

**FY2015**

**MCALESTER 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 an installation. 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), McAlester Army Ammunition Plant (MCAAP), the executing agencies, the 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

AEDB-CC	Army Environmental Database - Compliance-related Cleanup
AEDB-R	Army Environmental Database - Restoration
AMC	Army Materiel Command
CC	Compliance-related Cleanup
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CMI	Corrective Measures Implementation
CMI(C)	Corrective Measure Implementation (Construction)
CMI(O)	Corrective Measure Implementation (Operations)
CMS	Corrective Measures Study
COC	Contaminant of Concern
CR	Compliance Restoration
CS	Confirmatory Sampling
CTT	Closed, Transferring or Transferred
DAC	Defense Ammunition Center
DD	Decision Document
DERP	Defense Environmental Restoration Program
DES	Design
DMM	Discarded Military Munitions
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
DSERTS	Defense Environmental Restoration Tracking System
ER	Emergency Removal
ER,A	Environmental Restoration, Army
FRA	Final Remedial Action
FS	Feasibility Study
FY	Fiscal Year
HBX	1,3,5-trinitro-8-triazine
HMX	High Melting Explosive
HRR	Historical Record Review
IAP	Installation Action Plan
ID	Identification
IR	Installation Restoration
IRA	Interim Remedial Action
IRP	Installation Restoration Program
kg	kilogram
LTM	Long-Term Management
LUC	Land Use Control
MC	Munitions Constituent
MCAAP	McAlester Army Ammunition Plant
MCL	Maximum Contaminant Level
MEC	Munitions and Explosives of Concern
mg	milligram
mm	millimeter
MMRP	Military Munitions Response Program
MNA	Monitored Natural Attenuation

## Acronyms

MR	Munitions Response
MRS	Munitions Response Site
MRSPP	Munition Response Site Prioritization Protocol
MSSL	Medium-Specific Screening Level
N/A	Not Applicable
NFA	No Further Action
NPL	National Priorities List
OB	Open Burning
OCC	Oklahoma Corporation Commission
OD	Open Detonation
ODEQ	Oklahoma Department of Environmental Quality
ODUSD(I&E)	Office of the Deputy Under Secretary of Defense for Installations
PA	Preliminary Assessment
PBA	Performance-Based Acquisition
PCB	Polychlorinated Biphenyl
PCP	Pentachlorophenol
PETN	pentaerythritol tetranitrate
POL	Petroleum, Oil and Lubricants
PP	Proposed Plan
ppb	parts per billion
ppm	parts per million
PST	Powder Settling Tank
RA	Remedial Action
RA(C)	Remedial Action (Construction)
RAB	Restoration Advisory Board
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RDX	Royal Demolition Explosive
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RIP	Remedy-in-Place
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
SI	Site Inspection
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TAPP	Technical Assistance for Public Participation
TCE	Trichloroethylene
TNT	Trinitrotoluene
TPH	Total Petroleum Hydrocarbons
TRC	Technical Review Committee
USACE	US Army Corps of Engineers

## Acronyms

USACHPPM	US Army Center for Health Promotion and Preventive Medicine
USAEC	US Army Environmental Command
USAEHA	US Army Environmental Hygiene Agency
USEPA	US Environmental Protection Agency
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
WBZ	Water-Bearing Zone
WWII	World War II

## Acronym Translation Table

### CERCLA

Preliminary Assessment(PA)  
Site Inspection(SI)  
Remedial Investigation/Feasibility Study(RI/FS)  
Remedial Design(RD)  
Remedial Action (Construction)(RA(C))  
Remedial Action (Operation)(RA(O))  
Long Term Management(LTM)  
Interim Remedial Action(IRA)

### RCRA

= RCRA Facility Assessment(RFA)  
= Confirmation Sampling(CS)  
= RCRA Facility Investigation/Corrective Measures Study(RFI/CMS)  
= Design(DES)  
= Corrective Measures Implementation (Construction)(CMI(C))  
= Corrective Measures Implementation (Operation)(CMI(O))  
= Long Term Management(LTM)  
= Interim Measure(IM)



## Installation Information

### Installation Locale

**Installation Size (Acreage):** 44965

**City:** McAlester

**County:** Pittsburg

**State:** Oklahoma

### Other Locale Information

MCAAP occupies 44,965 acres (70 square miles) in a sparsely populated area of southeast Oklahoma, 9 miles southwest of the city of McAlester (population 18,383) in Pittsburg County (2010 population 44,837). The closest major cities are more than 100 miles away (Tulsa is 113 miles north, Oklahoma City is 120 miles northwest, and Dallas is 180 miles southwest). The area has been used for strip mining coal, but is currently used for agricultural purposes. MCAAP is one of the larger employers in the area.

### Installation Mission

The purpose of MCAAP is to produce and renovate quality conventional missile ammunition and ammunition-related components, perform engineering and product assurance in support of production, and receive, store, ship, demilitarize, and dispose of conventional and missile ammunition and related items.

MCAAP is also the group general technology center for bomb loading, assembling, packing, manufacturing, engineering, product assurance, and production support. This installation is an active government-owned and government-operated facility and is the home for the US Army Defense Ammunition Center (DAC), which was relocated from the Savanna Army Depot Activity, Savanna, Illinois in 1998.

### Lead Organization

Army Materiel Command (AMC)

### Lead Executing Agencies for Installation

US Army Corps of Engineers (USACE), Tulsa District

### Regulator Participation

<b>Federal</b>	US Environmental Protection Agency (USEPA), Region VI
<b>State</b>	Oklahoma Department of Environmental Quality (ODEQ)

### National Priorities List (NPL) Status

MCALESTER ARMY AMMUNITION PLANT is not on the NPL

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

The community has expressed no sufficient, sustained interest in a RAB.

## Installation Information

### Installation Program Summaries

#### IRP

**Primary Contaminants of Concern:** Dioxins/Dibenzofurans, Metals, Petroleum, Oil and Lubricants (POL), Polychlorinated Biphenyls (PCB), Semi-volatiles (SVOC), Volatiles (VOC)

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

#### MMRP

**Primary Contaminants of Concern:** Munitions and explosives of concern (MEC), Munitions constituents (MC)

**Affected Media of Concern:** Soil

#### CR

**Primary Contaminants of Concern:** Explosives, Metals, Munitions constituents (MC), Volatiles (VOC)

**Affected Media of Concern:** Groundwater, Sediment, Soil

## 5-Year / Periodic Review Summary

### 5-Year / Periodic Review Summary

Status	Start Date	End Date	End FY
Complete	201001	201010	2011
Complete	200208	200208	2002
Underway	201503	201603	2016

### Last Completed 5-Year / Periodic Review Details

Associated ROD/DD Name	Sites
DD - BURN AREA - 26	MCAAP-026
DD - BURN AREA - 26	MCAAP-026
DD -DEACT FURN LAGOON # 18	MCAAP-018
DD -DEACT FURN LAGOON # 18	MCAAP-018
DD FOR CLEANUP PALLET DIP BLDG 209	MCAAP-032
DD FOR CLEANUP PALLET DIP BLDG 209	MCAAP-032
DD FOR CLEANUP PALLET DIP BLDG 471	MCAAP-033
DD FOR CLEANUP PALLET DIP BLDG 471	MCAAP-033
DD FOR MINOL BLDG RCA. PCB RMVL	MCAAP-043
DD FOR MINOL BLDG RCA. PCB RMVL	MCAAP-043
DD for Former Scrap Metal Baler Area	MCAAP-046
DD for Former Scrap Metal Baler Area	MCAAP-046
MISCELLANEOUS TANKS	MCAAP-048
MISCELLANEOUS TANKS	MCAAP-048

**Results** According to 5-Year Review,2010. Remedies for 6 sites are functioning as intended. Two sites, MCAAP-046 & MCAAP-048 need time for remedies to be effective. They were implemented in 05/2010.

**Actions** Selected remedy for each of the sites is expected to be protective of human health and the environment by minimizing the migration of contaminants to groundwater and surface water.

**Plans** Use restrictions for each site are documented with the Master Planner. The Master Planner's base map was confirmed to identify each site as having environmental concerns related to the site. The next Five-Year Review will be 2015.

#### Recommendations and Implementation Plans:

The selected remedy for each of the sites is expected to be protective of human health and the environment by minimizing the migration of contaminants to groundwater and surface water and prevent direct contact with, or ingestion of contaminants in soil and sediments. Exposure pathways that could result in unacceptable risks are being controlled and institutional controls are preventing exposure to, or the ingestion of, contaminated groundwater. Threats at the sites have been addressed by the placement of clay materials or gravel, the installation of warning signs, and the implementation of institutional controls. In general, the effective implementation of institutional controls has prevented exposure to, or ingestion of, potentially contaminated soils. At MCAAP-032 and MCAAP-033, increased institutional controls are recommended to be continued in the form of sign-in/sign-out tracking logs. Use restrictions for each site are documented with the master planner. The master planning maps were confirmed to identify each site as having environmental concerns related to the site and required to contact the Environmental Office prior to any activity at the site.

# Cleanup Program Summary

## Installation Historic Activity

On June 10, 1942 the War Department announced that a \$35 million plant would be built to provide additional production facilities during World War II (WWII). In August 1942 work began on construction of the McAlester Naval Ammunition Depot at McAlester, Oklahoma. Construction of the depot was a concerted effort; at the height of activity 15,000 workers were employed. The work proceeded rapidly and on Sept. 24, 1943 the first munitions were produced. During WWII, the facility produced 325,000 tons of various types of munitions including 16-inch gun ammunition, mines, rockets, and depth charges.

On Oct. 1, 1977, under the provisions of Department of Defense (DoD) Directive 5160.65, the Deputy Secretary of Defense transferred operation from the Department of Navy to the Department of Army, and established the Army as the single manager for the manufacture of conventional ammunition. MCAAP was assigned to the US Army Armament Materiel Readiness Command. The primary mission of the MCAAP did not change after transfer of operations to the Army.

In September 1992 the USEPA Region VI, in conjunction with the ODEQ, issued a Resource Conservation and Recovery Act (RCRA) Part B permit. The USEPA Region VI was the lead regulatory agency for RCRA remediation until December 1994 when the ODEQ obtained corrective action authority. The permit was modified on Dec. 15, 1998 and requires the corrective action program at MCAAP.

MCAAP is performing corrective actions as required by their RCRA Part B permit issued by the USEPA (1992) and modified Dec. 15, 1998, and is currently under the primacy of the ODEQ (1994).

## Installation Program Cleanup Progress

### IRP

**Prior Year Progress:** Routine landfill cap maintenance continued at MCAAP-002. Groundwater monitoring activities will be conducted annually. The active Installation Restoration Program (IRP) sites are under a performance based acquisition (PBA) contract. The corrective measures implementation operations [CMI(O)] at MCAAP-046 and MCAAP-048 began in fiscal year (FY)11 and will continue for a 30-year period.

**Future Plan of Action:** Maintenance will continue at MCAAP-002. Monitored natural attenuation (MNA) and volatile organic compound (VOC) sampling at sites MCAAP-046 and MCAAP-048 will continue.

### MMRP

**Prior Year Progress:** The RI work plan was drafted for MCAAP-006-R-01.

Finalize proposed plan (PP) and decision document (DD) for five munitions response sites (MRS).

**Future Plan of Action:** Implement land use controls (LUC).

LTM will consist of five-year reviews and MEC institutional controls.

### CR

**Prior Year Progress:** The performance work statement was completed in 2014. An RFI, a source removal action and a draft CMS are planned.

**Future Plan of Action:** A CMS is planned for CCMCAAP-049, CCMCAAP-050, and CCMCAAP-051.

An IRA and site closeout are anticipated for CCMCAAP-049 and CCMCAAP-050.

