of Action: Continue to implement LUCs including an educational program, quarterly site inspections (SI), maintenance, and reporting.

Cleanup Program Summary

CR

Prior Year Progress: A work plan was completed for the investigation of the Area J former tank farm site.

Future Plan of Action: Risk at the site will be assessed and the site will be closed by reclassifying the groundwater under state regulations.

MILAN ARMY AMMUNITION PLANT

Army Defense Environmental Restoration Program
Installation Restoration Program

IRP Summary

Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count: 40/34

Installation Site Types with Future and/or Underway Phases

1 Drainage Ditch
(MAAP-034)
1 Explosive Ordnance Disposal Area
(MAAP-017A)
3 Industrial Discharge
(MAAP-003, MAAP-003A, MAAP-011)
1 Surface Impoundment/Lagoon
(MAAP 014A)

Most Widespread Contaminants of Concern

Asbestos, Explosives, Metals, Munitions and explosives of concern (MEC)

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
MAAP-014	O LINE LAGOON GROUNDWATER (SWMU 10)	FRA	GROUND WATER TREATMENT	1996
MAAP 014A	OU2 O-LINE LAGOON (SOILS) SWMU 10	FRA	CAPPING	1997
MAAP-036	LEAD CONTAMINATION @ WATER TOWERS	FRA	DRAINAGE CONTROLS	1997
MAAP-034	Northern Boundary Area OU1 & OU3	IRA	GROUND WATER TREATMENT	1998
MAAP-036	LEAD CONTAMINATION @ WATER TOWERS	FRA	WASTE REMOVAL - SOILS	1998
MAAP-003A	NI Soils OU (Areas North of Rt. 54)	FRA	BIOREMEDIATION	1999
MAAP-004A	LINE B (BIOREMEDIATION)	FRA	BIOREMEDIATION	1999
MAAP-005A	LINE C (BIOREMEDIATION)	FRA	BIOREMEDIATION	1999
MAAP-006A	LINE D (BIOREMEDIATION)	FRA	BIOREMEDIATION	1999
MAAP-007A	LINE E (BIOREMEDIATION)	FRA	BIOREMEDIATION	1999
MAAP-008A	LINE F (BIOREMEDIATION)	FRA	BIOREMEDIATION	1999
MAAP-009A	LINE H (BIOREMEDIATION)	FRA	BIOREMEDIATION	1999
MAAP-011A	LINE X (BIOREMEDIATION)	FRA	BIOREMEDIATION	1999
MAAP-012A	LINE Z (BIOREMEDIATION)	FRA	BIOREMEDIATION	1999
MAAP-013A	LINE O (BIOREMEDIATION)	FRA	BIOREMEDIATION	1999
MAAP-018A	CLOSED LANDFILL (BIOREMEDIATION)	FRA	BIOREMEDIATION	1999
MAAP-032A	CONSTRUCTION DISPOSAL SITE	FRA	BIOREMEDIATION	1999
MAAP-011	OU4 Western Plume Area Groundwater	FRA	GROUND WATER TREATMENT	2002
PBC at Milan	PBC at Milan	FRA	OTHER	2007
MAAP-003A	NI Soils OU (Areas North of Rt. 54)	FRA	CAPPING	2009
MAAP-017A	OPEN BURNING GROUND OU5 (REMOVAL)	FRA	CAPPING	2011
MAAP-003	Sitewide Goundwater (All Plumes)	FRA	NATURAL ATTENUATION	2014

IRP Summary

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

Site ID	Site Name	Action	Remedy	FY
MAAP-011	OU4 Western Plume Area Groundwater	FRA	GROUND WATER TREATMENT	2014
MAAP-034	Northern Boundary Area OU1 & OU3	IRA	GROUND WATER TREATMENT	2014
MAAP-034	Northern Boundary Area OU1 & OU3	FRA	GROUND WATER TREATMENT	2014

Duration of IRP

Date of IRP Inception: 197803

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201407/207407

Date of IRP completion including Long Term Management (LTM): 207407

IRP Contamination Assessment

Contamination Assessment Overview

Due to past practices at MLAAP, explosives [mainly 2,4,6-trinitrotoluene (TNT) and cyclotrimethylenetrinitramine (RDX)] have been identified as contaminants of concern (COC) in the soil and in the groundwater on-post, with impact to off-post groundwater. The off-post groundwater contamination was significant enough for the Army to finance the construction of a new drinking water system and well field for the city of Milan. There is significant soil contamination in the industrial areas of the post that has led to significant volumes of groundwater contamination. Three groundwater treatment systems (GWTS) and remedies were placed in operation to address this contamination. Cleanup priorities are to remove/remediate source area soils and then remediate off-post groundwater contamination.

In 1989, the US Army initiated a remedial investigation (RI) program with the goal of identifying, evaluating, selecting, and implementing permanent remedies for the entire installation. Initially, the focus of response activities was on those sites perceived to have the greatest potential for causing off-site contamination. The interim RI, completed in December 1991, identified the O-Line Ponds study area as a continuing source of contamination, with sufficient data to plan a feasibility study (FS) focusing on groundwater contamination. For the other major study areas, the interim RI identified the presence of potentially unacceptable contaminant migration, but additional source strength, contaminant transport, and fate data are required before feasible remedial alternatives can be considered.

All investigations and RAs at MLAAP will be conducted in accordance with the 1989 Federal Facility Agreement between the US Army, the USEPA, and the state of Tennessee. Under this agreement, remedial response actions for past disposal areas and solid waste management units (SWMU) will be determined in accordance with the provisions of the CERCLA, Resource Conservation and Recovery Act (RCRA) Section 3004 (u) and (v), the permit for MLAAP, and guidance contained in the NCP.

The IAP addresses the NPL site which includes all areas inside the installation boundary and all other areas off-post known to have contamination originating from the sites at MLAAP. Data shows that groundwater contamination originates from numerous source areas. In January 1994 levels of RDX above acceptable risk levels were detected in drinking water wells within the city of Milan and monitoring wells off-post to the west and north of the installation in four locations. Two of the locations are within the city of Milan and two of the locations are in farmland. Seventeen source areas that contribute to groundwater contamination plumes are under investigation. The plume velocities vary, but the direction is primarily north toward the Rutherford Fork of the Obion River and from the northwest boundary toward the city of Milan.

The installation restoration strategy is to separate the installation into the following OUs and/or major study areas:
- OU 1: The groundwater plume emanating from O-Line to the east of Ditch B.
- OU 2: The O-Line ponds soils, sediments, and surface water.
- OU 3: The remaining sources and groundwater contamination within the O-Line ponds basin that is not included as part of the OU1 and OU2 units. The east/west direction of OU3 extends from Line C to Line B in the south, and includes all areas between Line E and Line K in the north. Concerns include explosives sources and groundwater contamination associated with these sources.

- OU 4: (Also referred to as the Northern Study Areas) - This unit encompasses all aspects of groundwater contamination arising from residues due to past discharges emanating from LAP lines A, F, G, V, X, and Z, ditches 1, 2, D, E, and F, and Wolf Creek. These discharges have migrated west and northwest into the city of Milan. This unit is comprised of two regions. Region 1 comprises A, X, and V Lines, and the northern plume.

Cleanup Exit Strategy

An RA completion report was completed for OU3 and OU4. It memorialized all approved closure reports for each industrial site remediated under this OU3/OU4 soils record of decision (ROD). LUCs were established with mandated quarterly inspections to prevent exposures.

A site-wide groundwater ROD was established that allows a combination of active treatment with passive treatment [monitored natural attenuation (MNA)] to meet the Installation Restoration Program's (IRP) cleanup goals. Active treatment will be phased out as groundwater meets the remedial action objectives. Site-wide LUCs will be developed as a part of all final remedial measures.

IRP Previous Studies

	Title	Author	Date
1978			
	Installation Assessment of Milan AAP, PM for Chemical Demil and Installation Restoration	Department of the Army	JUN-1978
1981			
	MLAAP Contamination Survey	Envirodyne Engineers Inc	SEP-1981
1983			
	Environmental Survey of MLAAP	Roy F. Weston, Inc.	SEP-1983
1986			
	MLAAP RCRA Facility Assessment Report prepared for USEPA Region IV	A.T. Kearney, Inc.	AUG-1986
1988			
	Groundwater Contamination Survey Number 38-26-0881-88 Evaluation of SWMUs at MLAAP	Army Environmental Hygiene Agency	FEB-1988
1991			
	RI Report of MLAAP	ICF Technology, Inc.	DEC-1991
1992			
	Focused FS for OU 1 Groundwater Treatment Alternatives	ICF Technology Incorporated	JUN-1992
1993			
	Treatability Study, Report for Groundwater Treatment Alternatives	ICF Technology, Inc.	MAR-1993
	Focused FS for OU 2	ICF Technology, Inc.	JUN-1993
	MLAAP RI Follow-on Northern Study Area Effluent Drainage Ditches Site Characterization Report	Environmental Resources Management, Inc.	JUL-1993
	Public Health Assessment for MLAAP	Agency for Toxic Substances and Disease Registry	SEP-1993
	Well Field Study-Preliminary Site Analysis	Smith Seckman Reid, Inc.	DEC-1993
1994			
	MLAAP Northern Boundary Groundwater Focused FS	ICF Technology, Inc.	JUN-1994
	MLAAP preliminary Screening of Alternatives Report	Environmental Resources Management, Inc.	JUN-1994
1995			
	FFS for Northern Industrial Area Soils	ICF Technologies, Inc.	APR-1995
	MLAAP Focused FS for the Northern Industrial Area Soil	ICF Technologies, Inc.	APR-1995
	Excavation and Removal of Lead Contaminated Soil and Debris from Around Five Elevated Water Towers	MMOS	MAY-1995
	Focused FS Area Region 1 Groundwater Report	Environmental Resources Management, Inc.	MAY-1995
	Focused FS OU4 Northern Study Area Region 1 Groundwater	Environmental Resources Management, Inc.	MAY-1995
	RI of OU4 Northern Study Area	Environmental Resources Management, Inc.	AUG-1995
1996			
	RI Report Southern Study Area (OU 5)	Fluor Daniel	MAY-1996
1997			

IRP Previous Studies

	Title	Author	Date
1997			
	Lead Contaminated Soil and Debris Removal Action Evaluation MLAAP Water Towers CERCLA Time Critical Removal Action	Fluor Daniel	JAN-1997
	MLAAP Overall Groundwater Study	ICF Technologies, Inc.	APR-1997
	Final Post-Closure Care Plan OU-2 Cap Extension and O-Line Cap	USAEC	JUL-1997
	Final Residential Well Survey Report	QST	SEP-1997
	Final Proposed Plan (Salvage Yard, Former Burnout Area, and Sanitary Land Fill)	ICF Technologies, Inc.	NOV-1997
1998			
	Investigation and Engineering Analysis for RAs at the MLAAP OBG	Schuh & Jernigan, Inc.	JAN-1998
	Lead (Pb) Contaminated Soil and Debris Removal Action Evaluation	Fluor Daniel	FEB-1998
	Performance Evaluation of OU I Groundwater Treatment Plant	Fluor Daniel	JUL-1998
	Final Soils RI OU3 and OU4 Non Industrial Areas	QST	AUG-1998
	Reinjection System Alternatives Evaluation and Pre-Design Report	ICF Technologies, Inc.	NOV-1998
	Offsite Groundwater RI Report	QST	NOV-1998
	Evaluation of Human and Ecological Food Web Exposure Pathways Associated with Soil Contamination for Non Industrial Soil Areas of OU3 and OU4	QST	DEC-1998
1999			
	Final RI Report, Southern Study Area (OU 5), OU 4 Region 1	Fluor Daniel	FEB-1999
	IRA Report	Integrated Technologies, Inc.	FEB-1999
	Final Offsite Groundwater RI	QST	MAY-1999
	Proposed Plan for Treated Water Disposal OU 4 Region 1	Integrated Technologies, Inc.	JUL-1999
	Phase I Phytoremediation Treatability Study Report at MLAAP	ESE	OCT-1999
	Report on Line X Groundwater Investigation	ICF Technologies, Inc.	OCT-1999
2000			
	FS for OU5 Southern Study Report at MLAAP	ESE	JAN-2000
	Phytoremediation Treatability Study Report at MLAAP	ESE	MAR-2000
	FS for the Ditch E/Wolf Creek Groundwater Plume MLAAP	ESE	MAY-2000
	MLAAP OU-3 Northern boundary Capture Zone Analysis Report,	Integrated Technologies, Inc.	JUN-2000
	Final Record of Decision for OU-4 Region 1	Integrated Technologies, Inc.	JUL-2000
	MLAAP Overall Groundwater Study, RI	Integrated Technologies	AUG-2000
	Final Phase I/II Phytoremediation Treatability Study Report	PLEXUS	SEP-2000
	Final Five-year Review for MLAAP	ESE	OCT-2000

IRP Previous Studies

	Title	Author	Date
2000			
	Final Phase I/II Phytoremediation Treatability Study Report	ESE	OCT-2000
	Final Proposed Plan for OU3/4 Non-Industrial Area Soils	ESE	OCT-2000
	Final Pilot-Study Report for In situ Chemical Oxidation of Ditch E/Wolf Creek Shallow Groundwater at MLAAP	ESE	NOV-2000
	Final RI Report for Overall Groundwater Study at MLAAP	Integrated Technologies, Inc.	DEC-2000
2001			
	OU-4 Region 1 Explanation of Significant Differences (ESD) for Surface Discharges of Treated Water	Integrated Technologies, Inc.	MAY-2001
	Final FS for OU5 Southern Study Area	ESE	JUN-2001
	MLAAP Overall Groundwater Study FS Rpt for Area M Groundwater	Integrated Technologies, Inc.	JUN-2001
	Final ESD for OU1 at MLAAP	ESE	JUN-2001
	Final Proposed Plan MLAAP OU5 Southern Study Area	ESE	JUL-2001
	Final Proposed Plan for Milan AAP OU-4 Regions 2 and 3 Ditch E Wolf Creek	ESE	NOV-2001
	Groundwater Extraction Treatment Effectiveness Review	PLEXUS	NOV-2001
2002			
	MLAAP OU3, Northern Boundary, Screening-Level Ecological Risk Assessment	Integrated Technologies, Inc.	JUN-2002
	MLAAP Overall Groundwater Study FS Report	Integrated Technologies, Inc.	AUG-2002
	MLAAP OU3, Southern Boundary Report of Findings for Investigations South of Obion River OU-3	Integrated Technologies, Inc.	SEP-2002
	Line E Closure Report		OCT-2002
	MLAAP Overall Groundwater Study FS Report	Integrated Technologies, Inc.	NOV-2002
	MLAAP OU1 Capture Zone Analysis for December 2000 Data	HSI GeoTrans	DEC-2002
	MLAAP OU1 Capture Zone Analysis for December 2001 Data	HSI GeoTrans	DEC-2002
	MLAAP OU-3 Capture Zone Analysis for December 2001 Data	HSI GeoTrans	DEC-2002
2003			
	Final Report Time Critical Removal Action and Environmental Assessment for Y-103 Railroad Classification Yard, Petroleum-Contaminated Soils Site	AO	JAN-2003
	Line Z Closure Report	AO	APR-2003
	Milan AAP Overall Groundwater Study Area Proposed Plan	Integrated Technologies, Inc.	MAY-2003
	MLAAP OU 4 Region 1 SI for Plume Delineation Final Document	SAIC	OCT-2003
	MAAP SI Report for Shallow Groundwater Plume Delineation for OU Four Regions 2 and 3	CH2Mhill	OCT-2003
	MLAAP OU4 Capture Zone Analysis for December 2002 Data	HSI GeoTrans	DEC-2003
2004			

IRP Previous Studies

	Title	Author	Date
2004			
	SI Report for OU 4, Area M Plume Definition, Phase I , Data	SAIC	MAR-2004
	Completion Report for Explosive Contaminated Soil, Industrial, Load, Assembly, Pack at Line H for MLAAP	AO	APR-2004
	Phase I of the Line B Plume Characterization	CH2Mhill	APR-2004
	Vadoze Zone Investigation of Industrialized Areas of OUs 3 and 4 Final Report Data	CH2Mhill	MAY-2004
	OU4 Region 2 Investigation and Phase I Plume Characterization and OU1 Additional Groundwater Monitoring Wells Revised Final Report	CH2Mhill	JUL-2004
	SI Report for Line A Plume Characterization at the MLAAP	SAIC	SEP-2004
	Work Plan for the OU4, Region I Phase II SI For Line X Plume Characterization at MLAAP	SAIC	SEP-2004
	SI for Area M Plume Characterization, Phase I	SAIC	SEP-2004
	SI Report for Shallow Groundwater Plume Delineation OU 4	SAIC	OCT-2004
	OU5 Final Pilot Scale Test Work Plan	ARCADIS	NOV-2004
2005			
	OU-2 Technical Memorandum - Amendment to Post-Closure Care Plan	ARCADIS	JAN-2005
	Risk Assessment Technical Memorandum	ARCADIS	FEB-2005
	Surface Water and Sediment Sampling Work Plan	ARCADIS	FEB-2005
	Line V Closure Report	ARCADIS	APR-2005
	Site-Wide Soils Characterization Work Plan	ARCADIS	APR-2005
	Line K Closure Report	ARCADIS	APR-2005
	Technical Memorandum - OU-3 and 4 Northern Industrial Soils - Alternate Capping Methods	ARCADIS	APR-2005
	Technical Memorandum - Removal of Water Towers from OU-5	ARCADIS	APR-2005
	Technical Memorandum - OU-3 and 4, Amendment to Composting Curing Period and Analytical Requirements	ARCADIS	JUL-2005
	Technical Memorandum - CSM Support Additional Investigation Work Plan	ARCADIS	AUG-2005
	Revised Interim Site-wide Groundwater Monitoring Work plan	ARCADIS	NOV-2005
	Draft SI Report For Line X Plume	SAIC	DEC-2005
2006			
	Final Groundwater Flow Model Report	ARCADIS	JAN-2006
	Site-wide Groundwater Feasibility Study	ARCADIS	MAR-2006
	Former Borrow Pit Closure Report	ARCADIS	MAY-2006
2007			
	Line O Closure Report	ARCADIS	MAY-2007
	Area J Closure Report	ARCADIS	MAY-2007