**MCALESTER 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:** 49/41

## Installation Site Types with Future and/or Underway Phases

1	Burn Area (MCAAP-026)
3	Contaminated Buildings (MCAAP-032, MCAAP-033, MCAAP-043)
1	Industrial Discharge (MCAAP-048)
1	Landfill (MCAAP-002)
1	Spill Site Area (MCAAP-046)
1	Surface Impoundment/Lagoon (MCAAP-018)

## Most Widespread Contaminants of Concern

Dioxins/Dibenzofurans, Metals, Petroleum, Oil and Lubricants (POL), Polychlorinated Biphenyls (PCB), 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
MCAAP-037	WASTE OIL STORAGE TANK, RR HOUSE	FRA	WASTE REMOVAL - DRUMS, TANKS, BULK CONTAINERS	1990
MCAAP-045	ROUNDHOUSE COMPLEX	FRA	EX SITU SOIL TREATMENT	1998
MCAAP-018	DEACTIVATION FURNACE/LAGOON	IRA	EX SITU SOIL TREATMENT	1999
MCAAP-043	MINOL BUILDING (BLDG 644)	IRA	WASTE REMOVAL - SOILS	1999
MCAAP-018	DEACTIVATION FURNACE/LAGOON	FRA	EX SITU SOIL TREATMENT	2000
MCAAP-018	DEACTIVATION FURNACE/LAGOON	FRA	FENCE OR OTHER SITE ACCESS CONTROL MEASURES	2000
MCAAP-043	MINOL BUILDING (BLDG 644)	FRA	OTHER	2000
MCAAP-026	BURN AREA 2	FRA	SOLIDIFICATION/STABILIZATION	2003
MCAAP-032	BUILDING 209 PALLET DIPPING OPERATION	FRA	INSTITUTIONAL CONTROLS	2004
MCAAP-033	PALLET DIP OPERATION, BUILDING 471	FRA	INSTITUTIONAL CONTROLS	2004
MCAAP-046	FORMER SCRAP METAL BALER AREA	IRA	EX SITU SOIL TREATMENT	2005
MCAAP-047	PCB CONTAMINATION DETENTION AREA	FRA	REMOVAL	2005
MCAAP-048	MISCELLANEOUS TANKS	IRA	REMOVAL	2005
MCAAP-048	MISCELLANEOUS TANKS	FRA	NATURAL ATTENUATION	2008
MCAAP-046	FORMER SCRAP METAL BALER AREA	FRA	BIOREMEDIATION - IN SITU GROUNDWATER	2010
PBA@MCAAP	PBA@MCAAP	FRA	BIOREMEDIATION - IN SITU GROUNDWATER	2011

## IRP Summary

### Duration of IRP

**Date of IRP Inception:** 198709

**Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC):** 201010/204509

**Date of IRP completion including Long Term Management (LTM):** 204509

# IRP Contamination Assessment

## Contamination Assessment Overview

In 1987 the USEPA Region VI performed an RFA that identified eight solid waste management units (SWMU). In 1992 the US Army Environmental Hygiene Agency (USAEHA) performed an additional assessment that identified 42 potential SWMUs. On March 10, 1992 and March 11, 1992 consultations among the parties determined that the USAEHA report would be used as the baseline. All 42 of these sites were designated as Defense Environmental Restoration Program (DERP) eligible sites, and were entered into the Defense Site Environmental Restoration Tracking System (DSERTS), now AEDB-R. The ODEQ and the USEPA Region VI accepted the recommendation of no further action (NFA) for 33 of the sites, leaving nine that required further investigation.

On Jan. 25, 1993, MCAAP issued a memorandum to the USEPA Region VI providing notification of a newly identified SWMU, the Minol Building (MCAAP-043), and required further investigation for polychlorinated biphenyls (PCB), bringing the total number of sites requiring further investigation to 10. The USAEHA report identified Brown Lake as needing to be sampled and it subsequently became AEDB-R site MCAAP-044.

MCAAP requested, and the USAEC conducted, the RFI for the nine SWMUs identified in the permit, plus the newly identified SWMU (MCAAP-043). In December 1994 the RFI was submitted and NFA recommended at five of the 10 sites. On Dec. 15, 1998 the ODEQ accepted NFA for SWMUs 1, 2, 5, 12, and 19 by permit modification.

From 1994 to 1995 an RA was performed at the Minol Building. In 1998 the Deactivation Furnace/Lagoon (MCAAP-018) and in 2000 the Burn Area 2 (MCAAP-026) were remediated for lead contamination. On Dec. 15, 1998 these remedies were also accepted by permit modification. Based on risk assessments, the remaining sites, Building 209 Pallet Dipping Operation (MCAAP-032) and Pallet Dip Operation (MCAAP-033), were determined to meet the ODEQ remediation goals, thereby qualifying for NFA. On Oct. 4, 2000, the USEPA accepted the cleanup of the Minol Building (MCAAP-043) by letter. The application for permit renewal submitted in February 2002 requested final acceptance.

The MCAAP also investigated another site in December 1999 (the Roundhouse Complex) to determine if it required designation as a SWMU. The site did not meet the requirements to be designated as a SWMU, but was included in AEDB-R (MCAAP-045) and has since been remediated.

Over time several historical sites have come to the attention of MCAAP. In 1999 two possible sites (the Former Scrap Metal Baler Area and the Mortar Range Impact Area) were identified and investigated by the US Army Center for Health Promotion and Preventive Medicine (USACHPPM). The Former Scrap Metal Baler Area has been included in AEDB-R (MCAAP-046). The Mortar Range Impact Area is being addressed under the Military Munitions Response Program (MMRP). In 2001 two new Environmental Restoration, Army (ER,A) eligible AEDB-R sites, the PCB Contamination Detention Area (MCAAP-047) and Miscellaneous Tanks (MCAAP-048), were identified. In 2005 clean closure to unrestricted use was received from the USEPA for MCAAP-047.

The CMI(C) phase for MCAAP-048 and MCAAP-046 was achieved in 2008 and 2010 respectively and consists of a MNA well network. MCAAP-048 and MCAAP-046 are currently in the CMI(O) phase. MCAAP-046 will include an additional investigation and removal action to address soil contamination that was identified during a 2014 geophysical investigation of MCAAP-006-R-01 (co-located with MCAAP-046). Site maintenance activities are ongoing at MCAAP-002 which is in the LTM phase. The LUC inspections for MCAAP-002 were reduced from a semiannual to an annual schedule starting in 2009 and cap maintenance will be performed semiannually.

MCAAP-018, MCAAP-026, MCAAP-032, MCAAP-033 and MCAAP-043 are in the LTM phase which consists of five-year reviews to ensure RAs for the sites are still protective of human health and the environment.

## Cleanup Exit Strategy

In situ groundwater treatment followed by MNA was implemented for MCAAP-046 and MCAAP-048.

The CMI(O) phase is currently underway and will continue for 30 years until sample results are less than the maximum contaminant levels (MCL).

Five-year reviews will continue at sites where contamination was left in place to ensure RAs are still protective of human health and the environment.



## IRP Previous Studies

Year	Title	Author	Date
1979	Installation Environmental Impact Assessment	US Army Armament Materiel Readiness Command	MAR-1979
	McAlester Army Ammunition Plant Water Quality Management Study	Horacek, Smith, Painter and Spitz, Inc	NOV-1979
1987	RCRA Facility Assessment Report	McAlester Army Ammunition Plant	AUG-1987
1988	Update of the Initial Installation Assessment of McAlester Army Ammunition Plant	Environmental Science and Engineering, Inc	JUN-1988
1990	Groundwater Assessment	US Army Corps of Engineers	JAN-1990
1992	Wastewater Management Study No. 32-24-H094-92, Preliminary Toxicity Testing and Evaluation	US Army Environmental Hygiene Agency	FEB-1992
1994	RCRA Facility Investigation (RFI) Report for Various Solid Waste Management Units	Metcalf & Eddy, Inc	JAN-1994
	RCRA Facility Investigation and Risk Assessment Report - Supplemental Phase II - SWMU 32 and 33	Metcalf & Eddy, Inc	NOV-1994
	RCRA Facility Investigation and Risk Assessment (Final)	Metcalf & Eddy, Inc	DEC-1994
1995	Final Summary Report, Removal and Disposal of PCB Contaminated Material and Soil, Minol Building	Dow Environmental (formerly AWD)	JUL-1995
	Summary Report, Soil Sampling South of Building 177 (Draft, accepted as Final)	Dow Environmental (formerly AWD)	SEP-1995
1997	Final Corrective Measure Study Report - Deactivation Furnace and Lagoon - SWMU 18 and 34	R.F. Weston	JUN-1997
	Final Corrective Measure Study Report - Burn Area 2 - SWMU 26	R.F. Weston	JUN-1997
1999	Corrective Measure Completion Report - Minol Building	Radian International	MAR-1999
	Final Corrective Action Closure Report, SWMU #18 Soil Remediation and Lagoon Closure	IT Corporation/OHM Remediation Services	JUL-1999
	Final Corrective Measures Completion Report, Minol Building and Drainage Ditch South of Building 177	Radian International (formerly Dow Environmental)	JUL-1999
	Report for Removal and Disposal of Total Petroleum Hydrocarbons Contaminated Materials and Soil, Roundhouse Area	Woodward-Clyde	SEP-1999
	Hazardous and Medical Waste Study No. 37-EF-4333-00 Relative Risk Site Evaluation	USACHPPM	DEC-1999
2000	Final Corrective Measure Completion Report for SWMU 18 Soil Remediation and Lagoon Closure	IT Corporation/OHM Remediation Services	FEB-2000
	Final Corrective Action Closure Report, SWMU #26 Burn Area 2 Soil Remediation	IT Corporation/OHM Remediation Services	MAY-2000

## IRP Previous Studies

2000	Title	Author	Date
	Final Corrective Action Closure Report - Burn Area 2 - SWMU 26	IT Corporation/OHM Remediation Services	JUN-2000
	Final Corrective Measure Study Report - Former Pallet Dipping Area - Bldg 209 - SWMU 32	R.F. Weston	NOV-2000
	Final Corrective Measure Study Report - Former Pallet Dipping Area - Bldg 471 - SWMU 33	R.F. Weston	NOV-2000
2001			
	Hazardous and Medical Waste Study No. 37-EF-4333-01, Relative Risk Site Evaluation	USACHPPM	JAN-2001
	UST/PST Ground Penetrating Radar Report - Powder Settling Tank and Underground Storage Tanks - MCAAP 46 and MCAAP 48	GeoModel	FEB-2001
	Final Corrective Measures Study Work plan Former Scrap Metal Baler Area and PCB Contamination Detention Area at McAlester Army Ammunition Plant, McAlester, Oklahoma	Shaw Environmental	NOV-2001
	Final Corrective Measure Completion Report - Burn Area 2 Soil Remediation (SWMU 26)	IT Corporation/OHM Remediation Services	DEC-2001
2002			
	Magnetic Investigations - Powder Settling Tank and Underground Storage Tanks - MCAAP 46 and MCAAP 48	Environmental Geophysics Associates	JAN-2002
2003			
	Final Corrective Measures Study Work plan Former Scrap Metal Baler Area and PCB Contamination Detention Area - Final Addendum No. 1	Shaw Environmental	JAN-2003
	Final Corrective Measures Study Work plan Former Scrap Metal Baler Area and PCB Contamination Detention Area - Final Addendum No. 2	Shaw Environmental	JUL-2003
	Final Corrective Measures Study Work plan Former Scrap Metal Baler Area and PCB Contamination Detention Area - Final Addendum No. 3	Shaw Environmental	SEP-2003
	Field Activities Report - Investigation and Plume Delineation of Upper Groundwater Bearing Zone @ PST 103, 109A, 161, and 163	R.F. Weston	NOV-2003
2004			
	Final Corrective Measures Study Work plan Former Scrap Metal Baler Area and PCB Contamination Detention Area - Final Addendum No. 4	Shaw Environmental	APR-2004
	Final PCB Contamination Detention Area Remedial Action Completion Report	IT Corporation/Shaw Environmental	JUL-2004
2005			
	Final Corrective Measures Study Work plan Former Scrap Metal Baler Area and PCB Contamination Detention Area - Final Corrected Addendum No. 5	Shaw Environmental	JAN-2005
	Final RFI Addendum Report MCAAP-048	Weston Solutions, Inc.	FEB-2005
	Final RFI Report MCAAP-048, UST	Weston Solutions, Inc.	FEB-2005
	Final RFI Report MCAAP-048, PST	Weston Solutions, Inc.	MAR-2005
	Final Field Activities Report - Investigation and Plume Delineation of Upper Groundwater-bearing Zone at Former Scrap Metal Baler Site	US Army Corps of Engineers	APR-2005

## IRP Previous Studies

2005	Title	Author	Date
	Final Soil RCRA Facility Investigation Report, Former Scrap Metal Baler Area (DSERTS No. 46)	Shaw Environmental	MAY-2005
	Final Soil RFI Report for MCAAP-046	Shaw Environmental	MAY-2005
	Final Groundwater RCRA Facility Investigation Report Former Scrap Metal Baler Area, DSERTS No. 46	Shaw Environmental	DEC-2005
	Final Groundwater RFI report for MCAAP-046	Shaw Environmental	DEC-2005
2006			
	Site Conceptual Model PST Sites 161 & 163	Weston Solutions	FEB-2006
	Final Corrective Measures Study Work plan Former Scrap Metal Baler Area and PCB Contamination Detention Area - Final Corrected Addendum No. 6	Shaw Environmental	MAY-2006
	Final Corrective Measures Study for PST 103 and 109A	Weston Solutions, Inc.	NOV-2006
	Final Corrective Measures Study for PST 161 and 163	Weston Solutions, Inc.	NOV-2006
	Final Annual Groundwater Monitoring Report: Year One (June 2005 - April 2006) Former Scrap Metal Baler Area McAlester Army Ammunition Plant, Pittsburg County, Oklahoma	Shaw Environmental	DEC-2006
2007			
	Final Corrective Measures Implementation Plan for SWMU NO. 48	Weston Solutions	SEP-2007
2008			
	Corrective Measures Study Report Former Scrap Metal Baler Area	Shaw Environmental	FEB-2008
	Final Annual Groundwater Monitoring Report: Year Two (May 2006 - April 2007) Former Scrap Metal Baler Area McAlester Army Ammunition Plant, Pittsburg County, Oklahoma	Shaw Environmental	AUG-2008
2009			
	Corrected Final Groundwater Evaluation Report Year 3: September 2007 to April 2008 SWMU No. 48 Powder Settling Tanks	Shaw Environmental	JUN-2009
	Final Annual Groundwater Monitoring Report: Year Three (June 2007 - April 2008) Former Scrap Metal Baler Area	Shaw Environmental	JUN-2009
	Draft Corrective Measures Implementation (Plan), Former Scrap Metal Baler Area (MCAAP-046)	Shaw Environmental	JUL-2009
	Final Corrective Measures Implementation (Plan), Former Scrap Metal Baler - MCAAP-046	Shaw Environmental, INC	DEC-2009
2010			
	final Addendum Corrective Measures Implementation Plan (PST 161 & PST 163)	Shaw Environmental	JAN-2010
	Five Year Review	Shaw Environmental	DEC-2010
2011			
	Remedial Investigation Report for MMRP	Shaw Environmental	AUG-2011
	Corrected Final Remedial Investigation Report for Five Munitions Response Sites	Shaw Environmental Inc.	AUG-2011
	Final Groundwater Corrective Measures Implementation (O) Year 1 Former Scrap Metal Baler Area MCAAP-046	Shaw Environmental	OCT-2011