IRP Previous Studies

	Title	Author	Date
2007			
	Draft Final Site-wide Groundwater Feasibility Study	ARCADIS	DEC-2007
2008			
	Line X Closure Report	ARCADIS	FEB-2008
	Line D Closure Report	ARCADIS	FEB-2008
	Dispute Resolution Agreement	Between Army, USEPA, and TDEC	DEC-2008
2009			
	Final Remedial Action Completion Report Operable Units 3 and 4	ARCADIS	AUG-2009
	Long-term Groundwater Monitoring Program Work plan	ARCADIS	SEP-2009
2010			
	Feasibility Study Addendum and Supplemental Remedial Investigation Report OU5 Soils	ARCADIS	MAR-2010
	2009 Dispute Resolution Agreement Annual Progress Report	ARCADIS	MAR-2010
	Technical Memo Concerning Shutdown of Eastern Extraction Wells	ARCADIS	JUL-2010
	Optimization of OU1/OU3 Groundwater Remedial Action Systems - Eastern Extraction Wells	ARCADIS	JUL-2010
	Proposed Plan (Final) Operable Unit 5 Open Burning Ground Soils	ARCADIS	DEC-2010
	Interim Remedial Action Completion Report (Final)	ARCADIS	DEC-2010
2011			
	Remedial Action Work Plan (FINAL), OU5 Open Burning Ground Soils	ARCADIS	MAY-2011
	Final Supplemental Site Characterization Work plan, Revision 1	ARCADIS	DEC-2011
2012			
	Record of Decision (OU5)	Arcadis	APR-2012
	Remedial Action Completion Report (OU5)	Arcadis	OCT-2012
2013			
	Sitewide Groundwater Feasibility Study (Final)	Arcadis	SEP-2013
	Proposed Plan for Sitewide Groundwater (Final)	Arcadis	DEC-2013
2014			
	Final Remedial Action Workplan and Land Use Control Implementation Plan, Sitewide Groundwater	Arcadis	APR-2014
	Final Remedial Action Workplan, Sitewide Groundwater	Arcadis	MAY-2014
	Final Sitewide Groundwater Record of Decision	Arcadis	JUL-2014

MILAN ARMY AMMUNITION PLANT

Installation Restoration Program

Site Descriptions

Site ID: MAAP 014A
Site Name: OU2 O-LINE LAGOON (SOILS) SWMU 10

STATUS

Regulatory Driver: CERCLA

RRSE: HIGH

Contaminants of Concern: Explosives, Munitions and explosives of concern (MEC)

Media of Concern: Sediment, Soil, Surface Water

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	199306
RD	199311	199407
RA(C)	199502	199707
LTM	199710	204509

RIP Date: N/A

RC Date: 199707

SITE DESCRIPTION

The O-Line area at MLAAP was built in 1941 as part of the initial plant construction activity. It has operated since 1942 as an ordnance demilitarization facility. The types of explosives handled in the facility included TNT and RDX. From the start, the major function of the line has been to remove explosives from bombs and projectiles by injecting a high-pressure stream of hot water and steam into the shells.

From about 1942 until 1978 wastewater contaminated with explosives was discharged from the O-Line washout operations through a series of baffled concrete sumps where cooling caused significant amounts of explosives to precipitate out of the waste stream. The collected explosives were periodically removed from the sumps and burned at the burning ground. The wastewater then ran through a series of 11 ponds prior to being discharged to a drainage ditch.

In 1984, with the concurrence of the Tennessee Department of Public Health and USEPA, the O-Line ponds were closed by in-place containment. Containment was accomplished using a clay cap with overlying layers of gravel and soil with grass cover. The containment was carried out pursuant to RCRA closure requirements [(40 Code of Federal Regulations [CFR] part 265)].

In May 1984, because of the level of contamination in the groundwater from the O-Line ponds, the installation was proposed for listing on the NPL. Final listing of the installation on the NPL became effective on Aug. 21, 1987.

This is the most contaminated site on MLAAP. The O-Line ponds have been separated into three OUs (OU1, OU2, and OU3) in order to facilitate the response action at the site. These OUs are made up of AEDB-R sites MAAP-014 and MAAP-014A.

The site contains MAAP-014A. Unit 014A consists of contaminated soil beneath and around the former 11 ponds and surface water and shallow sediments in the drainage ditch that flows along the east and north sides of the ponds. Through sampling and consideration of former site activities, the area of OU2 has been defined as consisting of the area that has been impacted by use and/or closure of the former ponds at O-Line. The boundary of this area has been identified as the fence that encircles the capped area, exclusive of the area south of the access road to the O-Line IWTF. The area of OU2 is approximately 582,000 square feet (ft). The tributary of the drainage ditch (ditch 5) that flows along the east and north sides of the O-Line cap received pond effluent while the ponds were in use and currently receives treated water from the O-Line IWTF. This tributary is included.

Levels of explosives exceeding the risk to groundwater action levels derived by modeling the contaminant concentrations in the vadose zone indicated the need for an action in the area surrounding the current ponds. The selected alternative was to extend the existing cap to include these surrounding soils and provide for LTM of the cap. In September 1993 the ROD was signed and the design was completed in the third quarter of FY94. The construction contract was awarded in the fourth quarter of FY94. Construction was completed using a geosynthetic liner design.

LTM is required at this site.

Site ID: MAAP 014A
Site Name: OU2 O-LINE LAGOON (SOILS) SWMU 10

CLEANUP/EXIT STRATEGY

These sites will be semiannually, reported on annually, and repairs made to address any erosion problems which develop. Periodic maintenance will be performed as required.

The exit strategy for OU2 soils would include removal of the geosynthetic clay liner and removal of all contaminated soils from the OU2 capped area and any soils beneath the capped areas that would potentially cause an impact to groundwater (via leaching) above the USEPA acceptable risk range for exposure to potential future residents. The excavated material could potentially be composted or taken off-site or disposal at an approved facility. This approach would require either an explanation of significant differences (ESD) or ROD amendment.

Site ID: MAAP-003
Site Name: Sitewide Goundwater (All Plumes)

STATUS

Regulatory Driver: CERCLA

RRSE: HIGH

Contaminants of Concern: Explosives

Media of Concern: Groundwater

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	201403
RD	201403	201404
RA(C)	201401	201405
RA(O)	201407	207407

RIP Date: 201407

RC Date: 207407

SITE DESCRIPTION

The site-wide groundwater restoration strategy has historically been grouped into three separate and distinct groundwater plume areas. They are the northern boundary area, western boundary area and the central plume area.

One of these areas, identified as the central plume area, consists of groundwater in the vicinity of MAAP-003 (Line A), MAAP-004 (Line B), MAAP-005 (Line C), MAAP-006 (Line D), MAAP-017 (OBG) and MAAP-035 (Area M/Drainage Ditches). Past activities at these sites included renovating artillery, mortar rounds and rocket components, loading mortar rounds and rockets and disassembling and assembling howitzer shells, as well as the destruction and disposal of munitions. Past practices at these areas have apparently caused groundwater contamination resulting in the central plume area.

The northern boundary area is comprised of MAAP-014 (OU1), MAAP-034 (OU3), MAAP-010 (Line K), and MAAP-013 (Line O). These units consist of explosive-contaminated groundwater located directly under and immediately downgradient of the O-Line Ponds. This plume has migrated off the northern boundary of MLAAP.

The western boundary area (OU4) of site-wide groundwater consists of groundwater emanating from MAAP-011 (Line X). The groundwater plume has migrated off the western and northwestern boundary of MLAAP.

Other response complete (RC) sites associated with the central plume are MAAP-007 (Line E), MAAP-008 (Line F), MAAP-009 (Line H) and MAAP-012 (Line Z).

All groundwater sites both on-post and those that have migrated off-post have been grouped together into one site-wide groundwater remedy composed of active remediation (pump & treat) and MNA. The ROD was signed in July 2014 by the Army, USEPA and the state. Post-ROD actions and costs have been identified and are associated with long-term monitoring until 2074.

Support from the MLAAP installation base contract is provided for remedial action-operations [RA(O)] support. In addition, US Army Corps of Engineers support is utilized for review of technical documents and the US Army Corps of Engineers Real Estate Division is responsible for maintaining leases for monitoring wells and extraction system components that are located outside the boundary of MLAAP and on private property.

The remedy for site-wide groundwater includes a combination of groundwater extraction and treatment, MNA, and LUCs. The remedy includes a period of combined extraction and treatment with MNA in current areas of low concentrations, followed by a period of MNA once all extraction and treatment systems are shut down. The extraction and treatment systems in each plume area will be continually optimized to provide efficient COC mass reduction and/or hydraulic control, to maximize the use of the existing treatment plants at OU3 and OU4, and to shorten the overall life cycle of active remediation.

Site ID: MAAP-003
Site Name: Sitewide Goundwater (All Plumes)

Optimization activities will be triggered by a remedy management framework (including a prioritization process and a decision tree process) developed to evaluate remedy performance and guide optimization decisions.

The remedial action objectives developed for the site-wide groundwater remedy include restoring groundwater to cleanup levels (i.e., beneficial use), preventing and/or minimizing future migration of plumes, protecting receptors from exposure to groundwater containing COCs at concentrations above acceptable risk-based cleanup levels, and protection of surface water.

The LUC objectives for site-wide groundwater are to prevent access or use of the groundwater until cleanup levels are achieved and to maintain the integrity of the remedy (including existing or future monitoring wells and remediation systems). The LUC implementation actions include groundwater use controls, fencing, signage, monitoring, and public education and outreach programs. SIs and verification of recorded notices will be completed annually.

CLEANUP/EXIT STRATEGY

In accordance with the 2014 LUCIP, the LUCs are expected to remain in place until the concentration of hazardous substances in the groundwater has been reduced to levels that allow for unlimited exposure and unrestricted use (i.e., restoration of groundwater to beneficial use).

The remedy management framework was developed to provide optimization recommendations throughout the duration of the remedy and therefore include exit strategy end points such as shutting down extraction wells, transitioning to MNA-only, and finally removing monitoring wells from the long-term monitoring program. Implementation of the remedy is estimated to take 60 years to achieve cleanup levels (i.e., achieve beneficial use). During this time, cleanup levels may be achieved within each plume in a shorter time frame.

Site ID: MAAP-003A
Site Name: NI Soils OU (Areas North of Rt. 54)

STATUS

Regulatory Driver: CERCLA

RRSE: MEDIUM

Contaminants of Concern: Explosives, Metals

Media of Concern: Soil

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	199504
RD	199610	199801
RA(C)	199804	200909
RA(O)	199505	200909
LTM	200909	204409

RIP Date: 200909

RC Date: 200909

SITE DESCRIPTION

In the past, explosive wastewater from various production activities was discharged into open ditches, resulting in the contamination of surface and subsurface soils. Sites 003A, 004A, 005A, 006A, 011A, 013A, 018A and 032A have been consolidated into MAAP-003A as part of the northern industrial soils OU.

The remedy addressed the explosives contaminated soil within both OU3 and OU4. OU3 consists of the northeast sector of the facility and OU4 the northwest sector of the facility. The Northern Industrial (NI) area consists of all areas north of Route 54 in which industrial operations have been performed. These include LAP lines, storage areas, maintenance/fabrication areas and disposal areas.

A remedial action completion report has been generated that memorializes all activities associated with the final RA. Because of structural integrity issues with adjacent structures which preclude removal of explosive-contaminated soils, 48 caps have been installed. LTM of the caps is required.

Upon approval of a decommissioning plan by the USEPA and TDEC, the bioremediation facility was subsequently decommissioned during January through March 2009. On Aug. 29, 2009, the TDEC Division of Solid Waste Management conducted a final closure inspection of the compost facility. The facility was subsequently certified closed by the TDEC in accordance with the "Rules Governing Solid Waste Processing and Disposal in Tennessee."

CLEANUP/EXIT STRATEGY

The exit strategy for OU3/4 soils would include removal of all soils under the 48 caps that are above ROD cleanup levels. These cleanup levels are based on the potential contamination of groundwater and its ingestion by potential future residents. The strategy would involve excavation of all soil beneath the engineered caps that remains above the ROD cleanup levels and possibly soils beneath the existing production lines following demolition. The soil may be treated on-site via bioremediation techniques (windrow composting) similar to the process utilized for all soils excavated and removed per the OU3/4 ROD and used as excavation backfill or demolition cover or disposed of in an approved solid waste landfill. Alternatively, the excavated soil could be taken off-site for disposal at an approved facility; however, this would likely require an ESD or ROD Amendment.

Regarding the Closed Sanitary Landfill, similar to the OU2 pond areas, all waste material and contaminated soil material at and around the landfill trench areas would need to be excavated and disposed at an approved solid waste disposal facility.

In accordance with the 2009 LUCIP, the LUCs associated with the OU3/4 remedy can only be discontinued once concentration of hazardous substances in the soil are at such levels to allow for unrestricted use.

Site ID: MAAP-011
Site Name: OU4 Western Plume Area Groundwater

STATUS

Regulatory Driver: CERCLA

RRSE: HIGH

Contaminants of Concern: Explosives

Media of Concern: Groundwater

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	201310
RD	200109	201402
RA(C)	200010	201406
RA(O)	200509	204207

RIP Date: 201406

RC Date: 204207

SITE DESCRIPTION

The site-wide groundwater restoration strategy has been grouped into three separate and distinct groundwater plume areas. One of these areas, identified as the western plume area or OU4, consists of MAAP-011 (Line X). Past activities associated with these production areas included renovating artillery, mortar rounds and rocket components, locating mortar rounds and rockets, and disassembling and assembling howitzer shells. Past practices have apparently resulted in explosive-contaminated groundwater. Two separate groundwater plumes in these areas were identified in previous studies as Region 1 and Region 2 plumes. Portions of these plumes have migrated off-post resulting in the shutdown of the city of Milan's drinking water system. In the mid-1990s the Army provided funds to the city of Milan to construct an alternative drinking water source upgradient of the contamination, thereby eliminating the city's exposure to contaminated groundwater.

In July 2002 a groundwater treatment plant (GWTP) was put into operation which used eight extraction wells with four of the wells located outside the boundaries of MLAAP. Because this system did not effectively capture the leading edge of the plume, an off-post site characterization study was conducted. The study was finalized in December 2005 to further refine the extent of the plume's leading edge and further evaluate the need for additional extraction well placements for capture of the (OU4) Region 1 plume.

An additional area of groundwater contamination at the western boundary area (OU4) is Region 2. This is a region of groundwater that has considerably lower contamination levels than Region 1 groundwater. In 2000 a pilot study using an in situ method (Fenton's Reagent) was completed to determine if such treatment would reduce contaminant levels such that potential exposures beyond city limits would be below acceptable risk levels. The Region 2 site is identified as an MNA site; however, groundwater treatment is a possibility.

Three additional wells were installed and became operational at the end of December 2008. In 2014 another two extraction wells were installed and piped into the groundwater collection system.

The site-wide groundwater FS (final) signed in September 2013 provides a flexible management approach to determine whether groundwater treatment is needed in addition to MNA. In accordance with the proposed plan, all groundwater sites have been rolled into one site-wide groundwater ROD. The ROD was signed in July 2014.

Because all groundwater plumes on MLAAP are being included in one site-wide remedy, management of the sites associated with the site-wide groundwater and monitoring have been transitioned to site MAAP-003. Site MAAP-011 now includes only the costs for the operation of the OU4 GWTP and extraction systems and demolition of the OU4 GWTP at the end of its useful life. This site is included in the PBA at Milan.

Site ID: MAAP-011
Site Name: OU4 Western Plume Area Groundwater

CLEANUP/EXIT STRATEGY

Once concentrations of contaminants in groundwater are low enough to meet ROD criteria, the GWTP and associated extraction systems will be decontaminated and shut down.

Site ID: MAAP-017A
Site Name: OPEN BURNING GROUND OU5 (REMOVAL)

STATUS

Regulatory Driver: CERCLA

RRSE: MEDIUM

Contaminants of Concern: Asbestos, Explosives, Munitions and explosives of concern (MEC)

Media of Concern: Soil

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	200904
RD	200701	200908
RA(C)	200801	201109
LTM	201109	204409

RIP Date: N/A

RC Date: 201109

SITE DESCRIPTION

The OBG part of OU5 consists of 180 acres used for the destruction and disposal of munitions. Three categories of wastes originating both on and off the MLAAP facility have been handled and continue to be handled at the OBG. They include bulk explosives, ordnance components (including defective ordnance items or components removed from inventory at storage depots),and wastes potentially contaminated with explosives, including boxes, crates, paper, rags, strapping, pallets, precipitated explosives from settling sumps, and cleaning solvents that may have come into contact with explosive materials. After a burn was completed, any combustion by-products were placed in natural gullies or excavated trenches. Results from the RI of the southern study area (OU5) of surface soils found them to contain explosives and represent the source for infiltration to groundwater.

In June 2001 the FS was complete and in September 2004 an interim ROD was issued. Fieldwork was scheduled for April 2007, but was halted when asbestos-containing material (ACM) was discovered at the site. In 2010 an FS addendum/supplemental RI was completed. Subsequently, a proposed plan was prepared and issued in October 2010. A final ROD for the site was issued on April 21, 2011. Selected areas of about 2.55 acres at the site contaminated with explosives and asbestos were capped and placed under a LUC agreement. LTM is required at this site.

CLEANUP/EXIT STRATEGY

The exit strategy for OU5 soils would include removal of all soils above ROD cleanup levels. These cleanup levels are based on the potential contamination of groundwater and its ingestion by potential future residents.