## IRP Previous Studies

	<b>Title</b>	<b>Author</b>	<b>Date</b>
<b>2012</b>	Final Groundwater Evaluation Report Year 6: 2011 SWMU No. 48 Powder Settling Tank	Shaw Environmental	MAR-2012
	Final Groundwater Corrective Measures Implementation (O) Year 2 Former Scrap Metal Baler Area MCAAP-046	Shaw Environmental	SEP-2012
<b>2013</b>	Final Groundwater Evaluation Report Year 7: 2012; SWMU No. 48 Powder Settling Tank	Shaw/CB&I	MAR-2013
	Final Groundwater Evaluation Report Year 8, 2013 SWMU No. 48, Powder Settling Tanks	Shaw/CB&I	DEC-2013
<b>2014</b>	Final Groundwater Report Corrective Measures Implementation (Operation): Year 3 Former Scrap Metal Baler Area (MCAAP-046)	Shaw (CB&I)	JAN-2014
	Final Groundwater Report Corrective Measures Implementation (Operation): Year 3 Former Scrap Metal Baler Area (MCAAP-046)	Shaw (CB&I)	JAN-2014
	Final Groundwater Report Corrective Measures Implementation (Operation): Year 4 Former Scrap Metal Baler Area (MCAAP-046)	PIKA-ARCADIS Joint Venture	DEC-2014
	Final Groundwater Evaluation Report Year 9, 2014. SWMU No. 48, Powder Settling Tanks	PIKA-ARCADIS Joint Venture	DEC-2014

**MCALESTER ARMY AMMUNITION PLANT**  
**Installation Restoration Program**  
**Site Descriptions**

Site Name: LANDFILL, SOUTHWEST OF BROWN LAKE

STATUS

Regulatory Driver: RCRA
RRSE: HIGH
Contaminants of Concern: Metals, Volatiles (VOC)
Media of Concern: Groundwater

Table with 3 columns: Phases, Start, End. Rows include RFA, CS, RFI/CMS, LTM, RIP Date, and RC Date.

SITE DESCRIPTION

This site of approximately 50 acres is located 1,000 feet south of the western end of Brown Lake in the central section of the installation. The site operated from 1967 until August 1990 as a general refuse landfill.

The results of the December 1994 RFI and Risk Assessment conducted by Metcalf & Eddy showed no complete exposure scenarios for groundwater, surface water, or sediment for an occupational receptor.

In accordance with a USEPA letter dated Sept. 15, 1994, long-term groundwater monitoring was continued in accordance with the ODEQ directives.

In March 2000, the ODEQ approved the groundwater assessment, which included terminating the long-term monitoring and abandoning the wells. In FY01 the wells were abandoned and in FY02 documentation of the abandonment was submitted to and accepted by the ODEQ to complete closure requirements.

LUCs are in place at the site and documented in the master planner base maps.

Five-year reviews were conducted in 2005 and 2010 which determined that the remedy is still protective of human health and the environment. The five-year reviews tracked under MCAAP-002 also cover the five-year reviews at the following sites: MCAAP-018, MCAAP-026, MCAAP-032, MCAAP-033, MCAAP-043, MCAAP-046, MCAAP-048.

The LUC inspections were reduced from a semiannual to an annual schedule starting in 2009 and mowing of the landfill cover will be performed semiannually. Any deficiencies or changes in the site usage or institutional controls will be documented in the remedy review report and necessary recommendations will be made to protect human health and the environment.

Site mowing and maintenance was conducted in 2011 and an SI conducted in October 2011; no deficiencies or changes were noted.

In April 2012, the third year, a landfill inspection revealed a few minor erosion issues at this landfill. Moving and repair work was performed from June 4 through June 6, 2012. An SI report was submitted on July 3, 2012. The following year, mowing was performed on Sept. 18-20, 2012. A landfill inspection was performed on Sept. 27, 2012. No major deficiencies were identified. The final SI report was submitted on Oct. 11, 2012. The next five-year review will occur in 2015.

In 2013, minor erosion repair, gate repair, and sign replacement occurred. Also, routine mowing was performed.

In 2014 minor erosion repairs and semiannual routine mowings were performed.

LUCs are in place at the sites and documented in the master planning maps.

**Site ID: MCAAP-002**

**Site Name: LANDFILL, SOUTHWEST OF BROWN LAKE**

## **CLEANUP/EXIT STRATEGY**

This landfill site is currently under a PBA contract. Cap maintenance includes mowing, inspections, and repairing areas of erosion. Five-year reviews will be performed at the site in order to determine if the remedy is still protective of human health and the environment. The reviews tracked under this site will also assess the existing LUCs at MCAAP-018, -026, -032, -033, -043, -046, and -048. In addition, routine landfill cap maintenance will be conducted at MCAAP-002 in accordance with the requirements and recommendations of the February 1990 landfill closure plan and the 2010 five-year review report.

Site ID: MCAAP-018

## Site Name: DEACTIVATION FURNACE/LAGOON

### STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Explosives, Metals

Media of Concern: Sediment, Soil

Phases	Start	End
RFA.....	199106.....	199206
CS.....	199212.....	199412
RFI/CMS.....	199602.....	199712
DES.....	199712.....	199806
IRA.....	199806.....	199812
CMI(C).....	199812.....	200001
CMI(O).....	200202.....	200206
LTM.....	200210.....	204409

RIP Date: 200202

RC Date: 200209

### SITE DESCRIPTION

The Deactivation Furnace Lagoon (MCAAP-018) is an earthen-bermed, water-filled lagoon measuring approximately 35 feet by 75 feet. The lagoon was located about 150 feet north of the deactivation furnace. The deactivation furnace is used to demilitarize old conventional ammunition by burning it at high temperatures and the lagoon may have received wastewater from the deactivation furnace. The period of time the lagoon may have received wastewater from the furnace is not known.

A CMS report was reviewed by the ODEQ and an IRA was approved on Dec. 5, 1997. The ODEQ approved the corrective measures implementation plan (CMIP) on March 31, 1998 and a final DD, part of a RCRA Part B permit modification, was approved on Dec. 15, 1998. By accepting the CMIP, the ODEQ accepted the IRA as the final RA. An RA was performed from June 1998 to July 1999 and a corrective action closure report was approved by the ODEQ on Oct. 15, 1999. The corrective measures completion report was approved March 15, 2000.

The LUCs are in place at the site and are documented in the master planner's base maps. The 2010 five-year review inspection indicated that no activity was performed that will affect the selected remedy. The LTM at the site consists of five-year reviews and all relative funding information is tracked under MCAAP-002.

### CLEANUP/EXIT STRATEGY

Five-year reviews will be performed at the site in order to determine if the remedy is still protective of human health and the environment. The reviews are tracked under MCAAP-002, but will also assess the LUCs at the following sites MCAAP-018, -026, -032, -033, -043, -046, and -048.



**Site ID: MCAAP-026**  
**Site Name: BURN AREA 2**

**STATUS**

**Regulatory Driver:** RCRA  
**RRSE:** HIGH  
Contaminants of Concern: Explosives, Metals  
Media of Concern: Soil

<b>Phases</b>	<b>Start</b>	<b>End</b>
RFA.....	199106.....	199206
CS.....	199212.....	199412
RFI/CMS.....	199601.....	199910
DES.....	199808.....	200201
CMI(C).....	199912.....	200307
LTM.....	200308.....	204409
<b>RIP Date:</b>	N/A	
<b>RC Date:</b>	200308	

**SITE DESCRIPTION**

This site is located south of C-Tree Road, west of the entrance to the medium caliber area in the eastern portion of the installation. The site is a former burn area of approximately 23 acres that contained several burn cages with blast walls around the burn cages to contain any debris from the burn operations. The site was operated from the mid-1940s to the mid-1960s. The site borders the western edge of Brown Lake (MCAAP-44). The results of the RFI found lead levels associated with unacceptable predicted blood lead levels for occupational scenarios.

The RFI recommended a CMS to determine the most viable method of eliminating the lead hazard. The USEPA agreed with the recommendation and directed a CMS be performed. The fieldwork for the CMS was completed in FY96. The CMS was submitted for regulatory review in FY97 with the preferred alternative of removal with stabilization and off-site disposal. The ODEQ issued a Part B permit modification on Dec. 15, 1998 accepting the CMS PP as the approved RA. Fieldwork was completed to meet industrial standards in February 2000. The ODEQ approved the closure report in August 2000. A corrective measures completion report was submitted to and approved by the ODEQ in FY02.

The 2010 five-year review inspection indicated that no activity was performed that will affect the selected remedy.

The LTM at the site consists of five-year reviews and all relative funding information is tracked under MCAAP-002.

**CLEANUP/EXIT STRATEGY**

Five-year reviews will be performed at the site in order to determine if the remedy is still protective of human health and the environment. The reviews are tracked under MCAAP-002, but will also assess the existing LUCs at the following sites MCAAP-018, -026, -032, -033, -043, -046, and -048.

Site Name: BUILDING 209 PALLET DIPPING OPERATION

STATUS

Regulatory Driver: RCRA

RRSE: MEDIUM

Contaminants of Concern: Dioxins/Dibenzofurans

Media of Concern: Soil

Phases	Start	End
RFA.....	199106.....	199206
CS.....	199212.....	199412
RFI/CMS.....	199901.....	200101
DES.....	200106.....	200408
CMI(C).....	200309.....	200409
LTM.....	200501.....	204409

RIP Date: N/A

RC Date: 200409

SITE DESCRIPTION

The site is located near the southwest corner of the Bomb Mine Area along Road 5 in the center section of the installation. The site is an open-sided, steel-girder structure set on a concrete block foundation. It is approximately 30 feet by 150 feet. In the 1970s and 1980s, when it was operational, wooden pallets were immersed into dipping vats containing a pentachlorophenol (PCP) solution. The pallets were then allowed to drip dry. In the 1980s, PCP was replaced with copper-8-hydroxyquinolate.

Soil samples taken during the RFI did not find any PCP, but copper was detected above background levels and dioxins were detected in composite samples. The RFI recommended NFA based upon the low occupational exposure, and the USEPA concurred. The ODEQ has accepted a risk and cleanup level of 5 parts per billion (ppb) dioxins, which is a value greater than the observed site concentrations.

In February 2001 the CMS for this site was accepted by the ODEQ with the following conditions:

- (1) The exposure assessment factors must remain similar to those predicted in the human health risk assessment referenced in the Final CMS Report - Former Pallet Dipping Area - Bldg. 209 - SWMU 32 (2000), and
- (2) If the area use should change, a reevaluation of the exposure assessment and risk assessment may be necessary.

In order to comply with the RFI recommendation for NFA and the assumptions used in the risk assessment, some institutional controls are required. These controls include, but are not limited to the following:

- site access (signs, security personnel),
- site maintenance (gravel, surface runoff);
- use of appropriate personal protective equipment when handling affected soil; and
- minimization of activities that disturb soil conditions.

A request for closure was accepted by the ODEQ as part of the RCRA Part B permit renewal. This site is considered closed, but is subject to being reopened by public comments during the permit renewal period.

A five-year review was conducted and determined the remedy is still protective of human health and the environment. The effectiveness of the sign in/out roster was measured in FY07 per the recommendation of the five-year review.

The LUCs are in place at the site and documented in the master planner's base maps.

An effectiveness evaluation of institutional controls was generated in FY08.

The 2010 five-year review inspection indicated that no activity was performed that will affect the selected remedy. The LTM at the site consists of five-year reviews and all relative funding information is tracked under MCAAP-002.

**Site ID: MCAAP-032**

**Site Name: BUILDING 209 PALLET DIPPING OPERATION**

## **CLEANUP/EXIT STRATEGY**

Five-year reviews will be performed at the site in order to determine if the remedy is still protective of human health and the environment. The reviews are tracked under MCAAP-002, but will also assess the existing LUCs at the following sites MCAAP-018, -026, -032, -033, -043, -046, and -048.