The removal of contaminated soils was considered as part of the evaluation of alternatives at OU5, but because MEC are likely present at the OBG because of past ordnance disposal activities and ongoing RCRA permitted activities at the OBG, excavation of capped areas at OU5 soils was considered highly unfeasible. Additionally, ACM has been observed at OBG, likely from historical disposal of construction materials such as corrugated transite and ceiling plaster. During cap construction activities, ACM identified in the vicinity of the capped areas and/or work zones were relocated to beneath engineered cap OBG01CAP500. Based on the known presence of ACM beneath cap OBG01CAP500 and the potential presence of ACM in other locations at OBG, any excavation at OU5 would need to be performed following applicable health and safety protocol. The excavated material could potentially be composted or taken off-site for disposal at an approved facility, once all potential MEC has been removed. This approach would require either an ESD or ROD Amendment.

In accordance with the 2011 LUCIP, the LUCs associated with OU5 remedy can only be discontinued once concentrations of hazardous substances in the soil are at such levels to allow for unrestricted use and unlimited exposure.

Site ID: MAAP-034
Site Name: Northern Boundary Area OU1 & OU3

STATUS

Regulatory Driver: CERCLA

RRSE: HIGH

Contaminants of Concern: Explosives

Media of Concern: Groundwater

Phases	Start	End
PA	197803	197806
SI	197803	197806
RI/FS	198709	201309
RD	200410	201402
IRA	199701	201406
RA(C)	199809	201406
RA(O)	199909	204207

RIP Date: 201406

RC Date: 204207

SITE DESCRIPTION

The site-wide groundwater strategy has been grouped into three separate and distinct groundwater plume areas. One of the three areas includes the northern boundary area comprised of MAAP-014 (OU1), MAAP-034 (OU3), MAAP-010 (Line K), and MAAP-013 (Line O). These units consist of explosive-contaminated groundwater located directly under and immediately downgradient of the O-Line Ponds. In September 1992, interim RODs were signed for OU1 and in September 1994 for OU3. These established the implementation of groundwater extraction and treatment systems for each of these areas.

The OU1 GWTS originally used three extraction wells and six reinjection wells as its primary method of groundwater transport. Activated carbon was the primary treatment media that reduces explosives from extracted groundwater through the treatment process. In 2010, a technical memorandum approved by the regulatory community allowed the reconfiguration of flows from the OU1 GWTP to the OU3 GWTP. The OU1 GWTS was shut down in 2010 and the extraction wells were piped to OU3. The OU1 GWTS was decontaminated and demolished in calendar years 2012-2013.

The OU3 GWTS currently has 11 extraction wells available for use. Seven extraction wells are currently in service. After treatment, the water is discharged, in accordance with surface water requirements, into the Rutherford Fork of the Obion River. This system uses carbon as well for reduction of explosive from the extracted groundwater.

In January 2005, hardware modifications were made to all of the GWTPs to enhance automation and remote monitoring.

As of July 2014 a site-wide groundwater ROD was signed by Army, USEPA and TDEC. Because all plumes are under one site-wide groundwater ROD with a remedy of active pump and treat and MNA, the funding site for all plumes has been migrated to site MAAP-003, originally the "Central Plume" area. Site MAAP-034 is now strictly OU3 GWTS operations and maintenance.

This site is included in the PBA at Milan. Post-PBA actions and costs have been identified.

CLEANUP/EXIT STRATEGY

Once concentrations of contaminants in groundwater are low enough to meet ROD criteria, the GWTP and associated extraction systems will be decontaminated and shut down.

Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
MAAP-002	TEST AREA	200309	This site is NFA per USEPA and TDEC per Final Feasibility Study for OU5 Southern Study Area June 2001.
MAAP-004	OU4, Region 1 (LINE B (SWMU 9))	200407	This site has been consolidated into MAAP-003 as part of the Overall GW OU
MAAP-004A	LINE B (BIOREMEDIATION)	200407	This site has been consolidated into MAAP-003A as part of the Northern Industrial (NI) Soils OU.
MAAP-005	LINE C (SWMU 9)	200407	This site has been consolidated into MAAP-003 as part of the Overall GW OU.
MAAP-005A	LINE C (BIOREMEDIATION)	200407	This site has been consolidated into MAAP-003A as part of the NI Soils OU.
MAAP-006	LINE D (SWMU 9)	200407	This site has been consolidated into MAAP-003 as part of the Overall GW OU.
MAAP-006A	LINE D (BIOREMEDIATION)	200407	This site has been consolidated into MAAP-003A as part of the NI Soils OU.
MAAP-007	LINE E (SWMU 9)	200209	This site has been consolidated into MAAP-003 as part of the Overall GW OU.
MAAP-007A	LINE E (BIOREMEDIATION)	200209	Approved closure report from USEPA and TDEC October 2002.
MAAP-008	LINE F (SWMU 9)	200209	This site has been consolidated into MAAP-003 as part of the Overall GW OU.
MAAP-008A	LINE F (BIOREMEDIATION)	200109	NFA after sampling. Approved closure report August 2001.
MAAP-009	LINE H (SWMU 9)	200209	This site has been consolidated into MAAP-003 as part of the Overall GW OU.
MAAP-009A	LINE H (BIOREMEDIATION)	200209	NFA after sampling. Approved closure report.
MAAP-010	LINE K (SWMU 9)	200407	This site has been consolidated into MAAP-003 as part of the Overall GW OU.
MAAP-011A	LINE X (BIOREMEDIATION)	200407	This site has been consolidated into MAAP-003A as part of the NI Soils OU.
MAAP-012	LINE Z (SWMU 9)	200407	This site has been consolidated into MAAP-003 as part of the Overall GW OU.
MAAP-012A	LINE Z (BIOREMEDIATION)	200309	NFA after sampling. Approved closure report April 2003.
MAAP-013	LINE O (SWMU 9)	200209	This site has been consolidated into MAAP-003 as part of the Overall GW OU.
MAAP-013A	LINE O (BIOREMEDIATION)	200407	This site has been consolidated into MAAP-003A as part of the NI Soils OU.
MAAP-014	O LINE LAGOON GROUNDWATER (SWMU 10)	200407	This site has been consolidated into MAAP-034 as part of the Northern Boundary Area.
MAAP-015	CLOSED BURNOUT AREA (SWMU 2)	199112	No further action ROD January 1998.
MAAP-016	AMMO DESTRUCTION AREA (SWMU 1)	200209	Not Eligible for Environmental Restoration, Army/Base Realignment and Closure Funding.
MAAP-017	OPEN BURNING GROUNDS (SWMU 3)	200407	This site has been consolidated into MAAP-003 as part of the central plume.
MAAP-018	CLOSED LANDFILL (SWMU 6)	200301	This site has been consolidated into MAAP-003.

Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
MAAP-018A	CLOSED LANDFILL (BIOREMEDIATION)	200407	This site has been consolidated into MAAP-003A as part of the NI Soils OU. USEPA and TDEC approved NFA 14 Feb 2006.
MAAP-019	PRESENT LANDFILL (SWMU 4)	199112	Landfill has been closed under RCRA Subtitle D requirements and is presently undergoing 30-year monitoring as required by law.
MAAP-022	SALVAGE YARD (SWMU 11)	199211	NFA ROD January 2003.
MAAP-032	CONSTRUCTION DISPOSAL SITE (SWMU 7)	200210	This site has been consolidated into MAAP-003 as part of the Overall GW OU
MAAP-032A	CONSTRUCTION DISPOSAL SITE	200407	This site has been consolidated into MAAP-003A as part of the NI Soils OU. USEPA and TDEC approved NFA 14 Feb 2006.
MAAP-033	FORMER AMMUN DESTRUCTION AREA (SWMU 3)	200407	This site has been consolidated into MAAP-017A as part of OBG OU5.
MAAP-035	EFF DRAINAGE DITCHES (CENTRAL)(SWMU 8)	200407	This site has been consolidated into MAAP-034.
MAAP-036	LEAD CONTAMINATION @ WATER TOWERS	200407	Sites were excavated in Aug-Oct. 1997 to remove all soil contaminated from lead. This site has been consolidated into MAAP-014A as part of O-Line Lagoon OU2.
MAAP-037	BUILDING Y-103 RAILROAD YARD	200309	Time-critical removal action was completed January 2003.
PBC at Milan	PBC at Milan	201401	This was a funding site for contract W911SO-04-F-0019. The site was closed out when the contract expired on 23 May 2014.

IRP Schedule

Date of IRP Inception: 197803

Past Phase Completion Milestones

1978

SI	(MAAP 014A - OU2 O-LINE LAGOON (SOILS) SWMU 10, MAAP-002 - TEST AREA, MAAP-003 - Sitewide Goundwater (All Plumes), MAAP-003A - NI Soils OU (Areas North of Rt. 54), MAAP-004 - OU4, Region 1 (LINE B (SWMU 9)), MAAP-004A - LINE B (BIOREMEDIATION), MAAP-005 - LINE C (SWMU 9), MAAP-005A - LINE C (BIOREMEDIATION), MAAP-006 - LINE D (SWMU 9), MAAP-006A - LINE D (BIOREMEDIATION), MAAP-007 - LINE E (SWMU 9), MAAP-007A - LINE E (BIOREMEDIATION), MAAP-008 - LINE F (SWMU 9), MAAP-008A - LINE F (BIOREMEDIATION), MAAP-009 - LINE H (SWMU 9), MAAP-009A - LINE H (BIOREMEDIATION), MAAP-010 - LINE K (SWMU 9), MAAP-011 - OU4 Western Plume Area Groundwater, MAAP-011A - LINE X (BIOREMEDIATION), MAAP-012 - LINE Z (SWMU 9), MAAP-012A - LINE Z (BIOREMEDIATION), MAAP-013 - LINE O (SWMU 9), MAAP-013A - LINE O (BIOREMEDIATION), MAAP-014 - O LINE LAGOON GROUNDWATER (SWMU 10), MAAP-015 - CLOSED BURNOUT AREA (SWMU 2), MAAP-016 - AMMO DESTRUCTION AREA (SWMU 1), MAAP-017 - OPEN BURNING GROUNDS (SWMU 3), MAAP-017A - OPEN BURNING GROUND OU5 (REMOVAL), MAAP-018 - CLOSED LANDFILL (SWMU 6), MAAP-018A - CLOSED LANDFILL (BIOREMEDIATION), MAAP-022 - SALVAGE YARD (SWMU 11), MAAP-032 - CONSTRUCTION DISPOSAL SITE (SWMU 7), MAAP-032A - CONSTRUCTION DISPOSAL SITE, MAAP-033 - FORMER AMMUN DESTRUCTION AREA (SWMU 3), MAAP-034 - Northern Boundary Area OU1 & OU3, MAAP-035 - EFF DRAINAGE DITCHES (CENTRAL)(SWMU 8), MAAP-036 - LEAD CONTAMINATION @ WATER TOWERS)
CS	(MAAP-019 - PRESENT LANDFILL (SWMU 4))
PA	(MAAP 014A - OU2 O-LINE LAGOON (SOILS) SWMU 10, MAAP-002 - TEST AREA, MAAP-003 - Sitewide Goundwater (All Plumes), MAAP-003A - NI Soils OU (Areas North of Rt. 54), MAAP-004 - OU4, Region 1 (LINE B (SWMU 9)), MAAP-004A - LINE B (BIOREMEDIATION), MAAP-005 - LINE C (SWMU 9), MAAP-005A - LINE C (BIOREMEDIATION), MAAP-006 - LINE D (SWMU 9), MAAP-006A - LINE D (BIOREMEDIATION), MAAP-007 - LINE E (SWMU 9), MAAP-007A - LINE E (BIOREMEDIATION), MAAP-008 - LINE F (SWMU 9), MAAP-008A - LINE F (BIOREMEDIATION), MAAP-009 - LINE H (SWMU 9), MAAP-009A - LINE H (BIOREMEDIATION), MAAP-010 - LINE K (SWMU 9), MAAP-011 - OU4 Western Plume Area Groundwater, MAAP-011A - LINE X (BIOREMEDIATION), MAAP-012 - LINE Z (SWMU 9), MAAP-012A - LINE Z (BIOREMEDIATION), MAAP-013 - LINE O (SWMU 9), MAAP-013A - LINE O (BIOREMEDIATION), MAAP-014 - O LINE LAGOON GROUNDWATER (SWMU 10), MAAP-015 - CLOSED BURNOUT AREA (SWMU 2), MAAP-016 - AMMO DESTRUCTION AREA (SWMU 1), MAAP-017 - OPEN BURNING GROUNDS (SWMU 3), MAAP-017A - OPEN BURNING GROUND OU5 (REMOVAL), MAAP-018 - CLOSED LANDFILL (SWMU 6), MAAP-018A - CLOSED LANDFILL (BIOREMEDIATION), MAAP-022 - SALVAGE YARD (SWMU 11), MAAP-032 - CONSTRUCTION DISPOSAL SITE (SWMU 7), MAAP-032A - CONSTRUCTION DISPOSAL SITE, MAAP-033 - FORMER AMMUN DESTRUCTION AREA (SWMU 3), MAAP-034 - Northern Boundary Area OU1 & OU3, MAAP-035 - EFF DRAINAGE DITCHES (CENTRAL)(SWMU 8), MAAP-036 - LEAD CONTAMINATION @ WATER TOWERS)
RFA	(MAAP-019 - PRESENT LANDFILL (SWMU 4))

1992

RFI/CMS	(MAAP-019 - PRESENT LANDFILL (SWMU 4))
RI/FS	(MAAP-014 - O LINE LAGOON GROUNDWATER (SWMU 10), MAAP-015 - CLOSED BURNOUT AREA (SWMU 2), MAAP-022 - SALVAGE YARD (SWMU 11))

1993

RI/FS	(MAAP 014A - OU2 O-LINE LAGOON (SOILS) SWMU 10)

1994

RD	(MAAP 014A - OU2 O-LINE LAGOON (SOILS) SWMU 10, MAAP-014 - O LINE LAGOON GROUNDWATER (SWMU 10))

1995

RI/FS	(MAAP-003A - NI Soils OU (Areas North of Rt. 54), MAAP-004A - LINE B (BIOREMEDIATION), MAAP-005A - LINE C (BIOREMEDIATION), MAAP-006A - LINE D (BIOREMEDIATION), MAAP-007A - LINE E (BIOREMEDIATION), MAAP-008A - LINE F (BIOREMEDIATION), MAAP-009A - LINE H (BIOREMEDIATION), MAAP-011A - LINE X (BIOREMEDIATION), MAAP-012A - LINE Z (BIOREMEDIATION), MAAP-013A - LINE O (BIOREMEDIATION), MAAP-018A - CLOSED LANDFILL (BIOREMEDIATION), MAAP-032A -

	CONSTRUCTION DISPOSAL SITE)
1996	
RI/FS	(MAAP-036 - LEAD CONTAMINATION @ WATER TOWERS)
RA(C)	(MAAP-014 - O LINE LAGOON GROUNDWATER (SWMU 10))
1997	
RA(C)	(MAAP 014A - OU2 O-LINE LAGOON (SOILS) SWMU 10)
1998	
RD	(MAAP-003A - NI Soils OU (Areas North of Rt. 54), MAAP-004A - LINE B (BIOREMEDIATION), MAAP-005A - LINE C (BIOREMEDIATION), MAAP-006A - LINE D (BIOREMEDIATION), MAAP-007A - LINE E (BIOREMEDIATION), MAAP-008A - LINE F (BIOREMEDIATION), MAAP-009A - LINE H (BIOREMEDIATION), MAAP-011A - LINE X (BIOREMEDIATION), MAAP-012A - LINE Z (BIOREMEDIATION), MAAP-013A - LINE O (BIOREMEDIATION), MAAP-018A - CLOSED LANDFILL (BIOREMEDIATION), MAAP-032A - CONSTRUCTION DISPOSAL SITE)
RA(C)	(MAAP-036 - LEAD CONTAMINATION @ WATER TOWERS)
1999	
RA(C)	(MAAP-004A - LINE B (BIOREMEDIATION), MAAP-005A - LINE C (BIOREMEDIATION), MAAP-006A - LINE D (BIOREMEDIATION), MAAP-007A - LINE E (BIOREMEDIATION), MAAP-008A - LINE F (BIOREMEDIATION), MAAP-009A - LINE H (BIOREMEDIATION), MAAP-011A - LINE X (BIOREMEDIATION), MAAP-012A - LINE Z (BIOREMEDIATION), MAAP-013A - LINE O (BIOREMEDIATION), MAAP-018A - CLOSED LANDFILL (BIOREMEDIATION), MAAP-032A - CONSTRUCTION DISPOSAL SITE)
2000	
PA	(MAAP-037 - BUILDING Y-103 RAILROAD YARD)
2001	
RA(O)	(MAAP-005A - LINE C (BIOREMEDIATION), MAAP-008A - LINE F (BIOREMEDIATION))
2002	
RA(O)	(MAAP-007A - LINE E (BIOREMEDIATION), MAAP-009A - LINE H (BIOREMEDIATION))
RI/FS	(MAAP-007 - LINE E (SWMU 9), MAAP-008 - LINE F (SWMU 9), MAAP-009 - LINE H (SWMU 9), MAAP-013 - LINE O (SWMU 9), MAAP-016 - AMMO DESTRUCTION AREA (SWMU 1), MAAP-037 - BUILDING Y-103 RAILROAD YARD)
2003	
RI/FS	(MAAP-002 - TEST AREA, MAAP-018 - CLOSED LANDFILL (SWMU 6), MAAP-032 - CONSTRUCTION DISPOSAL SITE (SWMU 7))
PA	(PBC at Milan - PBC at Milan)
RA(O)	(MAAP-012A - LINE Z (BIOREMEDIATION))
LTM	(MAAP-037 - BUILDING Y-103 RAILROAD YARD)
2004	
LTM	(MAAP-005A - LINE C (BIOREMEDIATION), MAAP-036 - LEAD CONTAMINATION @ WATER TOWERS)
RI/FS	(MAAP-004 - OU4, Region 1 (LINE B (SWMU 9)), MAAP-005 - LINE C (SWMU 9), MAAP-006 - LINE D (SWMU 9), MAAP-010 - LINE K (SWMU 9), MAAP-012 - LINE Z (SWMU 9), MAAP-017 - OPEN BURNING GROUNDS (SWMU 3), MAAP-033 - FORMER AMMUN DESTRUCTION AREA (SWMU 3), MAAP-035 - EFF DRAINAGE DITCHES (CENTRAL)(SWMU 8))
RA(O)	(MAAP-004A - LINE B (BIOREMEDIATION), MAAP-006A - LINE D (BIOREMEDIATION), MAAP-011A - LINE X (BIOREMEDIATION), MAAP-013A - LINE O (BIOREMEDIATION), MAAP-014 - O LINE LAGOON GROUNDWATER (SWMU 10), MAAP-018A - CLOSED LANDFILL (BIOREMEDIATION), MAAP-032A - CONSTRUCTION DISPOSAL SITE)
2007	
RA(C)	(PBC at Milan - PBC at Milan)