Site Name: PALLET DIP OPERATION, BUILDING 471

STATUS

Regulatory Driver: RCRA

RRSE: HIGH

Contaminants of Concern: Dioxins/Dibenzofurans

Media of Concern: Soil

Phases	Start	End
RFA.....	199106.....	199206
CS.....	199212.....	199412
RFI/CMS.....	199901.....	200101
DES.....	200106.....	200209
CMI(C).....	200208.....	200409
LTM.....	200501.....	204409

RIP Date: N/A

RC Date: 200409

SITE DESCRIPTION

This site is located due north of the medium caliber area in the northeast section of the installation. It is a covered crane way area approximately 15 feet by 30 feet. From 1972 to 1974 wooden pallets were dipped into a PCP solution and allowed to drip dry on the surrounding concrete.

Soil samples during the RFI revealed no PCP or copper levels above background levels; however, the supplemental RFI detected dioxins in composite samples. The RFI recommended NFA based upon the low occupational exposure and the USEPA concurred. Increased activity in the area by DAC has increased the exposure potential beyond that used in the risk analysis estimated during the RFI. The CMS for this site, which included a detailed risk assessment, recommended NFA.

The ODEQ has accepted a risk and cleanup level of 5 ppb for dioxins, which is a value greater than observed site concentrations. In February 2001 the CMS for this site was accepted by the ODEQ with the following conditions:

- (1) Exposure assessment factors must remain similar to those predicted in the human health risk assessment referenced in the Final CMS Report - Former Pallet Dipping Area - Bldg. 471 - SWMU 33 (2000), and
- (2) If the area usage should change, a reevaluation of the exposure assessment and risk assessment may be necessary.

In order to comply with the RFI recommendation for NFA and the assumptions used in the risk assessment, some institutional controls are required. These controls include, but are not limited to the following:

- site access (signs, security personnel),
- site maintenance (gravel, surface runoff);
- use of appropriate personal protective equipment when handling effected soil; and
- minimization of activities that disturb soil conditions.

A request for closure was accepted by the ODEQ as part of the RCRA Part B permit renewal. The site is considered closed, but is subject to being reopened by public comments during the permit renewal period.

The LUCs are in place at the site and documented in the master planner's base maps.

A five-year review was conducted and determined the remedy is still protective of human health and the environment. The effectiveness of the sign in/sign out roster was measured in FY07 per the recommendations of the five-year review.

An effectiveness evaluation of institutional controls was generated in FY08.

The 2010 five-year review inspection indicated that no additional activity was performed at this site that will affect the RIP.

The LTM at the site consists of five-year reviews and all relative funding information is tracked under MCAAP-002.

**Site ID: MCAAP-033**

**Site Name: PALLET DIP OPERATION, BUILDING 471**

## **CLEANUP/EXIT STRATEGY**

Five-year reviews will be performed at the site in order to determine if the remedy is still protective of human health and the environment. The reviews are tracked under MCAAP-002, but will also assess the existing LUCs at the following sites MCAAP-018, -026, -032, -033, -043, -046, and -048.

**Site ID: MCAAP-043**  
**Site Name: MINOL BUILDING (BLDG 644)**

**STATUS**

**Regulatory Driver:** RCRA

**RRSE:** HIGH

Contaminants of Concern: Polychlorinated Biphenyls (PCB)

Media of Concern: Sediment, Soil

Phases	Start	End
RFA.....	198709.....	198809
CS.....	199212.....	199412
RFI/CMS.....	199301.....	199412
DES.....	199405.....	199412
IRA.....	199406.....	199811
CMI(C).....	199812.....	200002
LTM.....	200501.....	204409

**RIP Date:** N/A

**RC Date:** 200102

**SITE DESCRIPTION**

This site is located in the Bomb Mine Area in the center of the installation. The site was an abandoned one-story, flat-topped, cement block building approximately 15 feet by 25 feet. In 1988 installation personnel sampled and discovered PCB contamination of the structure [less than 15 parts per million (ppm)] and the soil [as high as 1,600 milligrams per kilogram (mg/kg)]. On Jan. 25, 1993, the installation notified the USEPA Region VI that this was a new SWMU.

The RFI detected PCB 1242, PCB 1260, and total petroleum hydrocarbons (TPH) above acceptable USEPA human health risk standards in the soils around the Minol Building and PCB 1242/1260 inside the structure at levels that exceed health-based applicable or relevant and appropriate requirements for an occupational scenario. The USEPA approved remediation of this site and issued temporary authorization to proceed with the removal of contaminated soils and structures to a level not to exceed 25 ppm.

In June 1994 a contract was awarded to remove the Minol Building, its associated piping, and the surrounding soil; all were contaminated with PCBs. In March 1995 the fieldwork was completed, the contamination was determined to have spread downstream into a drainage swale. In February 1996 the swale area was remediated. Final cleanup reports have been received and show the cleanup was achieved well below the 25 ppm specified. In July 1999 the final corrective measures completion report for the Minol Building and Drainage Ditch South of Building 177 was submitted and was accepted by the USEPA on Oct. 4, 2000.

PCB-contaminated soil has been left in place at concentrations well below 25 ppm in accordance with 40 CFR 761.61. This complies with federal guidelines associated with self-implementing on-site cleanup and disposal efforts for low occupancy areas.

The LUCs are in place at the site and documented at the master planner's base maps.

In FY05 a five-year review was conducted which determined that the remedy is still protective of human health and the environment.

The 2010 five-year review inspection indicated that the site appeared to have been operated in accordance with the recommendations addressed by the CMS and that no additional construction activity was performed since the 2005 remedy review inspection. LTM at the site consists of five-year reviews and all relative funding information is tracked under MCAAP-002.

**CLEANUP/EXIT STRATEGY**

Five-year reviews will be performed at the site in order to determine if the remedy is still protective of human health and the environment. The reviews are tracked under MCAAP-002, but will also assess the existing LUCs at the following sites MCAAP-018, -026, -032, -033, -043, -046, and -048.

Site Name: FORMER SCRAP METAL BALER AREA

STATUS

Regulatory Driver: RCRA

RRSE: MEDIUM

Contaminants of Concern: Metals, Petroleum, Oil and Lubricants (POL), Polychlorinated Biphenyls (PCB), Semi-volatiles (SVOC), Volatiles (VOC)

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

Phases	Start	End
RFA.....	199912.....	200009
RFI/CMS.....	200106.....	200709
DES.....	200710.....	200912
IRA.....	200305.....	200505
CMI(C).....	200906.....	201005
CMI(O).....	201010.....	204509
RIP Date:	201010	
RC Date:	204509	

SITE DESCRIPTION

The Former Scrap Metal Baler Area site is located in the Defense Reutilization and Marketing Office (DRMO) yard. At this site, a resource recovery recycling program baler was used to compact metal cans and other metal objects. The cans crushed here are suspected of having contained paints, oils, solvents, and other liquids in varying amounts. Over the years of operation (from the 1950s to 1980s, and especially during the 1950s and 1960s), some of the waste materials are believed to have leached into the soil. During rainy periods, an oily layer has been noted floating on puddles in the vicinity of the baler. The baler and the underlying sump have been removed. The site presently consists of a gravel-covered area of about 3 acres, with an active rail line running through it.

In December 1999, the USACHPPM conducted sampling. PCBs, metals, and SVOC above USEPA Region VI residential medium-specific screening levels (MSSL) were detected in the soil.

The RFI, begun in 2002, found petroleum hydrocarbons in the soils and chlorinated organics above the MCL in the groundwater. In 2003 a plume delineation study was performed. Chlorinated organics were only identified in the upper water-bearing zone (WBZ). Sentry wells installed in 2004 indicated the plume had not been fully delineated to the south and southeast. New wells were installed between the sentry wells and Brown Lake. Analytical results from these wells indicate that the plume has not been delineated. Hydrogeologic characterization of the upper WBZ has indicated permeability may be near 1/1000 centimeter per second. In 2004 removal of petroleum hydrocarbon-contaminated soils was completed. During the soil removal, multiple 105 millimeter (mm) rounds were encountered and removed.

In June 2005 sampling for determination of acceptability of MNA was initiated. In FY06 four quarters of groundwater monitoring were performed and the horizontal and vertical extent of the upper WBZ groundwater plume were delineated. In FY06 two RFIs were approved and finalized. In FY07 four quarters of groundwater sampling were performed as part of the MNA strategy. In February 2008 the CMS was submitted. In March 2008, 20 wells were sampled for VOC and MNA parameters.

In June 2008, eight downgradient perimeter wells were sampled for VOCs. In September 2008, 20 wells were sampled for VOCs.

In FY08 and FY09, a draft CMIP was generated. Twenty wells were sampled in December 2008 and April 2009. This site was under a PBA contract (August 2009 - August 2014).

The ODEQ approved the CMIP in January 2010. In situ groundwater treatment began in 2010. Bioaugmentation activities were completed in May 2010. Groundwater monitoring was performed on a semiannual basis through 2013 and on an annual basis thereafter.

A presentation meeting was held with the ODEQ and the Army on Oct. 24, 2012. On Nov. 5, 2012, the ODEQ approved the CMI(O) year two groundwater report.

The CMI(O) phase is currently underway and will continue for 30 years until sample results are less than the MCLs.

**Site ID: MCAAP-046**

**Site Name: FORMER SCRAP METAL BALER AREA**

In 2014, during geophysical investigation of MCAAP-006-R-01 (co-located with MCAAP-046), a trench was excavated that uncovered four crushed 55-gallon drums. Four soil samples were collected from the trench and analyzed for VOCs, SVOCs and TPH GRO/DRO. All of the sample results had high levels of GRO and DRO. This area of MCAAP-046 will require further investigation to determine extent followed by a removal action.

### **CLEANUP/EXIT STRATEGY**

This site is under a PBA which includes a cleanup/exit strategy. The cleanup/exit strategy includes MNA and five-year reviews. Groundwater samples will be collected annually until concentrations are below MCLs. Five-year reviews will be performed at the site in order to determine if the remedy is still protective of human health and the environment. The reviews are tracked under MCAAP-002, but will also assess the existing LUCs at the following sites MCAAP-018, -026, -032, -033, -043, -046, and -048.

In 2014, during geophysical investigation of MCAAP-006-R-01 (co-located with MCAAP-046), a trench was excavated that uncovered four crushed 55-gallon drums. Four soil samples were collected from the trench and analyzed for VOCs, SVOCs and TPH GRO/DRO. All of the sample results had high levels of GRO and DRO. This area of MCAAP-046 will require further investigation to determine extent followed by a removal action.



**Site ID: MCAAP-048**  
**Site Name: MISCELLANEOUS TANKS**

**STATUS**

**Regulatory Driver:** RCRA

**RRSE:** MEDIUM

Contaminants of Concern: Volatiles (VOC)

Media of Concern: Groundwater

Phases	Start	End
RFA.....	200010.....	200103
RFI/CMS.....	200106.....	200709
DES.....	200703.....	200807
IRA.....	200106.....	200503
CMI(C).....	200703.....	200807
CMI(O).....	200807.....	204509

**RIP Date:** 200807

**RC Date:** 204509

**SITE DESCRIPTION**

SWMU-048 originally consisted of locations with 19 suspected underground storage tanks (UST) and 10 locations with powder settling tanks (PST). Water used to clean the walls and floors of the production facilities settled in the PSTs and was discharged through an overflow pipe. Petroleum hydrocarbons are the contaminants of concern (COC).

Suspected UST locations were identified from files obtained during development of an FY00 environmental baseline survey for privatization of utilities and subsequent retiree interviews. Documents suggest that USTs had been filled with sand and fuel left in place. USACHPPM evaluated the sites and determined that at least one UST remained. In 2000, USACHPPM, through a combined magnetometer survey and test pit excavation of the 19 sites, four sites (50PC 101, 105B, 136B, and near Roads CD and 7) were found to contain a total of 11 USTs. The 11 USTs were removed during the IRA in summer 2002. In November 2002 closure forms were submitted to Oklahoma Corporation Commission (OCC) and accepted without comment.

Petroleum hydrocarbons and low levels of trichloroethylene (TCE) were detected in some USTs. No TCE was found in the soil. Where petroleum hydrocarbon contamination was found, soils were removed until confirmation samples verified that levels were below OCC requirements. In 2002 the RFI found chlorinated organics (e.g., TCE) above MCL in the groundwater at MCAAP-103, 109A, 161, and 163. Several metals were identified above the USEPA drinking water screening levels. In 2003 the horizontal extents of four chlorinated organic plumes were delineated, including the largest plume (161) located adjacent to the backwaters of Brown Lake, a sensitive water supply. Chlorinated organics were not detected in the second WBZ. The PSTs were removed along with tank pit soil that contained concentrations exceeding 10 times the USEPA MSSLS (one in 100,000) risk. During removal in 2003, three sites (133, 161, 163) were determined to have emptied into the sanitary sewer and seven sites (103, 109, 109a, 110, 111, 126, 130) discharged into drainage pathways. In 2004 additional TCE-contaminated soil at PST Site 103 was removed. The hydrogeologic formation characteristics of the upper WBZ at the PST sites (103, 109A, 161, 163) were evaluated and background soil evaluation for metals was performed. In 2003, at the request of the ODEQ, the groundwater at four UST sites was investigated for possible release from the tanks. Selenium and phthalates were identified above MCLs, but were not attributed to the USTs; TPH concentrations were less than OCC action levels. In February 2005 the final UST RFI report was approved by the ODEQ.