IRP Schedule

2009

RA(C)	(MAAP-003A - NI Soils OU (Areas North of Rt. 54))
RA(O)	(MAAP-003A - NI Soils OU (Areas North of Rt. 54))
RI/FS	(MAAP-017A - OPEN BURNING GROUND OU5 (REMOVAL))
RD	(MAAP-017A - OPEN BURNING GROUND OU5 (REMOVAL))

2011

RA(C)	(MAAP-017A - OPEN BURNING GROUND OU5 (REMOVAL))

2013

RI/FS	(MAAP-034 - Northern Boundary Area OU1 & OU3)

2014

RA(C)	(MAAP-003 - Sitewide Goundwater (All Plumes), MAAP-011 - OU4 Western Plume Area Groundwater, MAAP-034 - Northern Boundary Area OU1 & OU3)
RD	(MAAP-003 - Sitewide Goundwater (All Plumes), MAAP-011 - OU4 Western Plume Area Groundwater, MAAP-034 - Northern Boundary Area OU1 & OU3)
IRA	(MAAP-034 - Northern Boundary Area OU1 & OU3)
RI/FS	(MAAP-003 - Sitewide Goundwater (All Plumes), MAAP-011 - OU4 Western Plume Area Groundwater)
RA(O)	(PBC at Milan - PBC at Milan)

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: 201406

Schedule for Next Five-Year Review: 2015

Estimated Completion Date of IRP at Installation (including LTM phase): 207407

MILAN ARMY AMMUNITION PLANT IRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MAAP 014A	OU2 O-LINE LAGOON (SOILS) SWMU 10	LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**FY21+**
MAAP-003	Sitewide Goundwater (All Plumes)	RA(O)						
SITE ID	**SITE NAME**	**PHASE**	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**FY21+**
MAAP-003A	NI Soils OU (Areas North of Rt. 54)	LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**FY21+**
MAAP-011	OU4 Western Plume Area Groundwater	RA(O)						
SITE ID	**SITE NAME**	**PHASE**	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**FY21+**
MAAP-017A	OPEN BURNING GROUND OU5 (REMOVAL)	LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**FY21+**
MAAP-034	Northern Boundary Area OU1 & OU3	RA(O)						

MILAN ARMY AMMUNITION PLANT

Army Defense Environmental Restoration Program
Military Munitions Response Program

MMRP Summary

Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count: 3/2

Installation Site Types with Future and/or Underway Phases

1 Open Burn

(MAAP-001-R-01)

Most Widespread Contaminants of Concern

Munitions and explosives of concern (MEC)

Media of Concern

Soil

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

Site ID	Site Name	Action	Remedy	FY
MAAP-001-R-01	Open Burning Ground	FRA	FENCE OR OTHER SITE ACCESS CONTROL MEASURES	2014

Duration of MMRP

Date of MMRP Inception 200302

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

Date of MMRP completion including Long Term Management (LTM): 204409

MMRP Contamination Assessment

Contamination Assessment Overview

The DoD established the MMRP under the Defense Environmental Restoration Program to address DoD sites with MEC including unexploded ordnance (UXO), discarded military munitions and munitions constituents (MC).

The US Army's inventory of closed, transferred, or transferring military ranges and sites has identified sites eligible for action under the MMRP.

The MMRP began in the late-1990s as a result of key drivers such as processes outlined in the NCP (NCP - 40 CFR 300) as authorized by the CERCLA, 42 USC 9605, as amended by the SARA, Pub. L. 99-499.

The process began with three phases of range inventories. Phase I consisted of installations completing an initial data call. USAEC managed implementation of Phases II and III of the MMRP inventory.

The Phase II inventory dealt with active and inactive range considerations. In September 2003 the Phase III Army range inventory was completed at the MLAAP. The inventory identified three sites as eligible for the MMRP. The Phase III inventory serves as the preliminary assessment under CERCLA. An SI) began in FY04 and the report was completed in December 2005.

Cleanup Exit Strategy

An RI/FS for OBG, site (MAAP-001-R-01), began in FY10 and was completed in FY12. A final ROD was issued for the OBG in October 2013. The remedy for the OBG consisted of LUCs.

At Sunny Slope, site MAAP-003-R-01, a NFA ROD was signed in July 2012.

MMRP Previous Studies

	Title	Author	Date
2003			
	Final US Army Closed, Transferred or Transferring Range/Site Inventory	Malcolm Pirnie	SEP-2003
2004			
	Preliminary Assessment	Malcolm Pirnie, Inc.	NOV-2004
2005			
	Final Historical Records Review, Milan Army Ammunition Plant, Tennessee	Malcolm Pirnie, Inc.	MAY-2005
	Final Site Inspection Work Plan, Milan Army Ammunition Plant, Tennessee	Malcolm Pirnie, Inc.	JUN-2005
	Final Site Inspection Report, Milan Army Ammunition Plant, Tennessee	Malcolm Pirnie, Inc.	DEC-2005
2007			
	Final Work Plan for MMRP MPPEH Removal in Support of PBC Interim Remediation at MLAAP	EOTI	FEB-2007
2008			
	Revision to Final Site Inspection Report, Appendix F, Munitions Response Site Prioritization Protocol for Sunny Slope	Malcolm Pirnie	AUG-2008
2010			
	Remedial Investigation/Feasibility Study Work Plan Open Burning Ground and Sunny Slope	ARCADIS	JUN-2010
	Instrument Verification Strip (IVS) Letter Report Open Burning Ground and Sunny Slope	ARCADIS	JUL-2010
	Sunny Slope Remedial Investigation Report	ARCADIS	DEC-2010
2011			
	Proposed Plan (FINAL), Sunny Slopes Munition Response Site	ARCADIS	JUL-2011
2012			
	Final Record of Decision Sunny Slopes	Arcadis	JUL-2012
2013			
	Proposed Plan (Final) Open Burning Ground Munitions Response Site	Arcadis	MAR-2013
	Recod of Decision (Final) Open Burning Ground Munitions Response Site	Arcadis	OCT-2013
2014			
	Final Remedial Action Work Plan, Open Burning Ground MRS	Arcadis	APR-2014
	Remedial Action Report (Final), Open Burning Ground MRS	Arcadis	MAY-2014

MILAN ARMY AMMUNITION PLANT

Military Munitions Response Program

Site Descriptions

Site ID: MAAP-001-R-01
Site Name: Open Burning Ground

STATUS

Regulatory Driver: CERCLA

MRSPP Score: 04

Contaminants of Concern: Munitions and explosives of concern (MEC)

Media of Concern: Soil

Phases	Start	End
PA	200302	200309
SI	200405	200512
RI/FS	200909	201304
RD	201303	201403
RA(C)	200909	201403
LTM	201405	204409

RIP Date: N/A

RC Date: 201403

SITE DESCRIPTION

This OBG has been used since 1941 for the destruction and/or disposal of out-of-specification military munitions and explosive contaminated material. Destruction by burning, detonation, and flashing initially took place on the ground surface and later, in flash pans and pits. The 1988 investigation and engineering analysis report indicated that detonations might have caused kick-out of UXO from sub-area H into the surrounding areas; thus, a calculated fragmentation arc has been included as part of the OBG. Based on the extensive history and lack of detailed reports available regarding treatment operations, MEC resulting from kick-out over the entire surface of the OBG, and possibly outside the known range boundary are considered. Ordnance was also buried in this area in a number of identified sub-areas. They are referred to as OBG - Sub-Areas A, B, C, D, E, F, H, SH, R, S, and W.

No MC activities were conducted at this range; MC issues are addressed under the IRP.

The archive search report and the SI were funded in FY04 and completed in December 2005.

This site was incorporated into the PBA contract on Sept. 3, 2009. The RI fieldwork was completed at the site in 2010.

A ROD for this site was signed in October 2013. The remedy for the site is comprised of LUCs including site access restrictions, quarterly inspections and reports, prohibition of intrusive activities without proper UXO support, the installation of a fence and warning signs around the perimeter of the munitions response site, and an educational program.

CLEANUP/EXIT STRATEGY

The site will continue to be under LTM of LUCs to prevent disturbance of MEC.

Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
MAAP-002-R-01	Machine Gun Range	200512	This site was made RC after the site inspection that was completed in December 2005.
MAAP-003-R-01	Sunny Slopes Area	201209	This site was closed with no further action by a ROD dated July 19, 2012.

MMRP Schedule

Date of MMRP Inception 200302

Past Phase Completion Milestones

2003	
PA	(MAAP-001-R-01 - Open Burning Ground, MAAP-002-R-01 - Machine Gun Range, MAAP-003-R-01 - Sunny Slopes Area)
2006	
SI	(MAAP-001-R-01 - Open Burning Ground, MAAP-002-R-01 - Machine Gun Range, MAAP-003-R-01 - Sunny Slopes Area)
2011	
RI/FS	(MAAP-003-R-01 - Sunny Slopes Area)
2013	
RI/FS	(MAAP-001-R-01 - Open Burning Ground)
2014	
RD	(MAAP-001-R-01 - Open Burning Ground)
RA(C)	(MAAP-001-R-01 - Open Burning Ground)

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: 201403

Schedule for Next Five-Year Review: 2015

Estimated Completion Date of MMRP at Installation (including LTM phase): 204409

MILAN ARMY AMMUNITION PLANT MMRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MAAP-001-R-01	Open Burning Ground	LTM						

MILAN ARMY AMMUNITION PLANT

Army Defense Environmental Restoration Program
Compliance Restoration

CR Summary

Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count: 2/1

Installation Site Types with Future and/or Underway Phases

1 Above Ground Storage Tank
(CCMLAP06)

Most Widespread Contaminants of Concern

Petroleum, Oil and Lubricants (POL)

Media of Concern

Groundwater, Soil

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

Site ID	Site Name	Action	Remedy	FY
CCMLAAP05	LNAPL Removal At Line B	FRA	OTHER	2010

Duration of CR

Date of CR Inception: 198601

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201507/201507

Date of CR completion including Long Term Management (LTM): 201506

CR Contamination Assessment

Contamination Assessment Overview

Fuel oil storage tanks at MLAAP have been removed in previous years. At some locations residual product from leaking tanks and fill lines has been released into the soils and groundwater. Site CCMLAP06 is one of these locations. As of this time, no other sites are eligible for Defense Environmental Restoration Program funding.

Cleanup Exit Strategy

Closing of the CCMLAP06 site is planned under the Tennessee Corrective Action Program rules. If the site meets the state criteria, it will be closed by reclassifying the groundwater as a non-drinking water source and no RA will be necessary.

CR Previous Studies

	Title	Author	Date
1994			
	Environmental Assessment Report of the Area J Maintenance Facility Leaking Transfer Line, MLAAP	Fisher & Arnold	OCT-1994
2001			
	Additional Investigation & Remedial Action Work plan, Area J Transfer Line & Area J Tank Farm	American Ordnance LLC	JUL-2001
	Interim Measures Remedial Action Report Area J Transfer Line & Area J Tank Farm	American Ordnance LLC	AUG-2001
2007			
	Area J Closure Report, Final	Arcadis	MAY-2007
2010			
	Line B Comprehensive Monitoring Report	SCS Environmental	MAY-2010
2013			
	Area J Tank Farm Site Characterization Workplan	CORE Engineering Inc.	DEC-2013

MILAN ARMY AMMUNITION PLANT

Compliance Restoration

Site Descriptions

Site ID: CCMLAP06
Site Name: Area J Tank Farm

STATUS

Regulatory Driver: RCRA

Contaminants of Concern: Petroleum, Oil and Lubricants (POL)

Media of Concern: Groundwater, Soil

Phases	Start	End
ISC	199101	200506
CAP	201303	201506

RIP Date: N/A

RC Date: 201507

SITE DESCRIPTION

Area J, a former aboveground storage tank farm for fuel and heating oils, was located south and outside of the Area J perimeter fence. A transfer line for fuel was routed to Building J-53. Between the tank farm and Building J-53 was 350 ft of transfer line, located mostly within the Area J perimeter fence. Area J is a maintenance and craft area.

The Area J Tank Farm is a diked area 230 ft long by 110 ft wide. The wall of the dike is five to six ft high, eight ft wide at the base, and five to six ft wide at the top. The dikes floor slopes to the north/northeast and is composed of dirt mixed with limestone rock. At the east end of the dike is a square concrete catch basin covered with a steel grate. The catch basin is three feet by three feet wide by four ft deep. The catch basin is for draining rainwater from the dike. A four-inch diameter pipe at the bottom of the catch basin goes through the wall of the dike and empties to a surface water ditch east of the tank farm. From 1941 to 2005, the tank farm contained nine aboveground tanks used to store number 6 heating oil or number 2 heating oil. The tanks consisted of a fixed-roof 347,242-gallon tank, seven 20,000-gallon tanks and one 10,000-gallon tank.

The transfer line was used to transfer fuel from tankers to tank farm bulk tanks using pumps housed in Building J-53. Fuel from bulk storage was then pumped to MLAAP's tanker truck and hauled to facility heating oil underground storage tanks. A 30-ft section of the transfer line was inside the diked area of the tank farm. The transfer line connected with the piping manifold for the diked tanks.

In 1991, the tanks were emptied of fuel. In March 1994 a spill was discovered near the transfer line. Upon investigation, concentrations of total petroleum hydrocarbons-diesel range organics above 500 ppm were found along the transfer line. The transfer line was removed in 1999 and sampled along the excavation with sample concentrations exceeding 500 ppm. Working under an interim measures work plan approved by the TDEC, in May 2001 the tank farm and the transfer line were overexcavated. Extractable petroleum hydrocarbons were detected at greater than 3,000 ppm to 12 ft. deep at the transfer Line and 6,000 ppm potential contamination at the tank farm greater than 20 ft. deep. In October 2002, TDEC approved a work plan to decommission the tank farm and associated piping and conduct investigation of impacted soils and perform removal. In 2005, all nine tanks were dismantled and removed from the tank farm. No work has been performed at the site since the tank farm was dismantled.

Depth to shallow groundwater at the site is approximately 30 ft below ground surface with deeper groundwater at approximately 100 ft below ground surface.

Currently, Building J-53 houses pump equipment used to transfer fuel to and from tanker trucks to an underground storage tank system located west of J-53.

The site will be closed under the state of Tennessee Corrective Action Program for petroleum product released. Based upon a similar location at MLAAP, it is believed that the site can be closed by having the groundwater reclassified at the site as a non-drinking water source. If approved, implementation of an active remedy will not be required.

Site characterization is being conducted during FY14 and is expected to be complete in FY15 under the current contract.

Site ID: CCMLAP06
Site Name: Area J Tank Farm

CLEANUP/EXIT STRATEGY

A site assessment and investigation is planned to determine the concentration and extent of the petroleum product released at the site. If residual contamination in the soil is within the state of Tennessee Corrective Action Program limits, the site will be closed by having the groundwater reclassified at the site as a non-drinking water source and residual contamination at the site will be allowed to naturally attenuate.

Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
CCMLAAP05	LNAPL Removal At Line B	201006	An Initial Site Characterization Report (ISCR) with a Risk Analyses Report (RAR) with a request for Site Specific Cleanup Levels (SSCLs) was approved by the Tennessee Department of Environment and Conservation (TDEC) on September 10, 2009. In 2010, a comprehensive Monitoring Report documenting work done and site closure was submitted to the TDEC and approved by TDEC on July 23, 2010.

CR Schedule

Date of CR Inception: 198601

Past Phase Completion Milestones

1986
RFA (CCMLAAP05 - LNAPL Removal At Line B)
2000
CS (CCMLAAP05 - LNAPL Removal At Line B)
2005
ISC (CCMLAP06 - Area J Tank Farm)
2009
RFI/CMS (CCMLAAP05 - LNAPL Removal At Line B)
2010
CMI(C) (CCMLAAP05 - LNAPL Removal At Line B)

Projected Phase Completion Milestones

See attached schedule

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

To Be Determined

Final RA(C) Completion Date: 201006

Schedule for Next Five-Year Review: 2015

Estimated Completion Date of CR at Installation (including LTM phase): 201506

Community Involvement

Technical Review Committee (TRC): 198707

Community Involvement Plan (Date Published): 201502

Restoration Advisory Board (RAB): RAB established 199407

RAB Adjournment Date: 201408

RAB Adjournment Reason: All environmental restoration remedies are in place and are operating properly and successfully.

Additional Community Involvement Information

The MLAAP RAB has successfully kept the public involved in its IRP. Based on the recommendations and approval of the community members, the RAB adjourned on Aug. 5, 2014. The Army will continue to keep the public apprised of restoration activities by annual public meetings and fact sheets.

Administrative Record is located at

Army Environmental Office, Milan Army Ammunition Plant
Suite 1, Milan, Tennessee
Phone number: 731-686-6087

Information Repository is located at

Mildred G. Fields Library
1075 East Van Hook Street
Milan, Tennessee 38358-2859
Phone number: 731-686-8268
www.milanaap-ar.com

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

TAPP Title: N/A

Potential TAPP: N/A