The CMI(O) phase is currently underway and will continue for at least 30 years. Groundwater samples will be collected annually until concentrations are below MCLs.

**CLEANUP/EXIT STRATEGY**

This site is under a PBA which includes a cleanup/exit strategy. The cleanup/exit strategy includes MNA and five-year reviews. Groundwater samples will be collected annually until concentrations are below MCLs. The reviews are tracked under MCAAP-002, but will also assess the existing LUCs at the following sites MCAAP-018, -026, -032, -033, -043, -046, and -048.

## Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
MCAAP-001	LANDFILL, SOUTHEAST OF BROWN LAKE	199409	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-003	ACTIVE LANDFILL	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-004	LANDFILL, NW OF BLDG 52SH405	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-005	SCRAP METAL DISPOSAL AREA	199409	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-006	LANDFILL NE OF 20 MM AREA	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-007	DISPOSAL AREA NORTH OF DRMO	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-008	WOOD SCRAP YARD	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-009	LANDFILL, ROAD 4	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-010	LANDFILL SOUTH OF 71-BT AREA	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-011	LANDFILL, ROAD FOUR AND ROAD F	199206	This response complete recommendation

## Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
			was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-012	GROUP 41LC LAGOON AND LANDFILL AREA	199409	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-013	CONCRETE BOMB SETTLING PONDS, BLDG 454	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-014	CONCRETE BOMB SETTLING PONDS, BLDG 455	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-015	ROUNDHOUSE LAGOON	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-016	SEWAGE RETENTION LAGOON	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-017	BLDG 186 PONDS AND LAGOON	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-019	ROCKET LAKE	199409	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-020	B PLANT WEST LAGOON	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-021	B PLANT EAST LAGOON	199206	This response complete recommendation was accepted by the USEPA and is

## Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
			reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-022	MEDIUM CALIBER LAGOON	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-023	SPECIAL WEAPONS LAGOONS	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-024	C-TREE LAGOON	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-025	ACTIVE OPEN BURNING GROUND	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-027	OLD DEMOLITION AREA	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-028	NEW DEMOLITION AREA	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-029	SEDIMENTATION RETENTION BASIN	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-030	PINK WATER TREATMENT SYSTEM	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-031	PINK WATER COLLECTION SYSTEM	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of

## Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
			the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-034	DEACTIVATION FURNACE	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-035	SUSPECT ACID NEUTRALIZATION PIT	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-036	BURIAL SITE	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-037	WASTE OIL STORAGE TANK, RR HOUSE	199001	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-038	DRMO YARD	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-039	HAZARDOUS WASTE STORAGE AREA, BLDG 669	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-040	HAZ. WASTE STORAGE BUNKERS BLDG 41LC 103	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-041	SEWAGE TREATMENT PLANT	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-042	WATER TREATMENT PLANT @ BROWN LAKE	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued

## Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
			September 1992 and modified in December 1998.
MCAAP-044	BROWN LAKE	199206	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-045	ROUNDHOUSE COMPLEX	199909	This response complete recommendation was accepted by the USEPA and is reflected by its absence in Section IV of the RCRA Part B Permit issued September 1992 and modified in December 1998.
MCAAP-047	PCB CONTAMINATION DETENTION AREA	200501	USEPA approved Jan. 24, 2005
PBA@MCAAP	PBA@MCAAP	201406	PBA ended. Progress of all the sites covered in the PBA are now tracked at the individual site level.

## IRP Schedule

Date of IRP Inception: 198709

### Past Phase Completion Milestones

#### 1988

RFA (MCAAP-043 - MINOL BUILDING (BLDG 644))

#### 1989

RFI/CMS (MCAAP-037 - WASTE OIL STORAGE TANK, RR HOUSE)

RFA (MCAAP-037 - WASTE OIL STORAGE TANK, RR HOUSE)

DES (MCAAP-037 - WASTE OIL STORAGE TANK, RR HOUSE)

CS (MCAAP-037 - WASTE OIL STORAGE TANK, RR HOUSE)

#### 1990

CMI(C) (MCAAP-037 - WASTE OIL STORAGE TANK, RR HOUSE)

#### 1992

RFA (MCAAP-001 - LANDFILL, SOUTHEAST OF BROWN LAKE, MCAAP-002 - LANDFILL, SOUTHWEST OF BROWN LAKE, MCAAP-003 - ACTIVE LANDFILL, MCAAP-004 - LANDFILL, NW OF BLDG 52SH405, MCAAP-005 - SCRAP METAL DISPOSAL AREA, MCAAP-006 - LANDFILL NE OF 20 MM AREA, MCAAP-007 - DISPOSAL AREA NORTH OF DRMO, MCAAP-008 - WOOD SCRAP YARD, MCAAP-009 - LANDFILL, ROAD 4, MCAAP-010 - LANDFILL SOUTH OF 71-BT AREA, MCAAP-011 - LANDFILL, ROAD FOUR AND ROAD F, MCAAP-012 - GROUP 41LC LAGOON AND LANDFILL AREA, MCAAP-013 - CONCRETE BOMB SETTLING PONDS, BLDG 454, MCAAP-014 - CONCRETE BOMB SETTLING PONDS, BLDG 455, MCAAP-015 - ROUNDHOUSE LAGOON, MCAAP-016 - SEWAGE RETENTION LAGOON, MCAAP-017 - BLDG 186 PONDS AND LAGOON, MCAAP-018 - DEACTIVATION FURNACE/LAGOON, MCAAP-019 - ROCKET LAKE, MCAAP-020 - B PLANT WEST LAGOON, MCAAP-021 - B PLANT EAST LAGOON, MCAAP-022 - MEDIUM CALIBER LAGOON, MCAAP-023 - SPECIAL WEAPONS LAGOONS, MCAAP-024 - C-TREE LAGOON, MCAAP-025 - ACTIVE OPEN BURNING GROUND, MCAAP-026 - BURN AREA 2, MCAAP-027 - OLD DEMOLITION AREA, MCAAP-028 - NEW DEMOLITION AREA, MCAAP-029 - SEDIMENTATION RETENTION BASIN, MCAAP-030 - PINK WATER TREATMENT SYSTEM, MCAAP-031 - PINK WATER COLLECTION SYSTEM, MCAAP-032 - BUILDING 209 PALLET DIPPING OPERATION, MCAAP-033 - PALLET DIP OPERATION, BUILDING 471, MCAAP-034 - DEACTIVATION FURNACE, MCAAP-035 - SUSPECT ACID NEUTRALIZATION PIT, MCAAP-036 - BURIAL SITE, MCAAP-038 - DRMO YARD, MCAAP-039 - HAZARDOUS WASTE STORAGE AREA, BLDG 669, MCAAP-040 - HAZ. WASTE STORAGE BUNKERS BLDG 41LC 103, MCAAP-041 - SEWAGE TREATMENT PLANT, MCAAP-042 - WATER TREATMENT PLANT @ BROWN LAKE, MCAAP-044 - BROWN LAKE, MCAAP-045 - ROUNDHOUSE COMPLEX)

CS (MCAAP-001 - LANDFILL, SOUTHEAST OF BROWN LAKE, MCAAP-002 - LANDFILL, SOUTHWEST OF BROWN LAKE, MCAAP-003 - ACTIVE LANDFILL, MCAAP-004 - LANDFILL, NW OF BLDG 52SH405, MCAAP-005 - SCRAP METAL DISPOSAL AREA, MCAAP-006 - LANDFILL NE OF 20 MM AREA, MCAAP-007 - DISPOSAL AREA NORTH OF DRMO, MCAAP-008 - WOOD SCRAP YARD, MCAAP-009 - LANDFILL, ROAD 4, MCAAP-010 - LANDFILL SOUTH OF 71-BT AREA, MCAAP-011 - LANDFILL, ROAD FOUR AND ROAD F, MCAAP-012 - GROUP 41LC LAGOON AND LANDFILL AREA, MCAAP-013 - CONCRETE BOMB SETTLING PONDS, BLDG 454, MCAAP-014 - CONCRETE BOMB SETTLING PONDS, BLDG 455, MCAAP-015 - ROUNDHOUSE LAGOON, MCAAP-016 - SEWAGE RETENTION LAGOON, MCAAP-017 - BLDG 186 PONDS AND LAGOON, MCAAP-019 - ROCKET LAKE, MCAAP-020 - B PLANT WEST LAGOON, MCAAP-021 - B PLANT EAST LAGOON, MCAAP-022 - MEDIUM CALIBER LAGOON, MCAAP-023 - SPECIAL WEAPONS LAGOONS, MCAAP-024 - C-TREE LAGOON, MCAAP-025 - ACTIVE OPEN BURNING GROUND, MCAAP-027 - OLD DEMOLITION AREA, MCAAP-028 - NEW DEMOLITION AREA, MCAAP-029 - SEDIMENTATION RETENTION BASIN, MCAAP-030 - PINK WATER TREATMENT SYSTEM, MCAAP-031 - PINK WATER COLLECTION SYSTEM, MCAAP-034 - DEACTIVATION FURNACE, MCAAP-035 - SUSPECT ACID NEUTRALIZATION PIT, MCAAP-036 - BURIAL SITE, MCAAP-038 - DRMO YARD, MCAAP-039 - HAZARDOUS WASTE STORAGE AREA, BLDG 669, MCAAP-040 - HAZ. WASTE STORAGE BUNKERS BLDG 41LC 103, MCAAP-041 - SEWAGE TREATMENT PLANT, MCAAP-042 - WATER TREATMENT PLANT @ BROWN LAKE, MCAAP-044 - BROWN LAKE)

#### 1994

RFI/CMS (MCAAP-001 - LANDFILL, SOUTHEAST OF BROWN LAKE, MCAAP-002 - LANDFILL, SOUTHWEST OF BROWN LAKE, MCAAP-005 - SCRAP METAL DISPOSAL AREA, MCAAP-012 - GROUP 41LC LAGOON AND LANDFILL AREA, MCAAP-019 - ROCKET LAKE)



## 1995

RFI/CMS (MCAAP-043 - MINOL BUILDING (BLDG 644))  
 CS (MCAAP-018 - DEACTIVATION FURNACE/LAGOON, MCAAP-026 - BURN AREA 2, MCAAP-032 - BUILDING 209 PALLET DIPPING OPERATION, MCAAP-033 - PALLET DIP OPERATION, BUILDING 471, MCAAP-043 - MINOL BUILDING (BLDG 644))  
 DES (MCAAP-043 - MINOL BUILDING (BLDG 644))

## 1998

CMI(C) (MCAAP-045 - ROUNDHOUSE COMPLEX)  
 RFI/CMS (MCAAP-018 - DEACTIVATION FURNACE/LAGOON, MCAAP-045 - ROUNDHOUSE COMPLEX)  
 DES (MCAAP-018 - DEACTIVATION FURNACE/LAGOON, MCAAP-045 - ROUNDHOUSE COMPLEX)  
 CS (MCAAP-045 - ROUNDHOUSE COMPLEX)

## 1999

IRA (MCAAP-018 - DEACTIVATION FURNACE/LAGOON, MCAAP-043 - MINOL BUILDING (BLDG 644))  
 RFA (MCAAP-047 - PCB CONTAMINATION DETENTION AREA)

## 2000

RFI/CMS (MCAAP-026 - BURN AREA 2)  
 RFA (MCAAP-046 - FORMER SCRAP METAL BALER AREA)  
 CMI(C) (MCAAP-018 - DEACTIVATION FURNACE/LAGOON, MCAAP-043 - MINOL BUILDING (BLDG 644))

## 2001

RFI/CMS (MCAAP-032 - BUILDING 209 PALLET DIPPING OPERATION, MCAAP-033 - PALLET DIP OPERATION, BUILDING 471, MCAAP-047 - PCB CONTAMINATION DETENTION AREA)  
 RFA (MCAAP-048 - MISCELLANEOUS TANKS, PBA@MCAAP - PBA@MCAAP)  
 CS (MCAAP-047 - PCB CONTAMINATION DETENTION AREA)

## 2002

DES (MCAAP-026 - BURN AREA 2, MCAAP-033 - PALLET DIP OPERATION, BUILDING 471)  
 CMI(O) (MCAAP-018 - DEACTIVATION FURNACE/LAGOON)

## 2003

CMI(C) (MCAAP-026 - BURN AREA 2)

## 2004

CMI(C) (MCAAP-032 - BUILDING 209 PALLET DIPPING OPERATION, MCAAP-033 - PALLET DIP OPERATION, BUILDING 471)  
 DES (MCAAP-032 - BUILDING 209 PALLET DIPPING OPERATION)

## 2005

IRA (MCAAP-046 - FORMER SCRAP METAL BALER AREA, MCAAP-048 - MISCELLANEOUS TANKS)  
 CMI(C) (MCAAP-047 - PCB CONTAMINATION DETENTION AREA)

## 2007

RFI/CMS (MCAAP-046 - FORMER SCRAP METAL BALER AREA, MCAAP-048 - MISCELLANEOUS TANKS)

## 2008

DES (MCAAP-048 - MISCELLANEOUS TANKS)  
 CMI(C) (MCAAP-048 - MISCELLANEOUS TANKS)

## 2010

CMI(C) (MCAAP-046 - FORMER SCRAP METAL BALER AREA)  
 DES (MCAAP-046 - FORMER SCRAP METAL BALER AREA)

## 2011

DES (PBA@MCAAP - PBA@MCAAP)  
 CMI(C) (PBA@MCAAP - PBA@MCAAP)



# IRP Schedule

2014

CMI(O) (PBA@MCAAP - PBA@MCAAP)

## Projected Phase Completion Milestones

See attached schedule

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

Site ID	Site Name	ROD/DD Title	ROD/DD Date
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Final RA(C) Completion Date: 201010

Schedule for Next Five-Year Review: 2016

Estimated Completion Date of IRP at Installation (including LTM phase): 204509

## MCALESTER ARMY AMMUNITION PLANT IRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-002	LANDFILL, SOUTHWEST OF BROWN LAKE	LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-018	DEACTIVATION FURNACE/LAGOON	LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-026	BURN AREA 2	LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-032	BUILDING 209 PALLET DIPPING OPERATION	LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-033	PALLET DIP OPERATION, BUILDING 471	LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-043	MINOL BUILDING (BLDG 644)	LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-046	FORMER SCRAP METAL BALER AREA	CMI(O)						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-048	MISCELLANEOUS TANKS	CMI(O)						

**MCALESTER 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:** 8/2

## Installation Site Types with Future and/or Underway Phases

- 1 Burn Area  
(MCAAP-002-R-01)
- 1 Firing Range  
(MCAAP-005-R-02)
- 1 Storage Area  
(MCAAP-006-R-01)
- 3 Surface Disposal Area  
(MCAAP-001-R-01, MCAAP-003-R-01, MCAAP-004-R-01)

## Most Widespread Contaminants of Concern

Munitions and explosives of concern (MEC), Munitions constituents (MC)

## Media of Concern

Soil

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

Site ID	Site Name	Action	Remedy	FY
MCAAP-001-R-01	SCRAP METAL DISPOSAL AREA	IRA	INSTITUTIONAL CONTROLS	2012
MCAAP-002-R-01	WOOD SCRAP YARD	IRA	INSTITUTIONAL CONTROLS	2012
MCAAP-003-R-01	ABANDONED LANDFILL	IRA	INSTITUTIONAL CONTROLS	2012
MCAAP-004-R-01	GROUP 41 LC LAGOON & LANDFILL AREA	IRA	INSTITUTIONAL CONTROLS	2012
MCAAP-005-R-02	Mortar Range Impact Area	IRA	INSTITUTIONAL CONTROLS	2012
PBA@MR MCAAP	PBA@MR MCAAP	IRA	INSTITUTIONAL CONTROLS	2012

## Duration of MMRP

**Date of MMRP Inception:** 200212

**Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC):** 201609/201609

**Date of MMRP completion including Long Term Management (LTM):** 204509

# MMRP Contamination Assessment

## Contamination Assessment Overview

The DoD established the Military Munitions Response Program (MMRP) under the DERP to identify and address sites known or suspected to contain unexploded ordnance (UXO), discarded military munitions (DMM), or MC. The program concluded that RAs would be conducted under the process outlined in the National Oil and Hazardous Substances Pollution Contingency Plan as authorized by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).

The MMRP started with a baseline inventory that included a three-phase approach resulting in a closed, transferred, or transferring (CTT) range/site inventory report. The initial phase involved a data call requesting general information about ranges located at MCAAP. This initial phase indicated one MRS.

Phase II involved a survey and inventory of all operational ranges. The intent of the inventory was to collect detailed, site-specific information, which delineated among other things, the operational range boundaries. On Aug. 8, 2001 the Phase II inventory for MCAAP was conducted and concluded that 39.31 acres of MCAAP are considered nonoperational.

Phase III was a comprehensive inventory of nonoperational ranges and other sites with known or suspected UXO, DMM, or MC. After the Phase III inventory, five MRS were identified at MCAAP.

Following CERCLA guidance, completion of the CTT range/site inventory report satisfies the PA phase. In 2004 an SI phase began to collect information for refining the MMRP cost-to-complete estimates and determine if an RI is required. In March 2005 a historical records review (HRR), which is the initial step of the SI phase, was completed and further characterization at all five sites was recommended. In FY05 fieldwork was conducted to address data gaps that were identified during the records review and continue the site characterization. In FY06 the SI report was approved by the ODEQ.

During the 2006 hunting season, hunters found 40 mm parts and debris from rocket fins on MCAAP-005-R-02. Joggers have also noted finding debris.

An RI was completed in FY11 for five MRS: MCAAP-001-R-01, MCAAP-002-R-01, MCAAP-003-R-01, MCAAP-004-R-01 and MCAAP-005-R-0). ODEQ approved the RI report requiring MCAAP to supplement the report with a plan for the prevention of risk from any remaining MEC at the five MRS. An FS PP, and DD were completed in FY14 for the five MRS with LUCs/LTM anticipated to be implemented in 2015/2016.

An RI work plan was completed in FY14 for MCAAP-006-R-01 and initial RI work completed in FY14. Additional RI work is anticipated in FY15 followed by an RI report, FS, PP, and DD.

## Cleanup Exit Strategy

The RA(C) phase for the five MRS will include use restrictions documented with the master planner and signage for two sites (MCAAP-003-R-01 and MCAAP-005-R-02). The LTM phase for the five MRS will include the implementation of institutional controls and five-year reviews.

MCAAP-006-R-01 will require an FS after the RI followed by a PP and DD. It is too early to determine the RAs for MCAAP-006-R-01.

## MMRP Previous Studies

Year	Title	Author	Date
2000	US Army Advance Range Survey for McAlester Army Ammunition Plant, McAlester AAP	Installation	NOV-2000
2001	US Army Active/Inactive (A/I) Range Inventory for McAlester Army Ammunition Plant	USAEC	DEC-2001
2003	US Army Closed, Transferring & Transferred Range/Site Inventory for McAlester Army Ammunition Plant	Engineering-Environmental Management, Inc	APR-2003
2004	Historical Records Review for McAlester Army Ammunition Plant	Engineering-Environmental Management, Inc	DEC-2004
2005	Final Work Plan, Military Munitions Response Program, Site Inspection, Munitions Response Sites at McAlester Army Ammunition Plant, McAlester, OK	Engineering-Environmental Management, Inc.	JUN-2005
2006	Final Site Inspection Report, McAlester Army Ammunition Plant, Military Munitions Response Program, Site Inspection, McAlester, OK	Engineering-Environmental Management, Inc.	MAR-2006
2007	Final Groundwater Effectiveness Report MCAAP 048, PST (2005-2006)	Weston Solutions, INC.	MAY-2007
2010	Final Community Involvement Plan Update, McAlester Army Ammunition Plant, Oklahoma	Shaw Environmental	JUN-2010
2011	Corrected Final Work Plan, Remedial Investigation at Five Munitions Response Sites, McAlester Army Ammunition Plant, Oklahoma	Shaw Environmental Inc.	AUG-2011
2013	Final Feasibility Study for 3 Munitions Response Sites: Scrap Metal Disposal Area (MCAAP-001-R-01); Wood Scrap Yard (MCAAP-002-R-01); Group 41 LC Lagoon and Landfill (MCAAP-004-R-01)	Shaw/CB&I	MAR-2013
	Final Feasibility Study for 2 Munitions Response Sites: Abandoned Landfill (MCAAP-003-R-01) and Mortar Range Impact Area (MCAAP-005-R-02)	Shaw/CB&I	MAR-2013
	Final Non-Time Critical Removal Action Land Use Control Plan, MMRP	URS Group, Inc. Arcadis/Malcolm Pirnie	APR-2013
	Proposed Plan for Munitions Response Program: Abandoned Landfill and Mortar Range Impact Area	Shaw/CB&I	DEC-2013
	Proposed Plan for Military Munitions Response Program: Three Munitions Response Sites	Shaw/CB&I	DEC-2013
2014	Decision Document for Three Munitions Response Sites: Scrap Metal Disposal Area (MCAAP-001-R-01), Wood Scrap Yard (MCAAP-002-R-01), and Group 41 LC Lagoons and Lanfill (MCAAP-004-R-01)	Shaw/CM&I	MAY-2014
	Decision Document for Two Munitions Reponse Sites: Abandoned Landfill (MCAAP-003-R-01) and Mortar Range Impact Area (MCAAP-005-R-02)	Shaw/CB&I	MAY-2014

## MMRP Previous Studies

	Title	Author	Date
2014	Workplan for the Remedial Investigation of the Scrap Metal Disposal Yard (MCAAP-006-R-01)	Shaw/CB&I	MAY-2014

**MCALESTER ARMY AMMUNITION PLANT**  
**Military Munitions Response Program**  
**Site Descriptions**



**Site ID: MCAAP-001-R-01**  
**Site Name: SCRAP METAL DISPOSAL AREA**

**STATUS**

**Regulatory Driver:** CERCLA  
**MRSPP Score:** 05  
 Contaminants of Concern: Munitions and explosives of concern (MEC), Munitions constituents (MC)  
 Media of Concern: Groundwater, Soil

Phases	Start	End
PA.....	200212.....	200305
SI.....	200404.....	200603
RI/FS.....	200906.....	201411
IRA.....	201105.....	201209
RA(C).....	201411.....	201609
LTM.....	201609.....	204509
<b>RIP Date:</b>	N/A	
<b>RC Date:</b>	201609	

**SITE DESCRIPTION**

The Scrap Metal Disposal Area is located in the northeast portion of the installation. The site is approximately 10.2 acres in size, including a surface debris pile that covers 1.6 acres and two lagoons that total approximately 0.7 acres. The two lagoons are approximately 0.1 acre and 0.6 acre, respectively, in size or 0.7 total acreage. The lagoons are south of the landfill area and east of the medium caliber area. The landfill area accounts for 9.6 acres including the two lagoons and surface debris pile. From 1960 to 1970 this site was a scrap metal and munitions debris disposal area for refuse, including cans, buckets, drums, Zuni rocket bodies, and incinerator and electrical refuse. Similar debris was reported present in the lagoons. The depth of the fill is unknown. Currently, Zuni rocket bodies and scrap metal refuse are located on the surface of the landfill area, mounded along the northern and western perimeter. The site remains undeveloped as open grassy areas with sparse trees.

As part of the IRP, this site was identified as MCAAP-005 and NFA was approved by the ODEQ due to the absence of human health risk and the low ecological impact. The UXO responses have not been conducted at this site.

The SI was completed and on March 17, 2006 the ODEQ provided a letter accepting the recommendations stated in the SI report. This MRS has been recommended for further characterization based upon the potential for MEC. The MRS contained large quantities of munitions debris where it could not be determined if MEC were present or not. This site also had elevated levels of metal, primarily iron, in the collected surface soil samples, which are likely the result of the corrosion and deterioration of the munitions debris and associated scrap items.

An RI was completed in FY11. The nature and extent of MEC/MC has been adequately determined; no MEC items were found at the site. Fate and transport of MC is not a concern at the site. A human health and ecological risk assessment were performed as part of the RI. Thallium and lead were identified as potential COCs for human health in soil. Copper, chromium, lead, nickel, vanadium, and zinc were identified as potential COCs for ecological exposure.

The FS was finalized in FY13. Based on the results of this FS, LUCs are the most cost-effective alternative considering the relatively low risk posed by MEC and MC at this site.

The DD was finalized in FY14. The final DD identifies LUCs as the remedy for the site.

**CLEANUP/EXIT STRATEGY**

LTM will consist of five-year reviews and MEC institutional controls.

**Site ID: MCAAP-002-R-01**  
**Site Name: WOOD SCRAP YARD**

**STATUS**

**Regulatory Driver:** CERCLA

**MRSPP Score:** 05

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

Media of Concern: Groundwater, Soil

Phases	Start	End
PA.....	200212.....	200305
SI.....	200404.....	200603
RI/FS.....	200906.....	201411
IRA.....	201103.....	201209
RA(C).....	201411.....	201609
LTM.....	201609.....	204509

**RIP Date:** N/A

**RC Date:** 201609

**SITE DESCRIPTION**

This 8.71-acre MRS is located in the north central part of the installation, northeast of the intersection of Road 4 and Road F. This site has been used since 1970 to store scrap wood and lumber for future reuse at the installation, and the paved areas of the site are currently being used for the same purpose. At one time the site was a landfill and a burn area for ordnance disposal and burning of secondary explosives. The exact locations of the landfill and burn area are unknown. A number of MEC items (previously referred to as ordnance and explosives) were reportedly burned at the site, including trinitrotoluene (TNT), ammonium picrate, smokeless powder, pentaerythritol tetranitrate (PETN), compositions A,B,C, 2,4,6-trinitrophenylmethylnitramine (Tetryl), hexahydro-1,3,5-trinitro-1,3,5-triazine, cyclotrimethylenetrinitramine (RDX), also known as cyclonite], octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine [High Melting Explosive (HMX), also known as Octogen], hexahydro-1,3,5-trinitro-8-triazine (HBX), and black powder. Though undeveloped, the site is currently being used to store scrap wood for sale to the public and reuse. The site is cleared with a large gravel area and grassy area to the east.

As part of the IRP, this site is identified as MCAAP-008 and NFA was approved by the ODEQ due to low exposure potential and a lack of documented evidence of a release. UXO responses have not been conducted at this site.

The SI was completed and on March 17, 2006 the ODEQ provided a letter accepting the recommendations stated in the SI report. This MRS has been recommended for further characterization for MEC. No MEC were located during the visual/MEC survey of the Wood Scrap Yard MRS. A digital geophysical mapping survey conducted in the grassy area of this MRS indicated areas of landfilling. Based on these findings and historical evidence of the potential of an open burn (OB)/open detonation (OD) pit, the presence of subsurface MEC cannot be ruled out. This site also had elevated levels of metal, primarily iron, in the collected surface soil samples, which are likely the result of the corrosion and deterioration of the munitions debris and associated scrap items.

An RI was completed in FY11. The nature and extent of MEC/MC has been adequately determined; no MEC items were found at the site. Fate and transport of MC is not a concern at the site. A human health and ecological risk assessment were performed as part of the RI. Arsenic and thallium were identified as potential COCs for human health in soil. Vanadium was identified as a potential COC for ecological exposure.

An FS was finalized in FY13. Based on the results of this FS, LUCs is the most cost-effective alternative considering the relatively low risk posed by MEC and MC at this site. The DD was finalized in FY14. The final DD identifies LUCs as the remedy for the site. LTM will consist of five-year reviews and MEC institutional controls.

**CLEANUP/EXIT STRATEGY**

LTM will consist of five-year reviews and institutional controls.

**Site ID: MCAAP-003-R-01**  
**Site Name: ABANDONED LANDFILL**

**STATUS**

**Regulatory Driver:** CERCLA  
**MRSPP Score:** 04  
 Contaminants of Concern: Munitions and explosives of concern (MEC), Munitions constituents (MC)  
 Media of Concern: Groundwater, Soil

Phases	Start	End
PA.....	200212.....	200305
SI.....	200404.....	200603
RI/FS.....	200906.....	201411
IRA.....	201103.....	201209
RA(C).....	201411.....	201609
LTM.....	201609.....	204509
<b>RIP Date:</b>	N/A	
<b>RC Date:</b>	201609	

**SITE DESCRIPTION**

This 15.66-acre MRS is located in the southeast part of the installation, south of the Group 71-BT area and southwest of the 90 degree bend in Road F. Between 1950 and 1970 the landfill received unknown waste, including rocket bodies, metal boxes, wire, and concrete rubble. Currently, Zuni rocket bodies are located on the surface of this area and the site remains undeveloped and is covered with heavy vegetation.

As part of the IRP, this site is identified as MCAAP-010 and NFA was approved by the ODEQ. The UXO responses have not been conducted at this site.

The SI was completed and on March 17, 2006, the ODEQ provided a letter accepting the recommendations stated in the SI report. This MRS has been recommended for further characterization based upon the potential for MEC. The MRS contained large quantities of munitions debris where it could not be determined if MEC were present or not. The site also had elevated levels of metals, primarily iron, in the collected surface soil samples, which are likely the result of the corrosion and deterioration of the munitions debris and associated scrap items.

An RI was completed in FY11. The nature and extent of MEC/MC has been adequately determined; no MEC items were found at the site. Two items (fuzes) of management of material presenting potential explosive hazard were identified at the site and subsequently removed and destroyed. Fate and transport of MC is not a concern at the site. A human health and ecological risk assessment were performed as part of the RI. Thallium and RDX (explosive) were identified as potential COCs for human health in soil. Barium and zinc were identified as potential COCs for ecological exposure.

An FS was finalized in FY13. Based on the results of this FS, LUCs are the most cost-effective alternative considering the relatively low risk posed by MEC and MC at this site.

The DD was finalized in FY14. The final DD identifies LUCs as the remedy for the site because the long-term effectiveness of the MEC clearance activity would be compromised by potential kickouts from the active, adjacent Demolition Range A. LTM will consist of five-year reviews, MEC engineering controls, and MEC institutional controls.

**CLEANUP/EXIT STRATEGY**

LTM will consist of five-year reviews and MEC institutional controls.

**Site ID: MCAAP-004-R-01**

**Site Name: GROUP 41 LC LAGOON & LANDFILL AREA**

**STATUS**

**Regulatory Driver:** CERCLA  
**MRSPP Score:** 05  
 Contaminants of Concern: Munitions and explosives of concern (MEC), Munitions constituents (MC)  
 Media of Concern: Groundwater, Soil

Phases	Start	End
PA.....	200212.....	200305
SI.....	200404.....	200603
RI/FS.....	200906.....	201411
IRA.....	201103.....	201209
RA(C).....	201411.....	201609
LTM.....	201609.....	204509
<b>RIP Date:</b>	N/A	
<b>RC Date:</b>	201609	

**SITE DESCRIPTION**

This 23.91-acre MRS is located in the north central part of the installation south of the 41 LC bunker area and it includes two 5-acre lagoons. The lagoons were thought to be borrow pits to cover the disposal area. From 1945 to 1960 this area was used as a dump for miscellaneous scrap metal including significant amounts of mortar casings and rocket bodies (munitions debris). Types of MEC reported at the site included 20 mm fused rounds and possible intact DMM. The depth of the landfill is not known. Although MEC surveying or MC sampling in the lagoons was not within the scope of the SI, it cannot be ruled out as there may be MEC in the lagoons as well. Currently, mortar casings are located on the surface of this site and the site remains undeveloped and covered with grass and sparse trees.

As part of the IRP, this site is identified as MCAAP-012. Surface water was collected and analyzed for target compound list organics, pesticides, explosives, target analyte list (TAL) metals, cyanide, sulfates, and nitrates. Sediment was collected and analyzed for explosives, TAL metals, and cyanide and fish samples were analyzed for TAL metals. Under the IRP, NFA was approved by the ODEQ due to the absence of a human health risk and low ecological impact. The UXO responses have not been conducted at this site.

The SI was completed and on March 17, 2006 the ODEQ provided a letter accepting the recommendations stated in the SI report. This MRS has been recommended for further characterization based upon the potential for MEC. The MRS contained large quantities of munitions debris and a determination of whether or not MEC were present could not be made. This site also had elevated levels of metal, primarily iron, in the collected surface soil samples, which are likely the result of the corrosion and deterioration of the munitions debris and associated scrap items.

An RI was completed in FY11. The nature and extent of MEC/MC has been adequately determined; no MEC items were found at the site. Fate and transport of MC is not a concern at the site. A human health and ecological risk assessment were performed as part of the RI. Thallium was identified as a potential COCs for human health in soil. No potential COCs for ecological exposure were identified.

A FS was finalized in FY13. Based on the results of this FS, LUCs are the most cost-effective alternative considering the relatively low risk posed by MEC and MC at this site.

The DD was finalized in FY14. The final DD identifies LUCs as the remedy for the site.

**CLEANUP/EXIT STRATEGY**

LTM will consist of five-year reviews and MEC institutional controls.

## Site ID: MCAAP-005-R-02

### Site Name: Mortar Range Impact Area

#### STATUS

**Regulatory Driver:** CERCLA

**MRSPP Score:** 05

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

Media of Concern: Groundwater, Soil, Surface Water

Phases	Start	End
PA.....	200212.....	200305
SI.....	200404.....	200603
RI/FS.....	200906.....	201411
IRA.....	201103.....	201209
RA(C).....	201408.....	201609
LTM.....	201609.....	204509

**RIP Date:** N/A

**RC Date:** 201609

#### SITE DESCRIPTION

This former mortar range impact area is located at the east side of Brown Lake and was used from 1962 through 1977 by the US Marines during fire power shows in conjunction with Armed Forces Day celebrations. Mortars of various sizes, large caliber munitions, and machine gun and tracer rounds were fired across Brown Lake into the impact area and at targets on Brown Lake. The firing point or firing areas were located on a peninsula on the north side of the lake, while the impact area included Brown Lake and the land located on the south side of the lake. The latter currently includes a recreational area called Camp Plea. The boundaries of the Mortar Range Impact Area were not well defined in documents reviewed during the HRR; therefore boundaries arbitrarily set based upon the evidence available included the north peninsula, Camp Plea, and a portion of the wooded area adjacent to Camp Plea. The closed range boundary is also truncated against operational range property just south of Camp Plea. The total area of this MRS is 74.54 acres: 46.49 acres for the Brown Lake area and 28.05 acres for the Camp Plea area of the Impact MRS.

According to the records reviewed, the demonstrations of fire power, assaults, and beach landings included the use of M-1 rifles, Browning automatic rifles, flame throwers, rifle grenades, 3.5-inch rockets (bazooka), mortars (60 mm, 81 mm), and recoilless rifles. The demonstrations also included the loading and firing of 105 mm, 155 mm, and 8-inch howitzers; M16 rifles; and M1818A-4 (0.30 caliber) machine guns.

The SI was completed and on March 17, 2006 the ODEQ provided a letter accepting the recommendations stated in the SI report. The impact area MRS includes Brown Lake, which is likely to contain MEC and munitions debris. Reportedly, during dry periods when the lake water level is down, white phosphorus canisters have been observed near the south shoreline; however, these items would be considered subsurface active, whereas the subsurface items may be exposed during times of low water levels. SI field activities were not performed in Brown Lake.

The impact area MRS also includes the south side of Brown Lake in the Camp Plea area which was the impact area for the Armed Services Day demonstrations. This area showed no evidence of MEC or MC during the SI fieldwork. Records reviewed indicate this area was thoroughly swept twice for MEC or munitions debris prior to the current housing construction. Any items which were either on or near the surface were most likely removed at that time. The recent magnetometer-assisted visual survey indicated no surface or near-surface MEC. Based upon the relatively shallow bedrock at MCAAP the probability of subsurface MEC is low. No metals above the human health MSSLs were reported within the munitions response (MR) area. Explosive compounds were not detected above reporting limits in any surface soil samples at this site.

In 2006, hunters found 40 mm parts and debris from rocket fins. Joggers have also noted finding debris.

A RI was completed in FY11. No MEC items were found at the site. Fate and transport of MC is not a concern at the site. Thallium and arsenic were identified as potential COCs in in sediments.

An FS was finalized in FY13. Based on the results of this FS, LUCs is the most cost-effective alternative considering the relatively low risk posed by MEC and MC at this site.

**Site ID: MCAAP-005-R-02**  
**Site Name: Mortar Range Impact Area**

The DD was finalized in FY14. The final DD identifies LUCs as the remedy for the site considering the relatively low risk posed by MEC and MC, and the minimal effect of performing the additional investigation on the overall risk profile. LTM will consist of five-year reviews, MEC engineering controls, and MEC institutional controls.

**CLEANUP/EXIT STRATEGY**

LTM will consist of five-year reviews and MEC institutional controls.

# Site ID: MCAAP-006-R-01

## Site Name: Scrap Metal Disposal Yard

### STATUS

**Regulatory Driver:** CERCLA  
**MRSPP Score:** Evaluation pending  
**Contaminants of Concern:** Explosives  
**Media of Concern:** Soil

Phases	Start	End
PA.....	200212.....	200305
SI.....	200404.....	200603
RI/FS.....	201206.....	201511
<b>RIP Date:</b>	N/A	
<b>RC Date:</b>	201511	

### SITE DESCRIPTION

MCAAP-006-R-01 (Scrap Metal Disposal Yard) is located in a secure part of the plant, north of Brown Lake and C-Tree Road in the DRMO yard. DRMO is responsible for expediting the disposal of equipment and materials for the DoD at the customer level.

The Scrap Metal Disposal Yard has been in operation since the 1950s as a pre-disposal treatment area and is approximately 17 acres in size. Topographically, the site is relatively flat. The surrounding topography slopes very gently to the southeast. Elevation of the site is approximately 750 feet above mean sea level. No vegetation exists on the surface of the site. Surface water bodies including streams and a man-made lagoon occur in the immediate vicinity of the site. Brown Lake is located approximately 4,000 feet to the southeast.

The US Army currently plans to relocate the DRMO operations and clear the site for future construction projects. The area has been the site of various environmental IRAs and RAs. Intrusive investigations and remedial efforts associated with MCAAP-46 have documented the discovery of various MECs within the yard.

Most recently (in 2004) the following MECs were found:

- One unspent munitions (discovered during excavation activities on Feb. 18, 2004)
- Two 120 mm armor piercing rounds with ballistic windshields and tracers (discovered during excavation activities on Feb. 23, 2004. The rotating bands were determined to be uncut. Following examination by UXO personnel, it was determined that the rounds were inert.)
- One 40 mm and one 75 mm inert projectiles (discovered during excavation activities on March 3, 2004.)
- Two 50 mm armor piercing rounds inert rounds of ammunition (discovered during excavation activities on March 18, 2004.)
- One 5-inch rocket warhead (discovered during excavation activities in backfill material near the railroad on March 24, 2004.

In 2014, the work plan was submitted to ODEQ and the RI conducted. Additional RI work is anticipated in FY15 followed by an RI report, FS, PP and DD. Completion of the RI/FS report is anticipated in 2016. Out-year RAs may be required after the RI/FS is completed; however, it is too early in the RI process to determine what out-year RAs will be required.

### CLEANUP/EXIT STRATEGY

Based on the results of RI, an FS will be drafted and finalized in FY16. Future out-year costs will be determined after the completion of the RI/FS.

## Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
MCAAP-005-R-01	MORTAR RANGE NORTH SHORE	200603	SI (March 2006) determined there was no contamination on this site.
PBA@MR MCAAP	PBA@MR MCAAP	201203	Site is closed. Progress of all the sites covered in the PBA are now tracked at the individual site level.



# MMRP Schedule

**Date of MMRP Inception** 200212

## **Past Phase Completion Milestones**

### **2003**

PA (MCAAP-001-R-01 - SCRAP METAL DISPOSAL AREA, MCAAP-002-R-01 - WOOD SCRAP YARD, MCAAP-003-R-01 - ABANDONED LANDFILL, MCAAP-004-R-01 - GROUP 41 LC LAGOON & LANDFILL AREA, MCAAP-005-R-01 - MORTAR RANGE NORTH SHORE, MCAAP-005-R-02 - Mortar Range Impact Area, MCAAP-006-R-01 - Scrap Metal Disposal Yard, PBA@MR MCAAP - PBA@MR MCAAP)

### **2006**

SI (MCAAP-001-R-01 - SCRAP METAL DISPOSAL AREA, MCAAP-002-R-01 - WOOD SCRAP YARD, MCAAP-003-R-01 - ABANDONED LANDFILL, MCAAP-004-R-01 - GROUP 41 LC LAGOON & LANDFILL AREA, MCAAP-005-R-01 - MORTAR RANGE NORTH SHORE, MCAAP-005-R-02 - Mortar Range Impact Area, MCAAP-006-R-01 - Scrap Metal Disposal Yard, PBA@MR MCAAP - PBA@MR MCAAP)

### **2012**

RI/FS (PBA@MR MCAAP - PBA@MR MCAAP)

IRA (MCAAP-001-R-01 - SCRAP METAL DISPOSAL AREA, MCAAP-002-R-01 - WOOD SCRAP YARD, MCAAP-003-R-01 - ABANDONED LANDFILL, MCAAP-004-R-01 - GROUP 41 LC LAGOON & LANDFILL AREA, MCAAP-005-R-02 - Mortar Range Impact Area, PBA@MR MCAAP - PBA@MR MCAAP)

## **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:** 201609

**Schedule for Next Five-Year Review:** 2016

**Estimated Completion Date of MMRP at Installation (including LTM phase):** 204509

## MCALESTER ARMY AMMUNITION PLANT MMRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-001-R-01	SCRAP METAL DISPOSAL AREA	RA(C)						
		LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-002-R-01	WOOD SCRAP YARD	RA(C)						
		LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-003-R-01	ABANDONED LANDFILL	RA(C)						
		LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-004-R-01	GROUP 41 LC LAGOON & LANDFILL AREA	RA(C)						
		LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-005-R-02	Mortar Range Impact Area	RA(C)						
		LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
MCAAP-006-R-01	Scrap Metal Disposal Yard	RI/FS						

**MCALESTER ARMY AMMUNITION PLANT**  
**Army Defense Environmental Restoration Program**  
**Compliance Restoration**

## CR Summary

**Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count:** 3/0

### Installation Site Types with Future and/or Underway Phases

- 1 Contaminated Fill  
(CCMCAAP-050)
- 1 Contaminated Ground Water  
(CCMCAAP-051)
- 1 Contaminated Sediments  
(CCMCAAP-049)

### Most Widespread Contaminants of Concern

Explosives, Metals, Munitions constituents (MC), Volatiles (VOC)

### Media of Concern

Groundwater, Sediment, Soil

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

Site ID	Site Name	Action	Remedy	FY
N/A				

### Duration of CR

**Date of CR Inception:** 199203

**Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC):** 201704/201704

**Date of CR completion including Long Term Management (LTM):** 201704

## CR Contamination Assessment

### Contamination Assessment Overview

Environmental restoration activities include the IRP and MMRP. On Dec. 29, 2008, the Office of the Deputy Under Secretary of Defense for Installations and Environment, [ODUSD(I&E)], issued an interim policy for DERP eligibility that rescinded the 1986 eligibility date for the IRP and the 2002 eligibility date for the MMRP. This made many sites previously addressed in the Army's Compliance-related Cleanup (CC) program eligible for the DERP. Sites that are now eligible for the Munitions Response (MR) program have been migrated from Army Environmental Database-Compliance-related Cleanup (AEDB-CC) and given the naming convention of other MR sites. The newly eligible non-MR type sites are considered to be Installation Restoration (IR) sites; however, the newly eligible sites are being coded as CR in AEDB-R to distinguish them from the original IR sites and IR metrics.

### Cleanup Exit Strategy

Conduct a CMS, perform an RA and document site closeout.

## CR Previous Studies

**Title**

**Author**

**Date**

There are no Previous Studies

# **MCALESTER ARMY AMMUNITION PLANT**

## **Compliance Restoration**

### **Site Descriptions**

**Site ID: CCMCAAP-049**

**Site Name: Soils Around Case Loading Bldg**

**STATUS**

**Regulatory Driver:** RCRA  
**Contaminants of Concern:** Explosives, Volatiles (VOC)  
**Media of Concern:** Sediment, Soil

<b>Phases</b>	<b>Start</b>	<b>End</b>
RFA.....	201201.....	201212
CS.....	201201.....	201212
RFI/CMS.....	201408.....	201610
CMI(C).....	201509.....	201704
<b>RIP Date:</b>	N/A	
<b>RC Date:</b>	201704	

**SITE DESCRIPTION**

MCAAP-049 (soils around case loading bldg) is located in a secure part of the plant, north of Brown Lake and C-Tree Road at the Case Loading Building on 40MM. The Case Loading Building (40MM Area) has been used for ammunition production (TNT) at MCAAP. During normal operations and building cleanup, process water becomes contaminated with TNT and other explosives and is given the term "pink water". Pink water flows into floor drains within the building and is piped into a pink water collection sump southeast of the building.

In October 2011, pink water was detected in a drainage ditch on the west side of the building. Upon investigation, pink water was found flowing from a pipe running out of a rain water collection sump located under the west side of the building. The cause for the pink water contamination in the rain water collection sump was initially believed to be from fugitive TNT dust accumulation. A temporary piping and collection tank were installed to capture any remaining pink water from the rain water collection sump. A collection pit was dug into the drainage ditch to aid the pumping of the pink water during cleanup. The collection pit remains to capture any pink water leaching from the gravel area beneath the railroad tracks and around the building. Testing was done over the course of a year to determine if explosive levels in the water were improving. As of December 2012, pink water can still be observed in the drainage ditch and no improvements are evident in the water's test results. The source of the pink water was recently determined to be a broken pipe under the building running from the floor drains to the southeast collection sump. To prevent further contamination the building was directed to stop generating pink water, which does not impact continued operations. In 2013, a new pink water sump and trough was installed for the floor drains.

In FY14 a PBA was awarded to address the RFI and CMS which will be completed in FY15 and FY16. The remaining cost to complete for the site includes final RA and a clean closure report.

**CLEANUP/EXIT STRATEGY**

Conduct a CMS, perform an RA and document site closeout.



**Site ID: CCMCAAP-050**  
**Site Name: Ballast Material Area - TTF**

**STATUS**

**Regulatory Driver:** RCRA

**Contaminants of Concern:** Metals, Munitions constituents (MC)

**Media of Concern:** Soil

<b>Phases</b>	<b>Start</b>	<b>End</b>
RFA.....	201209.....	201211
CS.....	201209.....	201211
RFI/CMS.....	201408.....	201608
CMI(C).....	201509.....	201704

**RIP Date:** N/A

**RC Date:** 201704

**SITE DESCRIPTION**

This site is located on the northeast section of the installation in the DAC transportation test facility near Buildings 418 and 419. In particular, the area just east of Building 418 and between the gravel parking lot and the vehicle test track. According to DAC personnel, inert ballast material was dumped in this location in order to fill a low lying area.

The site requires a RFI to determine the nature and extent of the contamination followed by CMS, final RA and a clean closure report.

In FY14 a PBA was awarded to address RFI, a source removal action and CMS which will be completed in FY15 and FY16. It is assumed that the remaining cost to complete for the site will be a clean closure report after the source removal action has been completed under the existing contract.

**CLEANUP/EXIT STRATEGY**

Conduct a CMS, perform a RA and document site closeout.

**Site ID: CCMCAAP-051**

**Site Name: PCP Contamination-Vicinity Ind Area**

**STATUS**

**Regulatory Driver:** RCRA  
Contaminants of Concern: Metals, Volatiles (VOC)  
Media of Concern: Soil

<b>Phases</b>	<b>Start</b>	<b>End</b>
RFA.....	199203.....	200903
CS.....	200903.....	201209
RFI/CMS.....	201401.....	201610

**RIP Date:** N/A  
**RC Date:** 201610

**SITE DESCRIPTION**

The area around Building 628 (the Former Service Station) at the MCAAP has been investigated several times since a spill occurred there in 1992. All of the investigations have focused on petroleum products with most of the sampling including selected VOCs and TPH. After the investigation of the 1992 spill, a French drain with a turbine ventilator was installed to remove volatiles from the groundwater around building 628.

Beginning in 2009, investigation samples were further analyzed for SVOCs and, in some cases, herbicides, at the recommendation of the contractor who had remediated the tank area north of the site. These results have indicated PCP at more than a magnitude above the acceptable drinking water level of 1 ppb. Possible sources of the PCP include the Lumber Treatment Building, Railroad Car Repair Shop, and Railroad Building. PCP has not been used at any of these locations for more than 20 years.

The site is located approximately 0.5 mile from Brown Lake which is the drinking water supply for MCAAP and several surrounding communities, including Savanna and Heywood. The ODEQ has expressed concern over this contamination because of potential impacts to the drinking water supply.

The site was created in 2013 to allow an investigation be performed to determine the source and limits of this contamination, and will likely be accelerated, to minimize any potential impacts to the public.

**CLEANUP/EXIT STRATEGY**

Conduct an RFI/CMS to determine the source and limits of contamination.

## Site Closeout (No Further Action) Summary

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

## CR Schedule

**Date of CR Inception:** 199203

### **Past Phase Completion Milestones**

#### **2009**

RFA (CCMCAAP-051 - PCP Contamination-Vicinity Ind Area)

#### **2012**

CS (CCMCAAP-051 - PCP Contamination-Vicinity Ind Area)

#### **2013**

RFA (CCMCAAP-049 - Soils Around Case Loading Bldg , CCMCAAP-050 - Ballast Material Area - TTF)

CS (CCMCAAP-049 - Soils Around Case Loading Bldg , CCMCAAP-050 - Ballast Material Area - TTF)

### **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:** 201704

**Schedule for Next Five-Year Review:** 2016

**Estimated Completion Date of CR at Installation (including LTM phase):** 201704

## MCALESTER ARMY AMMUNITION PLANT CR Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
CCMCAAP-049	Soils Around Case Loading Bldg	RFI/CMS						
		CMI(C)						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
CCMCAAP-050	Ballast Material Area - TTF	RFI/CMS						
		CMI(C)						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
CCMCAAP-051	PCP Contamination-Vicinity Ind Area	RFI/CMS						

## Community Involvement

**Technical Review Committee (TRC):** None

**Community Involvement Plan (Date Published):** 201405

**Restoration Advisory Board (RAB):** No

**Reason Not Established:** The community has expressed no sufficient, sustained interest in a RAB.

**Community Interest Solicited on:** 201503

### **Efforts Taken to Determine Interest**

MCAAP does not have a RAB or a TRC. The plant has surveyed the surrounding community on several occasions and determined that there is no community interest in forming a RAB. MCAAP published articles in the local newspaper on March 11, March 18, and March 25, 2015, to determine if there was any interest and/or whether anyone would like additional information concerning the MCAAP environmental restoration program.

### **Results**

No interest was shown.

### **Follow-up Procedures**

In 2017, solicitation will be made to determine if there is any public interest in the MCAAP environmental restoration program.

### **Additional Community Involvement Information**

The community involvement plan was updated in May 2014.

### **Administrative Record is located at**

McAlester Army Ammunition Plant  
1 C Tree Road  
McAlester, OK 74501  
918-420-6551

### **Information Repository is located at**

Oklahoma Department of Environmental Quality  
707 N Robinson  
Oklahoma City, OK 73102  
405-702-1000

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

**TAPP Title:** N/A

**Potential TAPP:** N/A

